Getting Ready for the
2015 Florida Standards Assessment (FSA)

Grade 7 Mathematics

Educators Resource — Spring 2015 FSA Mathematics
2014-15 Florida Standards Assessments ELA and Mathematics Fact Sheet
Equation Editor Item Tutorial [PDF]
FSA Scientific Calculator
Florida Computer-Based Testing Work Folder [PDF]
Spring 2015 Testing Times [PDF]
Grade 6 Mathematics Test Item Specifications [PDF] Grade 7 Mathematics Test Item Specifications [PDF] Grade 8 Mathematics Test Item Specifications [PDF]
Mathematics Test Design Summary – Updated 11-12-14[PDF]

Florida Department of Education
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MAFS.7.RP.1.1

A CALCULATOR IS ALLOWED

Juan learned that gear ratio refers to the number of times one gear rotates in relation to another gear. The ratio of the gears in the picture below is $1\frac{1}{2}$ to $\frac{1}{2}$.

1. Write two **unit** rates to represent the gear ratio above. (Numbers can be used more than once.)

$\frac{1}{2}$	
$\frac{1}{3}$	
$\frac{3}{2}$	
1	
$1\frac{1}{2}$	
3	

$\square : \square$

$\square : \square$

2. Explain what each unit rate means in the context of the problem.

3. A machine packs boxes at a constant rate of $\frac{2}{3}$ of a box every $\frac{1}{2}$ minute.

What is the number of boxes per minute that the machine packs?

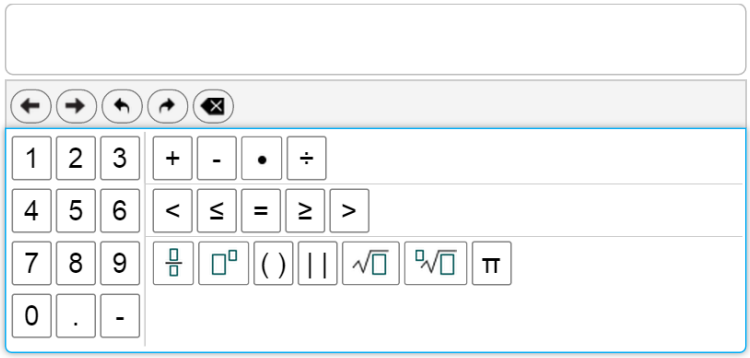
Ⓐ $\frac{1}{3}$

Ⓑ $\frac{3}{4}$

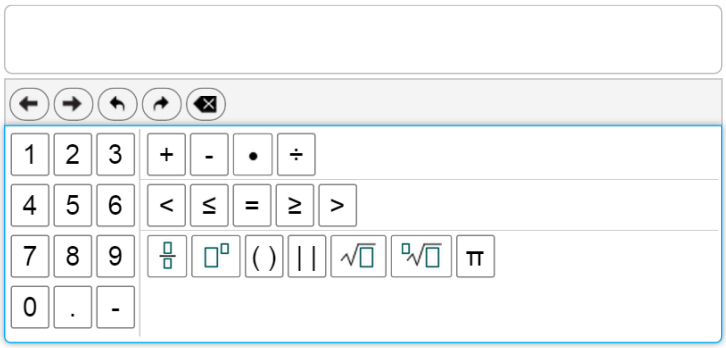
Ⓒ $1\frac{1}{6}$

Ⓓ $1\frac{1}{3}$

4. A. The fountain in the pond behind Kevin's school has a pump that recirculates 60 gallons of water every $\frac{1}{5}$ of an hour. Express this rate as a **unit** rate in gallons per hour.



B. The fountain in the pond at the public park near Kevin's house has a pump that recirculates 75 gallons of water in $\frac{1}{4}$ of an hour. Express this rate as a **unit** rate in gallons per hour.



C. Which fountain flows at a faster rate? Explain.

5.	Roy is going to increase the size of his patio to make room for a new BBQ grill. The ratio of the area of the old patio to the area of the new patio is $2\frac{1}{4} : 6\frac{3}{4}$. Convert this ratio to a unit rate and explain what this unit rate means in the context of this problem.

MAFS.7.RP.1.1 FSA Practice

A CALCULATOR IS ALLOWED

1. Robin is making bows to sell at her mother's yard sale. She will use $\frac{3}{4}$ foot of red ribbon and $\frac{2}{3}$ foot of blue ribbon to make each bow.

   A. What is the ratio of the length of red ribbon to blue ribbon?

   B. What is the ratio of the length of red ribbon to blue ribbon written as a unit rate?

$\frac{1}{8}$ $\frac{9}{8}$ $\frac{3}{4}$ 1 $\frac{2}{3}$ 8	☐ to ☐

   C. What is the ratio of the length of blue ribbon to red ribbon?

D. What is the ratio of the length of blue ribbon to red ribbon written as a unit rate?

$\frac{1}{8}$ $\frac{8}{9}$ $\frac{3}{4}$ 1 $\frac{2}{3}$ 8	☐ to ☐

2. Angel and Jayden were at track practice. The track is 25 kilometers around.

- Angel ran 1 lap in 2 minutes.
- Jayden ran 3 laps in 5 minutes.

A. How many minutes does it take Angel to run one kilometer? What about Jayden?

B. How far does Angel run in one minute? What about Jayden?

C. Who is running faster? Explain your reasoning.

3.	Molly ran $\frac{2}{3}$ of a mile in 8 minutes. If Molly runs at that speed, how long will it take her to run one mile?
4.	Travis was attempting to make muffins to take to a neighbor that had just moved in down the street. The recipe that he was working with required $3/4$ cup of sugar and $1/8$ cup of butter. Travis accidentally put a whole cup of butter in the mix. A. What is the ratio of sugar to butter in the original recipe? What amount of sugar does Travis need to put into the mix to have the same ratio of sugar to butter that the original recipe calls for? B. If Travis wants to keep the ratios the same as they are in the original recipe, how will the amounts of all the other ingredients for this new mixture compare to the amounts for a single batch of muffins? C. The original recipe called for 3/8 cup of blueberries. What is the ratio of blueberries to butter in the recipe? How many cups of blueberries are needed in the new enlarged mixture?
5.	This got Travis wondering how he could remedy similar mistakes if he were to dump in a single cup of some of the other ingredients. Assume he wants to keep the ratios the same. A. How many cups of sugar are needed if a single cup of blueberries is used in the mix? B. How many cups of butter are needed if a single cup of sugar is used in the mix? C. How many cups of blueberries are needed for each cup of sugar?

MAFS.7.RP.1.2

A CALCULATOR IS ALLOWED

1. Select each option that represents a proportional relationship between x and y.

Ⓐ

x	y
$1\frac{1}{2}$	6
$3\frac{1}{4}$	13
7	28

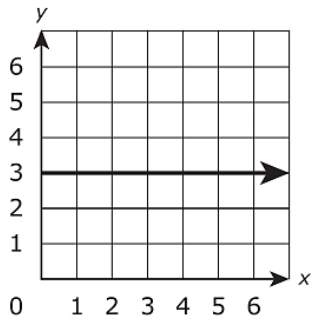
Ⓑ

x	y
4	1
5	2
9	6

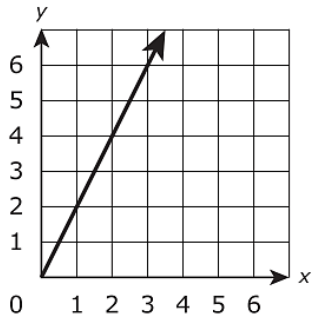
Ⓒ $y = \frac{7}{8}x$

Ⓓ $y = x + 1$

Ⓔ



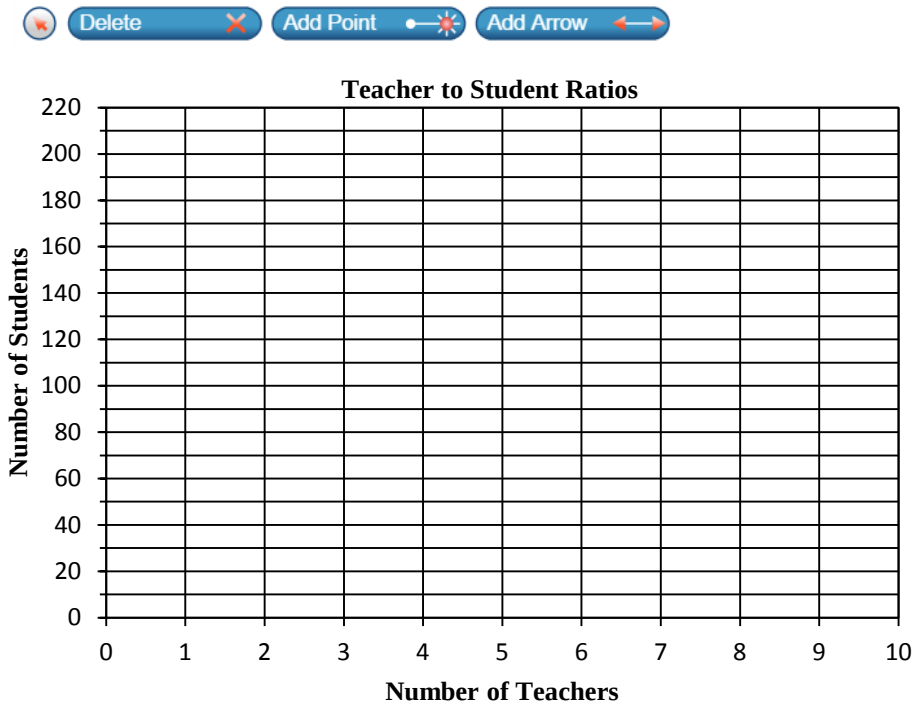
Ⓕ



2.

- Evergreen Elementary School has an average of six teachers per 138 second grade students.
- In third grade, there are 196 students for every seven teachers.
- The ratio of teachers to students in the fourth grade is three to 69.
- There are 207 fifth grade students for every nine teachers.

Part A: Graph the four teacher to student ratios as ordered pairs.



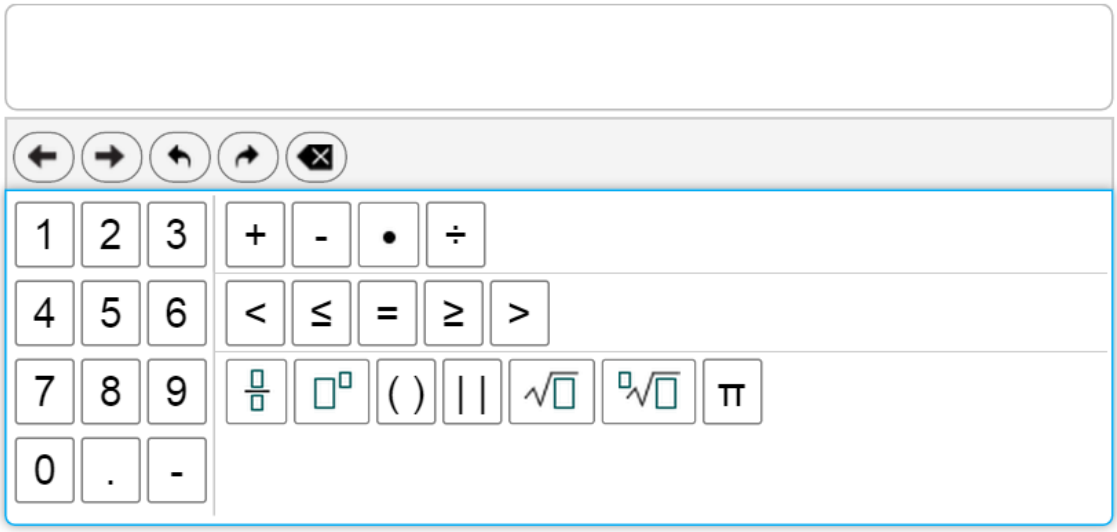
Part B: Use the graph to detrmine if the two quantities, number of teachers and number of students, are proportionally related. Explain.

Write your answer in the space provided.

3. This table shows a proportional relationship between x and y.

x	y
2	1.25
4	2.5
6	3.75
10	6.25

What is the constant of proportionality between x and y?
as a decimal.

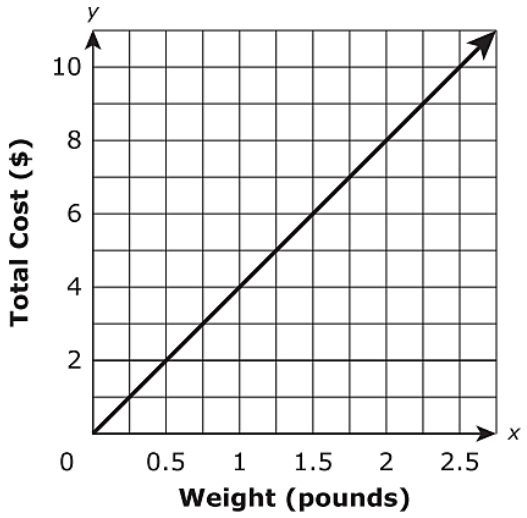


4. Hayden mixed 6 cups of blue paint with 8 cups of yellow paint to make green paint. To represent the relationship between the number of cups of blue paint, b, and the number of cups of yellow paint, y, needed to make the same shade of green paint, Hayden wrote the equation $b = \square y$.

What number should be placed in the box?

8 0.75 6 1.33	$b = \square y$

5. This graph shows the relationship between the pounds of cheese bought at a deli and the total cost, in dollars, for the cheese.



Select **each** statement about the graph that is true. Select **all** that apply.

Ⓐ The point (0,0) shows the cost is $0.00 for 0 pounds of cheese.

Ⓑ The point (0.25,1) shows the cost is $0.25 for 1 pound of cheese.

Ⓒ The point (0.5,2) shows that 0.5 pound of cheese costs $2.00.

Ⓓ The point (1,4) shows the cost is $4.00 for 1 pound of cheese.

Ⓔ The point (2,8) shows that 8 pounds of cheese cost $2.00.

MAFS.7.RP.1.2 – FSA Practice

A CALCULATOR IS ALLOWED

1. A business in the Florida Keys offers Key West Jet Ski Tours for the following rates:

Tour Prices

Time (in hours)	Price (in dollars)
$\frac{3}{4}$ hour	$90.00
$1\frac{1}{2}$ hours	$130.00
2 hours	$180.00

Are the two quantities, time and price, proportionally related? Explain.

Write your answer in the space provided.

2. Which equation has a constant of proportionality equal to 4?

Ⓐ $4y = 4x$

Ⓑ $4y = 12x$

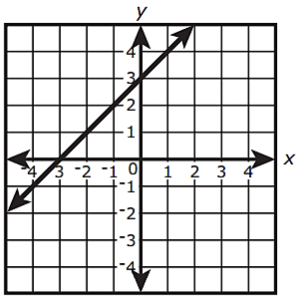
Ⓒ $3y = 4x$

Ⓓ $3y = 12x$

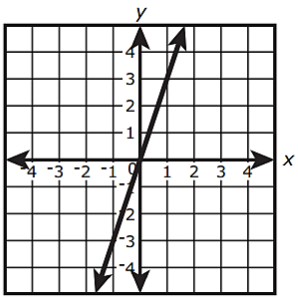
3. Which relationships have the same constant of proportionality between y and x as in the equation $y = \frac{1}{3}x$?

Select **each** correct answer.

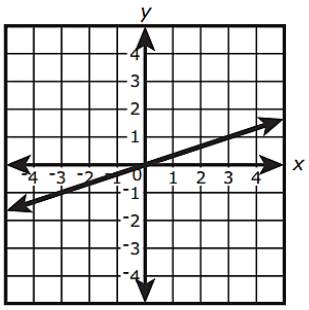
Ⓐ



Ⓑ



Ⓒ



Ⓓ

x	−1.5	0	1.6	9.7
y	−4.5	0	4.8	29.1

Ⓔ

x	−5.4	−2.7	1.5	2.4
y	−1.8	−0.9	0.5	0.8

4. The numbers of parts produced by three different machines are shown in the table.

Numbers of Machine Parts

Minutes	Machine Q	Machine R	Machine S
1	9	8	6
3	18	24	18
9	27	72	52

Only one of the machines produces parts at a constant rate. Which equation represents y, the number of parts produced in x minutes, for the one machine that produces parts at a constant rate?

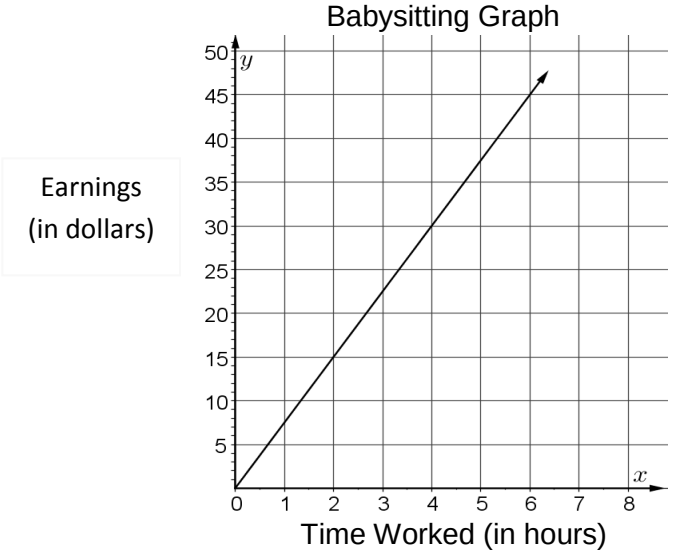
Ⓐ $y = 3x$

Ⓑ $y = 6x$

Ⓒ $y = 8x$

Ⓓ $y = 9x$

5. The amount Sandy earns from babysitting is proportional to the number of hours she works. The graph represents this proportional relationship.



A. Explain what the point (0, 0) represents in the context of this problem.
Write your answer in the space provided.

B. Explain what the point (6, 45) represents in the context of this problem.
Write your answer in the space provided.

C. Find the hourly rate that Sandy charges and write this as an ordered pair.
Write your answer in the space provided.

	MAFS.7.RP.1.3	• **A CALCULATOR IS ALLOWED**
1.	Use the information provided to answer Part A through Part D. The directions on a bottle of vinegar say, "mix 1 cup of vinegar with 1 gallon of water to make a cleaning solution." The ratio of vinegar to water is 1 to 16. **Part A** How many **cups** of water should be mixed with $\frac{1}{4}$ cup of vinegar to make the cleaning solution? **Part B** How many **fluid ounces** of vinegar should be mixed with 80 fluid ounces of water to make the cleaning solution? **Part C** The bottle contains 1 quart of vinegar. What is the **total number of quarts of cleaning solution** that can be made using the entire bottle of vinegar?	

	Part D A spray bottle holds up to 1 cup of the cleaning solution. When the spray bottle is full, what fraction of the cleaning solution is vinegar? Ⓐ $\frac{1}{17}$ Ⓑ $\frac{1}{16}$ Ⓒ $\frac{15}{16}$ Ⓓ $\frac{16}{17}$
2.	Use the information provided to answer Part A and Part B for question #2. A store owner paid $15 for a book. She marked up the price of the book by 40% to determine its selling price. **Part A** What is the selling price of the book? **Part B** A customer buys a different book that has an original selling price of $38. The book is discounted 25%. The customer must pay a 6% sales tax on the discounted price of the book. What is the total amount the customer pays for the discounted book?

3.	Tiffany plans to use $275 she earned from a summer job to buy some new clothes for school. She found several items she likes but is trying to decide if she has enough money to buy all of them. She wants to buy three pairs of jeans for $42 each and five shirts with an average cost of $27 per shirt. She will have to pay $6\frac{1}{2}$ % sales tax. A. If she buys all of these items, how much tax will she have to pay? B. Will she have enough money for the entire purchase? Explain how you know whether she will have enough money. Write your answer in the space provided.
4.	Today, gasoline prices are $3.44 per gallon. One year ago, gasoline prices were $3.75 per gallon. Determine the percent change in the gasoline price from a year ago to today. Show how you calculated this change and interpret its meaning in the context of this problem. Write your answer in the space provided.
5.	Kennedy wants to use an internet site to sell his game system. The website will charge him a fee that will be deducted from the selling price. A. Suppose the fee is $9\frac{1}{2}\%$ of the selling price. Determine the amount of the fee if Kennedy sells his system for $50. B. How much money will Kennedy receive after the fee has been deducted?

6.	A \$1,500 loan has an annual interest rate of $4\frac{1}{4}$% on the amount borrowed. How much time has elapsed if the interest is now \$127.50?

MAFS.7.RP.1.3-FSA Practice

A CALCULATOR IS ALLOWED

1. Use the information provided to answer Part A and Part B.

Part A

What was the selling price of each calendar last year?

Part B

The students in Naomi's class earned 20% of the money received from selling these calendars.

- They sold 650 calendars last year.
- They sold 600 calendars this year.

Based on the information, which statement is true?

Ⓐ The students in Naomi's class earned more money from this fund-raiser last year by $20.

Ⓑ The students in Naomi's class earned more money from this fund-raiser last year by $35.

Ⓒ The students in Naomi's class earned more money from this fund-raiser this year by $20.

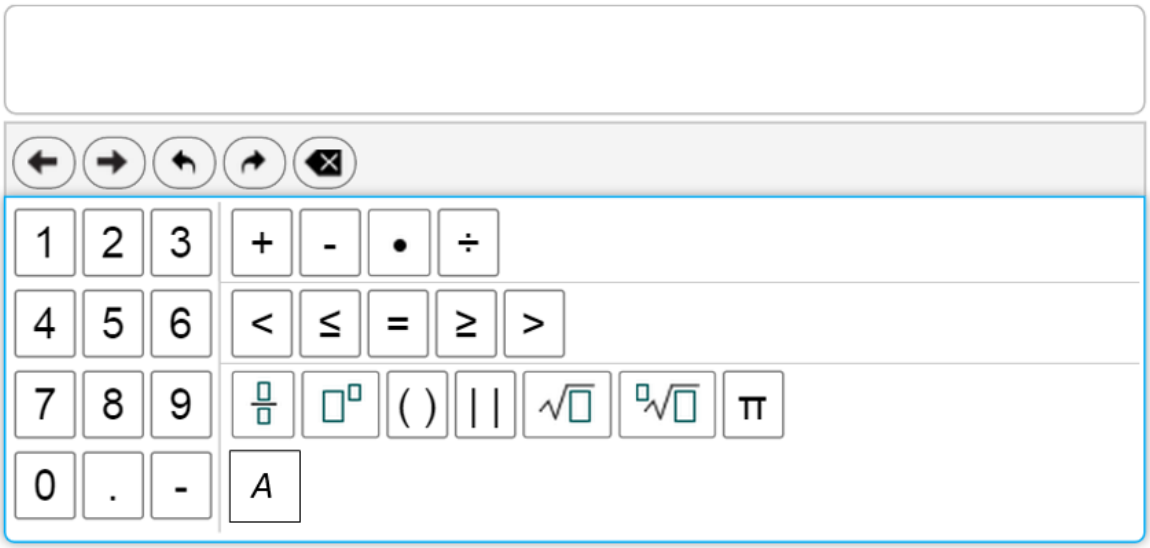
Ⓓ The students in Naomi's class earned more money from this fund-raiser this year by $35.

2. A recipe that makes 16 cookies calls for $\frac{1}{4}$ cup of sugar and $\frac{2}{3}$ cup of flour. Janelle wants to proportionally increase these amounts to get a new recipe using one cup of sugar.

A. Using the new recipe, how much flour should she use?

B. How many cookies can she make with the new recipe?

3.	You have a coupon worth $18 off the purchase of a scientific calculator. At the same time the calculator is offered with a discount of 15%, but no further discounts may be applied. For what tag price on the calculator do you pay the same amount for each discount?
4.	The sales team at an electronics store sold 48 computers last month. The manager at the store wants to encourage the sales team to sell more computers and is going to give all the sales team members a bonus if the number of computers sold increases by 30% in the next month. How many computers must the sales team sell to receive the bonus? Explain your reasoning. Write your answer in the space provided.
5.	Alexandra buys sweatshirts for $12 each. In her store, she sells each sweatshirt for $30. **Part A** As part of a promotion, Alexandra discounts the college sweatshirts by 25%. If a customer purchases 2 college sweatshirts at a sales tax of 4%, what is the total price for this customer? Show your work or explain your answer.

	Part B During a clearance sale, Alexandra discounts the Halloween sweatshirts by 55%. What is the percentage of profit Alexandra will make on each Halloween sweatshirt she sells? Show your work or explain your answer.
6.	Write an equation to find the amount of simple interest, $\boldsymbol{A}$, earned on a $\$\mathbf{6}00$ investment after $1\frac{1}{2}$ years if the interest rate is $\mathbf{2}\%$. 

MAFS.7.EE.1.1

A CALCULATOR IS ALLOWED

1. Which expressions are equivalent to $-2.5(1 - 2n) - 1.5n$?

Select **all** that apply.

Ⓐ $-2.5 - 3.5n$

Ⓑ $-2.5 + 3.5n$

Ⓒ $-2.5 - 6.5n$

Ⓓ $-2.5 - n(5 - 1.5)$

Ⓔ $-2.5 + n(5 - 1.5)$

2. Mark which expressions are equivalent to 8 – 2(5x – 3). Explain or show work to justify your decision.

Expression	Equivalent
A. $6(5x - 3)$	☐
B. $8 - 10x + 6$	☐
C. $8 - (10x - 6)$	☐
D. $8 - 10x - 6$	☐
E. $-10x + 14$	☐

Explanation

3. Which expressions are a factor of $-48xyz - 24xy + 40xyz$?

Select **all** that apply.

Ⓐ 4

Ⓑ 24

Ⓒ $3x$

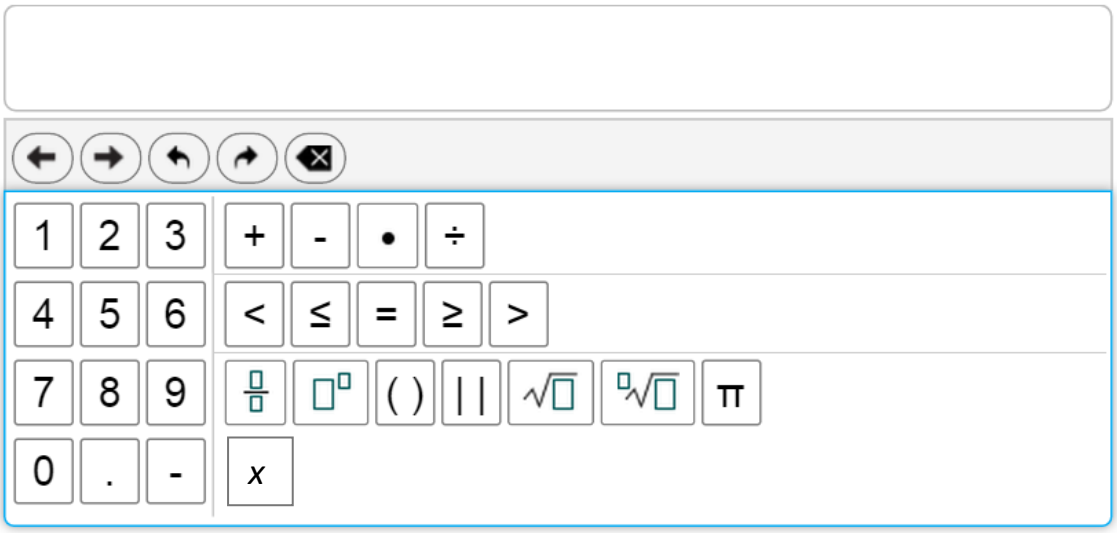
Ⓓ $8y$

Ⓔ $2xy$

Ⓕ $6xy$

Ⓖ xyz

4. What is the simplest form of $\frac{1}{3}(45x - \frac{18}{7})$?



5. Use factoring to rewrite each expression in an equivalent form. Use the fewest number of terms possible. Show each step of your work.

A. $4x + 8 + 2$

B. $3x - 12 + 6x + 9$

6. Patricia, Hugo and Sun work at a music store. Each week, Patricia works three more than twice the number of hours that Hugo works. Sun works 2 less than Hugo.

A. Let x represent the number of hours that Hugo works each week. The number of hours that Hugo, Patricia, and Sun work can be modeled is shown below. Write an expression that represents each person's number of hours.

Hugo _____

Patricia _____

	Sun _____ B. Model the total number of hours that Patricia and Sun work together. Draw the result below. Then write an expression for the drawing. C. Like tiles are tiles that have the same shape. Using your model, group like tiles together and remove the zero pairs. Draw the result below. Then write an expression for your drawing.

MAFS.7.EE.1.1-FSA Practice

A CALCULATOR IS ALLOWED

1. Which expression is equivalent to $\frac{1}{4}(8 - 6x + 12)$?

Ⓐ $\frac{7}{2}x$

Ⓑ $-\frac{13}{2}x$

Ⓒ $-6x + 14$

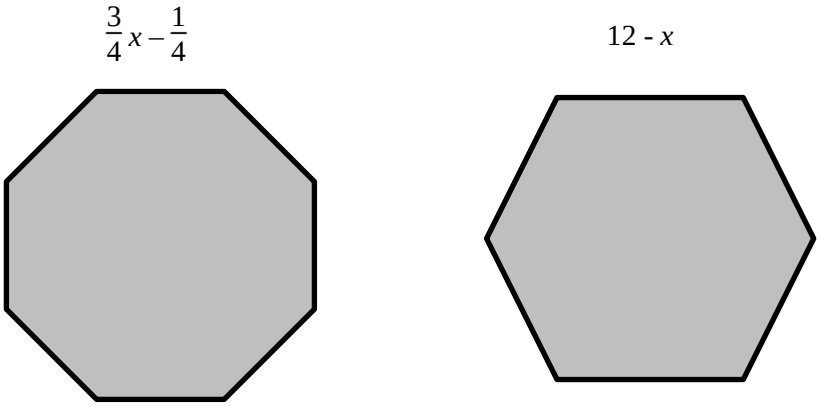
Ⓓ $-\frac{3}{2}x + 5$

_____

2. Mark all of the expressions in the table that are equivalent to: $-1.8\,x - 11.76\,y + 10.8$.
Explain or show work to justify your decisions.

	Expression	Equivalent	Explanation
A.	$-1.8x - 11.76y + (10.8 + 3.06) - 3.06$	☐	
B.	$-1.8(x + 11.76y - 10.8)$	☐	
C.	$\frac{1}{2} \cdot (-1.8x - 11.76y + 10.8) \cdot 2$	☐	
D.	$-1.8x - 11.76y + 0 \cdot 4.2z + 10.8$	☐	
E.	$-(1.8x - 11.76y + 10.8)$	☐	

3. A regular octagon has a side length of $\frac{3}{4}x - \frac{1}{4}$. A regular hexagon has a side length of $12 - x$.



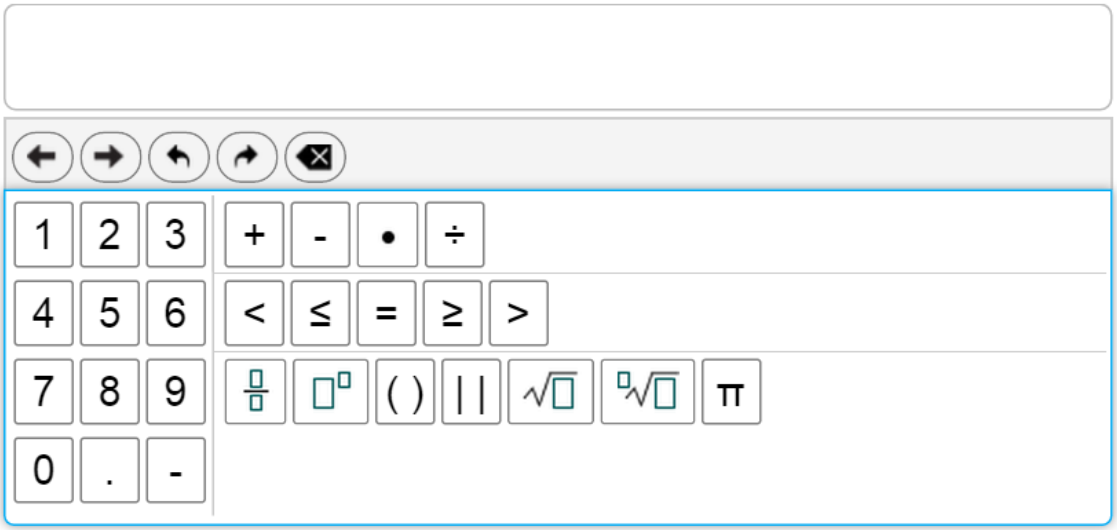
The difference between the *perimeters* of the two shapes is represented by the expression $8\left(\frac{3}{4}x - \frac{1}{4}\right) - 6(12 - x)$.

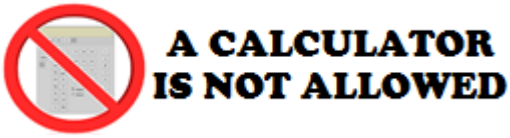
Write an expression equivalent to $8\left(\frac{3}{4}x - \frac{1}{4}\right) - 6(12 - x)$ using the fewest possible terms. Show all work neatly and clearly.

4. The students in Mr. Sanchez's class are converting distances measured in miles to kilometers. To estimate the number of kilometers, Abby takes the number of miles, doubles it, then subtracts 20% of the result to create the expression, $2m - 0.2(2m)$. Renato first divides the number of miles by 5, then multiplies the result by 8 to create the expression, $8\left(\frac{m}{5}\right)$.

Determine if the two expressions are equivalent.

5.	What is the difference of the two expressions? $(\frac{3}{7}x + 9)$ - $(\frac{2}{7}x - 3)$





MAFS.7.EE.1.2

1. A garden is 15-feet long by 5-feet wide. The length and width of the garden will each be increased by the same number of feet. This expression represents the perimeter of the larger garden:

$$(x + 15) + (x + 5) + (x + 15) + (x + 5)$$

Which expression is equivalent to the expression for the perimeter of the larger garden?

Select **all** that apply.

Ⓐ $4x + 40$

Ⓑ $2(2x + 20)$

Ⓒ $2(x + 15)(x + 5)$

Ⓓ $4(x + 15)(x + 5)$

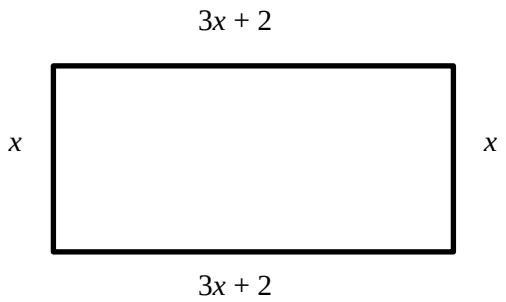
Ⓔ $2(x + 15) + 2(x + 5)$

Andrew sells treats from his ice cream cart. The items he sells along with their prices are shown in the table.

Item	Price	Quantity
Frosty Mango Pop	$1.75	*a*
Frozen Fruit Yogurt	$2.25	*b*
Sundae Swirl Cup	$2.75	*a*
Chocolate Chip Cone	$2.25	*c*
Fudge Sandwich	$1.75	*b*

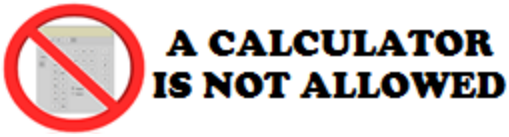
Suppose Andrew sells the quantities of each item given by the variables in the table.

2. What does the expression $1.75a + 2.25b + 2.75a + 2.25c + 1.75b$ represent in the context of this problem?

3.	An expression equivalent to the one above is $4.5a + 4b + 2.25c$. What does the first expression show about the quantities in this problem that the second expression does not show?
4.	The width of the rectangle is x inches and the length is $(3x + 2)$ inches.  Brit represented the perimeter of the rectangle using the expression: $x + (3x + 2) + x + (3x + 2)$. Explain how Brit's expression represents the perimeter of the rectangle. Write your answer in the space provided.

5.	Abbey represented the perimeter of the rectangle with the expression $8x + 4$. Determine if Abbey's expression is equivalent to Brit's expression. Justify your reasoning. Write your answer in the space provided.
6.	Explain what the second expression, $8x + 4$, indicates about finding the perimeter of the rectangle. Write your answer in the space provided.

MAFS.7.EE.1.2-FSA Practice



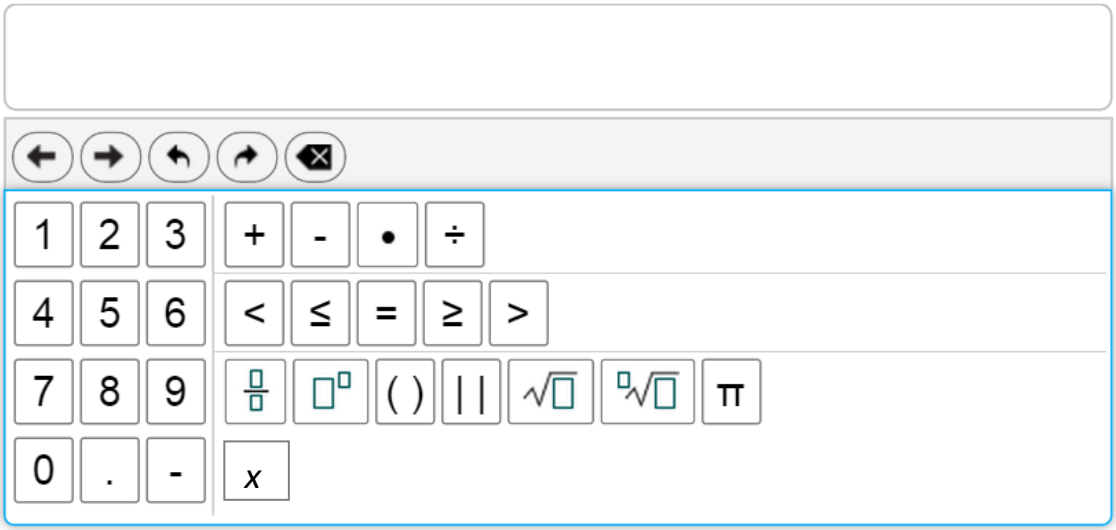
1. Which expression is not equivalent to the other three?
   a. −8−7n+16n
   b. 9(n−8)
   c. n−8+8n
   d. 9n−8

2. Why are the expressions 3(y−2)+2(y−2) and 5(y−2) equivalent? Justify your answer.

   Write your answer in the space provided.

3. Malia is at an amusement park. She bought 14 tickets, and each ride requires 2 tickets.

   Write an expression that gives the number of tickets Malia has left in terms of x, the number of rides she has already gone on. Find at least one other expression that is equivalent to it.



4.	$14-2x$ represents the number of tickets Malia has left after she has gone on x rides. How can each of the following numbers and expressions be interpreted in terms of tickets and rides? 14 -2 $2x$ Write your answer in the space provided.
5.	$2(7-x)$ also represents the number of tickets Malia has left after she has gone on x rides. How can each of the following numbers and expressions be interpreted in terms of tickets and rides? 7 $(7-x)$ 2 Write your answer in the space provided.
6.	Select all the expressions that are equivalent to each other. ☐ A. $2(1+2b+3a)$ ☐ B. $2(1+2a)+2(a+2b)$ ☐ C. $6a+2+4b$ ☐ D. $2(3a+1)+4b+1$

MAFS.7.EE.2.3

A CALCULATOR IS ALLOWED

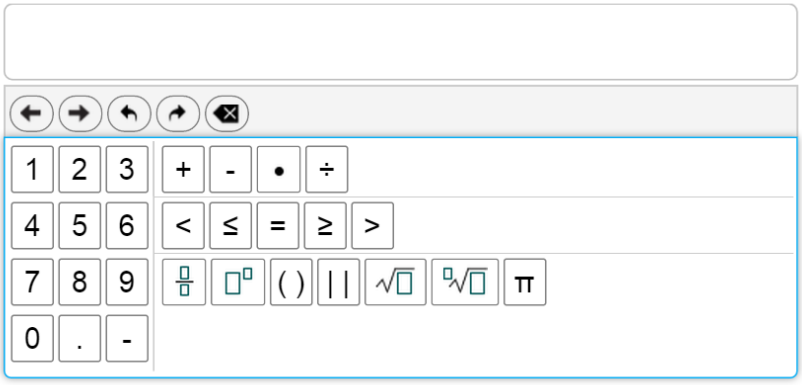
1. Use the information provided to answer Part A and Part B.

Each bulleted statement describes how the amount of income tax is determined for yearly taxable incomes in different ranges.

- Yearly taxable incomes of $8,925 or less are taxed at a flat rate of 10%.
- For yearly taxable incomes from $8,926 to $36,250, the first $8,925 is taxed at 10% and any income beyond $8,925 is taxed at 15%.
- For yearly taxable incomes greater than $36,250, the first $8,925 is taxed at 10%, the next $27,325 is taxed at 15%, and any income beyond $36,250 is taxed at 25%.

Part A

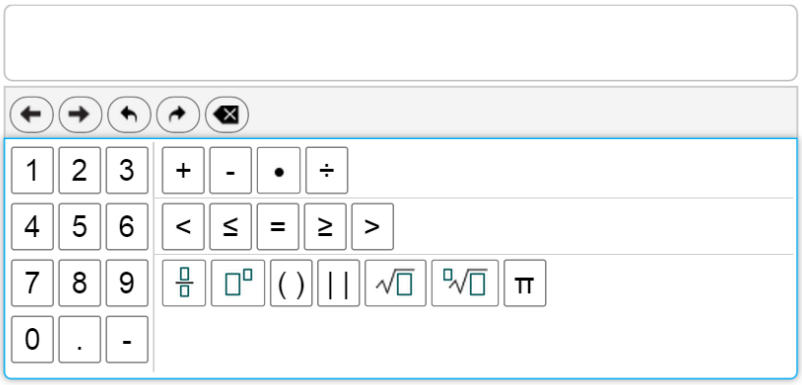
Mr. Vance's yearly taxable income is $35,675. What is the dollar amount taken out for taxes based on Mr. Vance's taxable income?



Part B

Mr. Rivera's taxable income is $20 each hour before taxes are taken out. Mr. Rivera worked a total of 40 hours each week for 50 weeks.

What is the dollar amount, to the nearest dollar, taken out for taxes based on Mr. Rivera's taxable income?



2.	Use the information provided to answer Part A and Part B. Today, Joelle walked 20 minutes at a rate of 3 miles per hour, and she ran 15 minutes at a rate of 6 miles per hour. **Part A** How many total miles did Joelle travel while walking and running? **Part B** Tomorrow, Joelle wants to travel a total of 4 miles by walking and running. She plans to run for 20 minutes at a rate of 6 miles per hour. How many **minutes** should she walk at a rate of 3 miles per hour to finish traveling the 4 miles?

3. Use the information provided to answer Part A and Part B.

A teacher surveyed students in four classes to determine the location for a field trip. Each student chose only one location. The table shows the number of students from each class who chose each location.

Field Trip Choices

Class	Number of Students Who Chose the Zoo	Number of Students Who Chose the Museum	Number of Students Who Chose the Planetarium
Class E	10	9	8
Class F	8	11	11
Class G	12	8	5
Class H	6	10	8

Part A

Determine the percent of students in each class who chose the museum. What is the order, from **least** to **greatest**,of the percents for each class?

Ⓐ Class E, Class F, Class G, Class H

Ⓑ Class G, Class E, Class F, Class H

Ⓒ Class G, Class E, Class H, Class F

Ⓓ Class H, Class F, Class E, Class G

Part B

The total number of students who chose the zoo is how many times as great as the total number of students who chose the planetarium?

Ⓐ 1

Ⓑ $1\frac{1}{18}$

Ⓒ $1\frac{1}{8}$

Ⓓ $1\frac{1}{9}$

4.	At the beginning of the month, Alexa's bank account contained $4329.97. She then made two deposits of $452.28 each and a withdrawal of $279.34. Alexa estimates that she has about $5000 in her account. Use a mental strategy to determine if her estimate is reasonable. Explain and describe your strategy. Write your answer in the space provided.
5.	Bruno noticed today's gasoline price at the local convenience store was advertised as $3.40 per gallon. This price is 15% above last year's price. Calculate last year's price, showing each step of your work.

MAFS.7.EE.2.3-FSA Practice

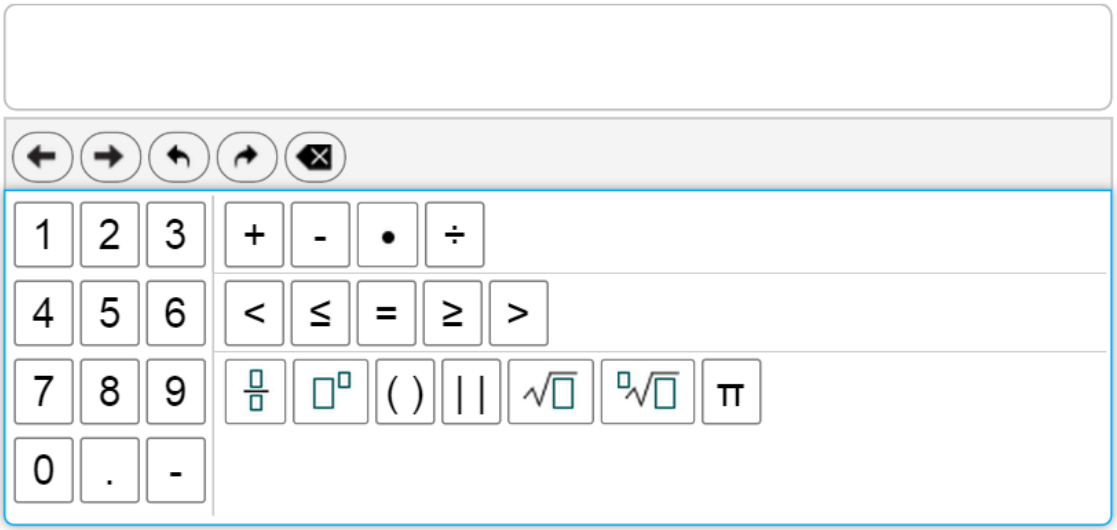
A CALCULATOR IS ALLOWED

1. A Florida factory produces fishing reels at a rate of 800 per day, every day. In April, they are forced to cut their production by $\frac{1}{5}$ due to an aluminum shortage.

A chain of sporting goods stores orders 20,000 fishing reels. Will the factory be able to produce enough fishing reels in the 30 days of April to meet this order? Explain how you know.

Write your answer in the space provided.

2. How many days will it take the factory to produce the 20,000 fishing reels?



3.	Brittany's family went to dinner at her favorite restaurant because her father had a coupon for 15% off. Her father said if she could correctly figure out the total cost of dinner, including the $6\frac{1}{2}$% sales tax, he would take them all out for frozen yogurt on the way home. The meal cost $53.52 without the discount. Brittany determined the total, with the discount and sales tax, will be $44.50. Did Brittany figure it out correctly? Show your work to support your answer.
4.	Jordan earned $200 this month delivering newspapers. His mom said he must put 20% into his savings account. He wants to buy headphones that cost $99.95 and two shirts that cost $17.99 each. He also has to pay 7% sales tax on his purchases. Jordan said, “No problem. I will put 20% into savings, buy the things I want, and still have about $10 left.” Use estimation to determine if Jordan’s calculation is reasonable. Show your work.

5. A restaurant makes a special seasoning for all its grilled vegetables. Here is how the ingredients are mixed:

$\frac{1}{2}$ of the mixture is salt

$\frac{1}{4}$ of the mixture is pepper

$\frac{1}{8}$ of the mixture is garlic powder

$\frac{1}{8}$ of the mixture is onion powder

When the ingredients are mixed in the same ratio as shown above, every batch of seasoning tastes the same.

Study the measurements for each batch in the table. Fill in the blanks so that every batch will taste the same.

	Batch 1	**Batch 2**	**Batch 3**
Salt (cups)	1	_____	_____
Pepper (cups)	_____	1	_____
Garlic powder (cups)	$\frac{1}{4}$	_____	1
Onion powder (cups)	_____	_____	1

MAFS.7.EE.2.4

A CALCULATOR IS ALLOWED

1. Two equations are shown.

- Equation 1: $-0.5x - 4 = 1.5$
- Equation 2: $-0.5(x - 4) = 1.5$

Select **each** statement that **must** be true.

Ⓐ x represents a negative value in both equations.

Ⓑ x represents a positive value in both equations.

Ⓒ x represents a positive value in one equation and a negative value in the other equation.

Ⓓ The value x represents in Equation 1 is less than the value x represents in Equation 2.

Ⓔ The value x represents in Equation 1 is greater than the value x represents in Equation 2.

Use the information provided to answer Problems 2 and 3.
Rebecca and Megan are shopping at a store that sells jewelry, scarves, and purses. The cost of all the items at the store include tax.

2. Rebecca buys some scarves that cost \$5 each and 2 purses that cost \$12 each. The cost of Rebecca's total purchase is \$39. What equation can be used to find n, the number of scarves that Rebecca buys?

Ⓐ $5 + 24n = 39$

Ⓑ $5n + 24 = 39$

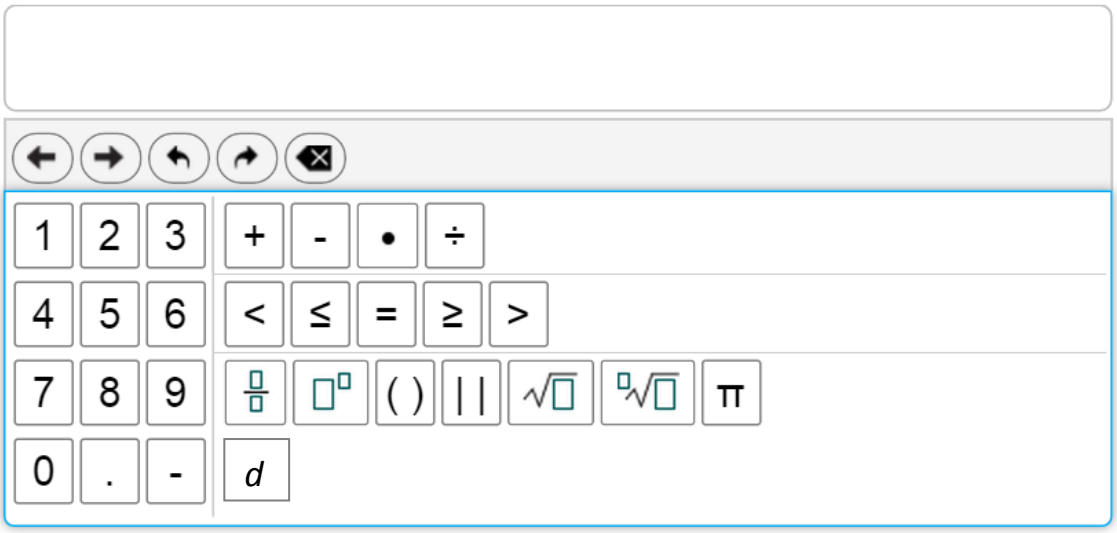
Ⓒ $(24 + 5)n = 39$

Ⓓ $24 \cdot 5 + n = 39$

3. Megan buys 3 bracelets and 3 necklaces. Each bracelet costs \$5. Megan pays the clerk \$40 and gets \$4 change. What is the cost, in dollars, of one necklace?

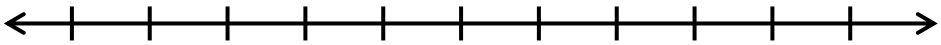
4. A scrapyard had 200 tons of recycled steel. They sold 15 tons per day for several days. If there are fewer than 80 tons left at the scrapyard, how many days, *d*, have passed?

A. Write an inequality to answer the question.



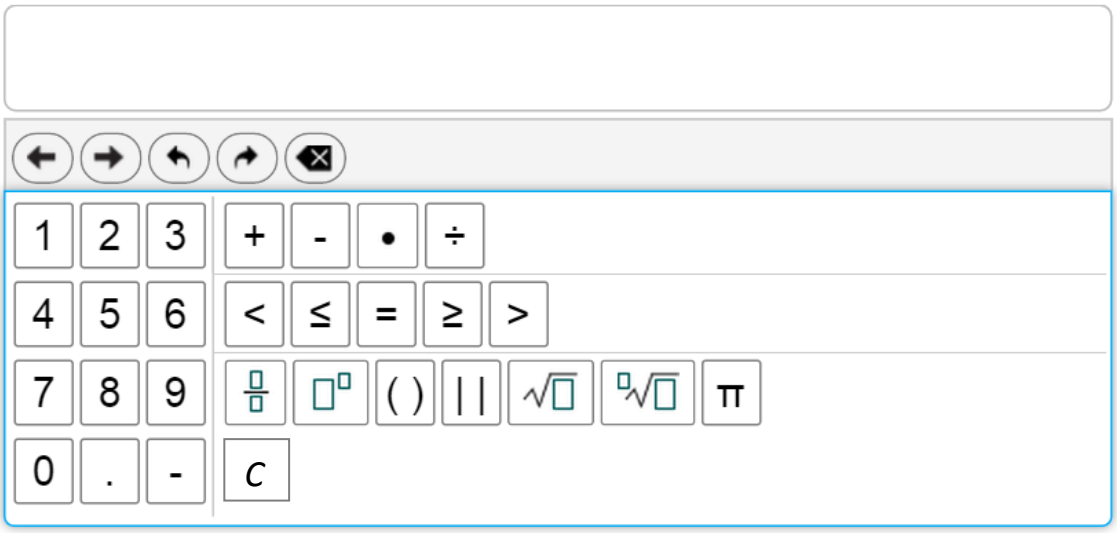
B. Solve the inequality.

C. Graph the solution set of the inequality. What does the solution of your inequality mean in terms of the answer to the question?



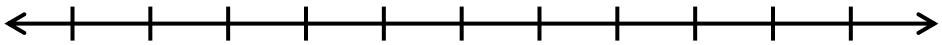
5. When carbon dioxide is frozen, it is called dry ice. In order to keep the carbon dioxide frozen, the temperature has to be $-109.3°$ Fahrenheit or lower. Fahrenheit is $\frac{9}{5}$ of the Celsius temperature plus 32 degrees.

A. Write an inequality to determine the Celsius temperatures, *C*, at which dry ice can be kept.



B. Solve your inequality.

C. Scale the number line below and graph the solution to the inequality.



MAFS.7.EE.2.4-FSA Practice

A CALCULATOR IS ALLOWED

1. Devon exercised the same amount of time each day for 5 days last week.

- His exercise included walking and swimming.
- Each day he exercised, he walked for 10 minutes.
- He exercised for a total of 225 minutes last week.

What is the number of minutes Devon swam **each** of the 5 days last week?

2. Jessica rented 1 video game and 3 movies for a total of $11.50.

- The video game cost $4.75 to rent.
- The movies cost the same amount each to rent.

What amount did Jessica pay to rent each movie?

3. A. Which of the equations below will answer the following question? Check all that apply.

"I think of a number, add 8 and then multiply by 3. My answer is 66. What was my number?

☐ A. $x + 24 = 66$

☐ B. $3x + 8 = 66$

☐ C. $3x + 24 = 66$

☐ D. $3(x + 8) = 66$

B. Find the value of x for the equation(s) for the number described.

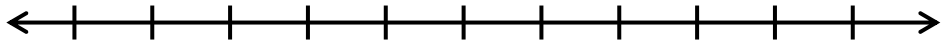
4. Aaron received a $25 gift card for his birthday. He used it to download a game for $3.99 and some songs for $0.99 each.

The following inequality models the relationship among the quantities in this scenario where *x* represents the number of songs Aaron can afford to download:

$$25 \geq 0.99x + 3.99$$

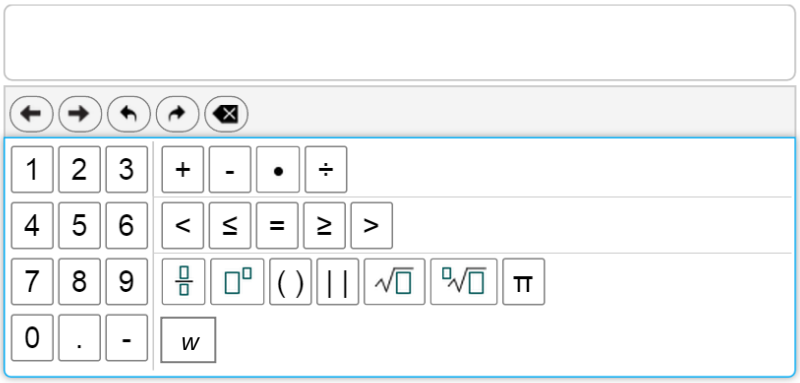
A. Show all work to solve the inequality.

B. Scale the number line below and graph the solution to the inequality. Explain the meaning of your solution within the context of the problem.



5. Jonathan wants to save up enough money so that he can buy a new sports equipment set that includes a football, baseball, soccer ball, and basketball. This complete boxed set costs $50. Jonathan has $15 he saved from his birthday. In order to make more money, he plans to wash neighbors' windows. He plans to charge $3 for each window he washes, and any extra money he makes beyond $50 he can use to buy the additional accessories that go with the sports box set.

A. Write inequality that represents the number of windows, *w*, Jonathan can wash in order to save at least the minimum amount he needs to buy the boxed set.

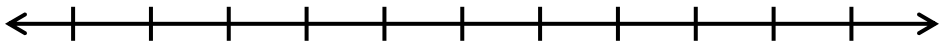


B. Solve the inequality.

C. What is a realistic number of windows for Jonathan to wash? How would that be reflected in the graph?

Write your answer in the space provided.

D. Scale the number line below and graph the solutions to the inequality.



MAFS.7.NS.1.1

Neutral-Questions for this standard may or may not allow the use of a calculator.

1. In which of these situations would the answer to the question be 0?

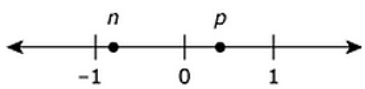
Ⓐ Teddy jumped into a pool from a diving board 8 feet above the water. He sank 8 feet and then swam straight up to the surface of the water. How many feet did Teddy swim?

Ⓑ Jerry left his house and walked 1.5 miles directly west. Then he walked 1.5 miles directly east. At this point, how many miles was Jerry from his house?

Ⓒ A trail begins at an elevation of -50 feet. The trail ends at an elevation of 50 feet. By how many feet does the elevation of the trail change from beginning to end?

Ⓓ The low temperature one day was $-3°$ Celsius. The high temperature that day was $3°$ Celsius. What is the difference between the low temperature and the high temperature that day?

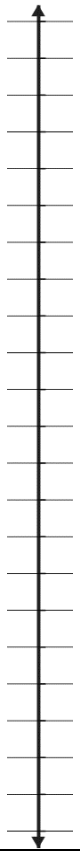
2. Two numbers, n and p are plotted on the number line shown.



The numbers $n - p$, $n + p$, and $p - n$ will be plotted on the number line.

Select an expression from each drop-down menu to make this statement true.

The number with the least value is Choose... (Choose... / n - p / n + p / p - n), and the number with the greatest value is Choose... (Choose... / n - p / n + p / p - n).

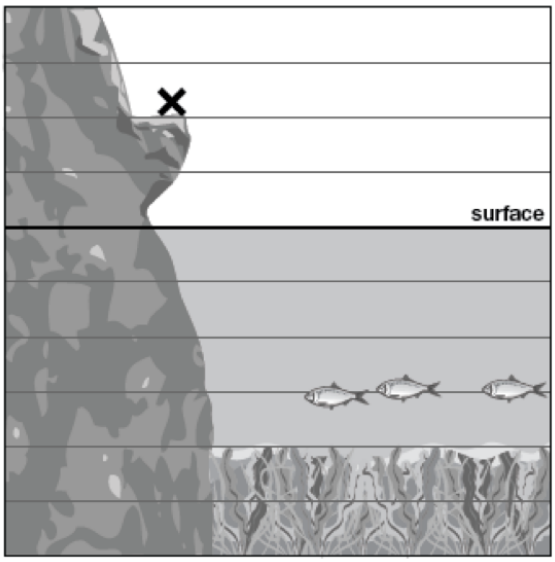
3.	Jonah is a novice when it comes to scuba diving. His first dive was 12 feet deep, and his second dive was 3 feet deeper than the first. Describe the depth of Jonah's second dive. Show your work on the vertical number line. 

4.	Which expressions are equivalent to $-3 - (7.5 + 4)$? Select **all** that apply. Ⓐ $(7.5 + 4) - 3$ Ⓑ $-(7.5 + 4) - 3$ Ⓒ $-(7.5 + 4) + 3$ Ⓓ $-3 - (4 + 7.5)$ Ⓔ $-(3 - 7.5) + 4$ Ⓕ $-3 + (-7.5 - 4)$ Ⓖ $-3 + (-7.5 + 4)$

MAFS.7.NS.1.1-FSA Practice

Neutral-Questions for this standard may or may not allow the use of a calculator.

1. **Part A**
DeWayne stands on a rock that is (+10) feet compared to the surface of the water, as shown with the **X** below. Place an X on the picture to show where (–10) feet is compared to the surface of the water.

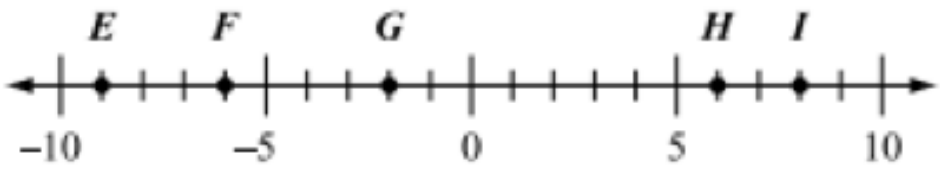


Part B
The bottom of the lake is 50 feet below the surface. What number can be used to represent the depth of the lake?

Part C
DeWayne starts at the surface of the water and swims to (–25) feet. From there he swims (+10) feet to see the fish and then back down (–5) feet to the seaweed. How many feet does DeWayne need to swim in order to get back to the surface?

Part D
What number would represent the surface of the water? Explain your reasoning.
Write your answer in the space provided.

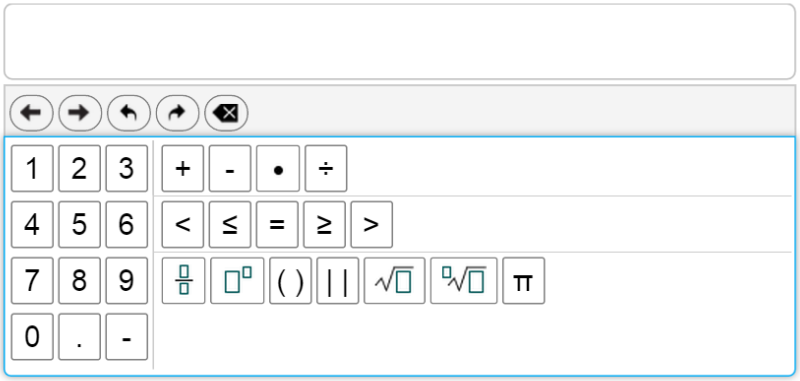
2. Ethan plotted points *E*, *F*, *G*, *H*, and *I* on a number line, as shown below.



A. Which two points that Ethan plotted represent numbers that have a sum of 0? Show or explain how you got your answer.

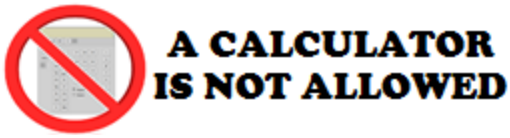
Write your answer in the space provided.

B. Write an equation using **subtraction** that could be used to find *d*, the distance, in units, between point *E* and point *I*.



	C. Solve the equation that you wrote in part (b). Show or explain how you got your answer. Write your answer in the space provided. Ethan wrote the expression below to represent the distance between point *G* and point *H*. $\lvert -2 \rvert + \lvert 6 \rvert$ D. What is the value of Ethan's expression? Explain how you know Ethan's expression is equivalent to the distance between point *G* and point *H*. Write your answer in the space provided.
3.	Which expressions are equivalent to $3\frac{1}{4} - \left(-\frac{1}{2}\right)$? Select all that apply. ☐ A. $3\frac{1}{4} - \left(\frac{1}{2}\right)$ ☐ B. $3\frac{1}{4} + \left(\frac{1}{2}\right)$ ☐ C. $3\frac{1}{4} + \left(-\frac{1}{2}\right)$ ☐ D. $3\frac{1}{4} + \left(+\frac{1}{2}\right)$ ☐ E. $-3\frac{1}{4} + \left(-\frac{1}{2}\right)$ ☐ F. $-3\frac{1}{4} + \left(+\frac{1}{2}\right)$

4.	Select the correct number from each drop-down menu to complete the equation. $\frac{1}{2} - \left(-2 + \frac{3}{4}\right) = \left(\right.$ Choose... $+$ Choose... $\left.\right) + \frac{1}{2}$ Choose... 2 -2 3/4 -4/3 Choose... 2 -2 4/3 -3/4



MAFS.7.NS.1.2

1. Which expressions have products that are positive? Select **all** that apply.

Ⓐ $(-5)(0.2)(-9)$

Ⓑ $\left(\frac{2}{3}\right)\left(\frac{3}{2}\right)\left(-\frac{1}{2}\right)$

Ⓒ $(6)(-3)(8)(-7)$

Ⓓ $\left(-4\frac{1}{3}\right)\left(-\frac{1}{4}\right)\left(-5\frac{1}{2}\right)\left(-\frac{7}{9}\right)$

Ⓔ $\left(\frac{5}{6}\right)(-10)\left(3\frac{4}{5}\right)(2)$

Ⓕ $(-1.2)(-3.5)(2.7)(-0.8)$

2. In which situation could the quotient of $-24 \div 3$ be used to answer the question?

Ⓐ The temperature of a substance decreased by 24°C per minute for 3 minutes. What was the overall change of the temperature of the substance?

Ⓑ A football team lost 24 yards on one play, then gained 3 yards on the next play. How many total yards did the team gain on the two plays?

Ⓒ Julia withdrew a total of $24 from her bank account over 3 days. She withdrew the same amount each day. By how much did the amount in her bank account change each day?

Ⓓ A cookie jar contains 24 cookies. Each child receives 3 cookies. How many children are there?

3. Which expressions are equivalent to $-3 \cdot \frac{4}{-5}$?

Select **each** correct answer.

Ⓐ $\frac{-3}{-5} \cdot 4$

Ⓑ $-\frac{3}{5} \cdot 4$

Ⓒ $\frac{-3 \cdot 4}{-3 \cdot (-5)}$

Ⓓ $-3 \cdot 4 \cdot \frac{-1}{5}$

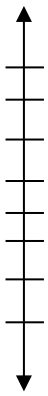
Ⓔ $\frac{3}{5} \cdot 4$

Ⓕ $\frac{3 \cdot 4}{5}$

4.	Convert each of the following fractions to a decimal using long division. A. $\frac{5}{6}$ B. $\frac{0}{17}$ C. Which of the fractions above are rational numbers? Explain how you know. Write your answer in the space provided.

5. The water level in Ricky Lake changes at an average of $-\frac{7}{16}$ inch every 3 years.

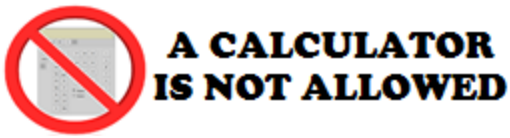
a. Based on the rate above, how much will the water level change after one year? Show your calculations and model your answer on the vertical number line, using 0 as the original water level.



b. How much would the water level change over a 7-year period?

c. When written in decimal form, is your answer to part (b) a repeating decimal or a terminating decimal? Justify your answer using long division.

MAFS.7.NS.1.2-FSA Practice



1. Roger is trying to understand why the product of a positive number and a negative number should be negative. How would you explain to Roger why $2 \cdot \frac{-4}{5}$ is a negative number?

   Write your answer in the space provided.

2. Which expressions are equivalent to $\frac{-5}{19}$?

   Select **each** correct answer.

   - ☐ A. $\frac{5}{19}$
   - ☐ B. $-\frac{5}{19}$
   - ☐ C. $\frac{-5}{-19}$
   - ☐ D. $\frac{5}{-19}$
   - ☐ E. $-\left(\frac{5}{19}\right)$
   - ☐ F. $-\left(-\frac{5}{19}\right)$

3. Mark which expressions below are equivalent to $-5 \div 20$.
Explain your reason for each choice.

		Equivalent
A.	$\frac{1}{-4}$	☐
B.	$-\frac{20}{5}$	☐
C.	-4	☐
D.	$-\left(\frac{-5}{-20}\right)$	☐
E.	$-\frac{1}{4}$	☐
F.	$\frac{-5}{-20}$	☐

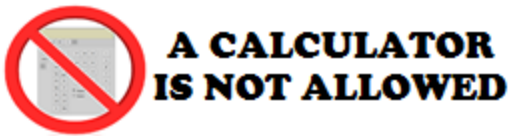
Explanation

4. Evaluate each expression using the properties of operations (e.g., the Associative, Commutative, and Distributive Properties) to make your work easier. Indicate where you used any properties to complete the problem.

	Associative Property	Distributive Property	Commutative Property
A. $(1\frac{1}{3} \bullet 2\frac{1}{2}) \bullet 3$	☐	☐	☐
B. $7 \bullet 2\frac{4}{5} + 7 \bullet 3\frac{1}{5}$	☐	☐	☐

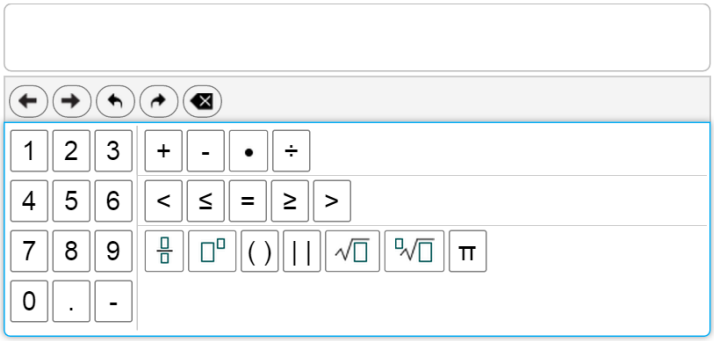
5.	Convert each of the following fractions to a decimal using long division. A. $\frac{13}{8}$ B. $\frac{32}{0}$ C. Which of the fractions above are rational numbers? Explain how you know. Write your answer in the space provided.

MAFS.7.NS.1.3



1. At the start of the month, the value of an investment was $48.45. By the end of the month, the value of the investment changed by a loss of $13.80.

What was the value, in dollars, of the investment at the end of the month?



2. Evaluate the expression. Show all of your work.

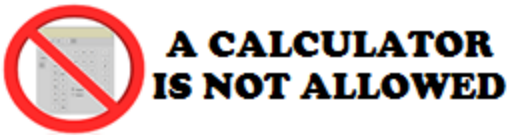
$$-10 - 6 + 4 \div (-0.5)(-2)$$

3. Adonica made snacks for her friends by putting equal amounts of trail mix into small bags. If she started wth $3\frac{4}{5}$ cups of trail mix and put $\frac{3}{4}$ cup into each bag, how many complete bags did she make?

Show your work and explain how you answered the question.

Write your answer in the space provided.

4.	Kay's mother taught her how to make handmade ornaments to sell at a craft fair. Kay rented a table at the fair for $30 and set up her work station. Each ornament that she makes costs approximately $2.50 for materials. She sells each ornament for $6.00. Kay does not want to lose money on her business. Her mother told her she needs to sell enough ornaments to at least cover her expenses (costs for materials and table rental). Kay figures that if she sells 8 ornaments, she covers her expenses and does not lose any money. Do you agree? Explain and show work to support your answer. Write your answer in the space provided.



MAFS.7.NS.1.3-FSA Practice

1. An airplane's altitude changed −378 feet over 7 minutes. What was the mean change of altitude in feet per minute?

2. The water around a Florida power plant in the winter averages 22.5 °C. Isaiah measured the water temperature, *t*, every week for five weeks and recorded the difference between each measured temperature and 22.5 °C by calculating *t* – 22.5.

Week	Temperature Difference from 22.5 °C
Week 1	2.5
Week 2	- 4.1
Week 3	- 0.5
Week 4	1.0
Week 5	- 3.4

What is the average of the **actual water temperatures** taken during the five weeks? Explain how you found your answer.

3. Travis received a letter from his bank saying that his checking account balance fell below zero. His account transaction log is shown below.

CHECK NO.	DATE	DESCRIPTION OF TRANSACTION	PAYMENT	DEPOSIT	BALANCE	
---	10/17	Beginning Balance	---	---	$367.50	
1125	10/18	CBC Audio (Headphones)	$62.00		−62.00	
					$305.50	Line 1
1126	10/22	NY Sport (Basketball Shoes)	$87.00		−87.00	
					$218.50	Line 2
Debit	10/25	Gary's Country Market	$38.50		−38.50	
					$180.00	Line 3
1127	10/25	Iggy's Skate Shop (Skateboard)	$188.00		−188.00	
					$8.00	Line 4
	10/25	Cash Deposit (Birthday Money)		$20.00	+20.00	
					$28.00	Line 5
Debit	10/30	McDonuts	$5.95		−5.95	
					$22.05	Line 6

On which line did Travis make a mathematical error? Explain Travis' mistake.

Write your answer in the space provided.

4. The bank charged Travis a $20 fee because his balance dropped below 0. He knows that he currently has an outstanding charge for $7.85 that he has not recorded yet. How much money will Travis have to deposit into his account so that the outstanding charge does not create another bank fee? Explain.

Write your answer in the space provided.

5.	The three seventh grade classes at Sunview Middle School collected the most boxtops for a school fundraiser, and so they won a $600 prize to share among them. Mr. Aceves' class collected 3,760 box tops, Mrs. Baca's class collected 2,301, and Mr. Canyon's class collected 1,855. How should they divide the money so that each class gets the same fraction of the prize money as the fraction of the box tops that they collected?

MAFS.7.G.1.1

A CALCULATOR IS ALLOWED

Use the information provided to answer Questions 1 and 2.

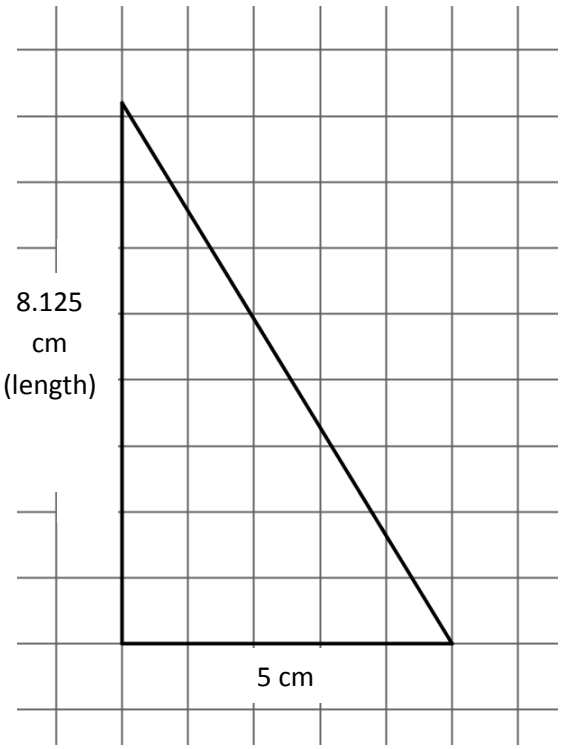
The scale on a map shows that 5 centimeters = 2 kilometers.

1. What number of centimeters on the map represents an actual distance of 5 kilometers?

2. What is the actual number of kilometers that is represented by 2 centimeters on the map?

Many supersonic jet aircraft in the past have used triangular wings called delta wings. Below is a scale drawing of the top of a delta wing.

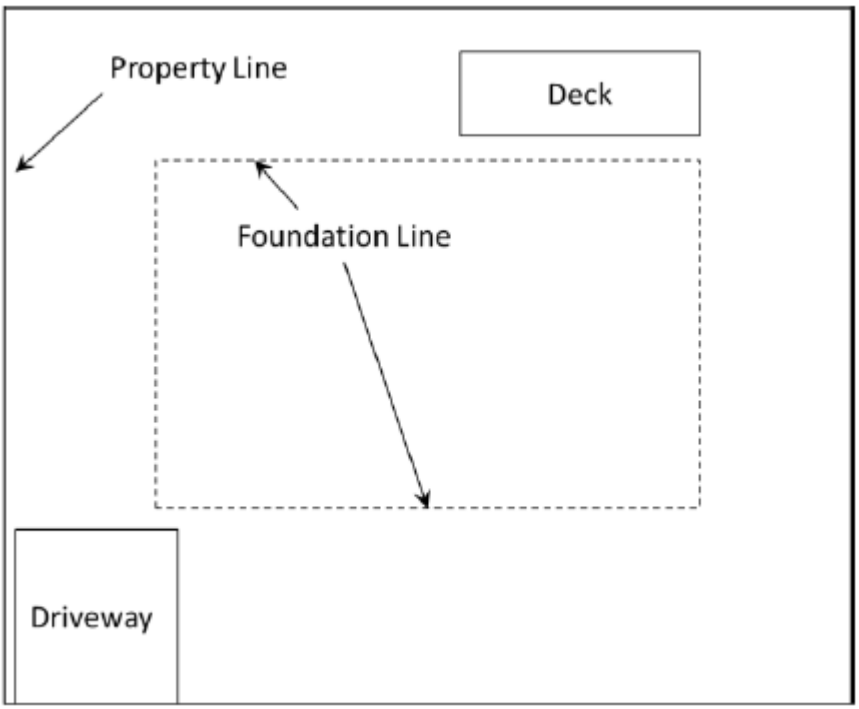
Scale: 2 centimeters (cm) in the drawing = 192 cm on the actual wing.



3. What is the length of the actual wing?

4. What is the area of the actual wing?

5. Over the break, your uncle and aunt ask you to help them cement the foundation of their newly purchased land and give you a top-view blueprint of the area and proposed layout. A small legend on the corner states that 4 inches of the length corresponds to an actual length of 52 feet.



A. What is the scale factor?

B. If the dimensions of the foundation on the blueprint are 11 inches by 13 inches, what are the actual dimensions in feet?

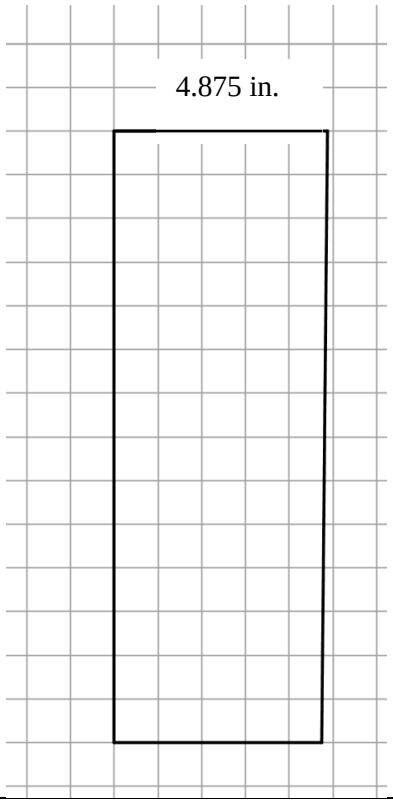
C. You're asked to go buy bags of dry cement and know that one bag covers 350 square feet. How many bags do you need to buy to finish this project?

MAFS.7.G.1.1-FSA Practice

A CALCULATOR IS ALLOWED

1. Racquel drew a picture of her school. She used the scale 1 cm : 3 m. Her drawing is 61 cm long. What is the length, in meters, of the actual school?

2. Each solar array wing on the International Space Station measures 39 feet by 112 feet. The scale drawing of a solar array wing shown below was made using a scale of 1 inch: 8 feet.



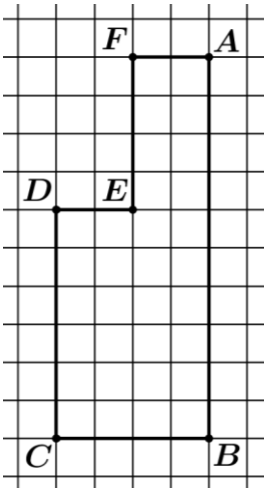
Write the ratio of the area of the wing in the drawing (square inches) to the area of an actual solar array wing (square feet) as a unit fraction.

3. Explain the relationship between your answer to Question 2 and the scale of the drawing.

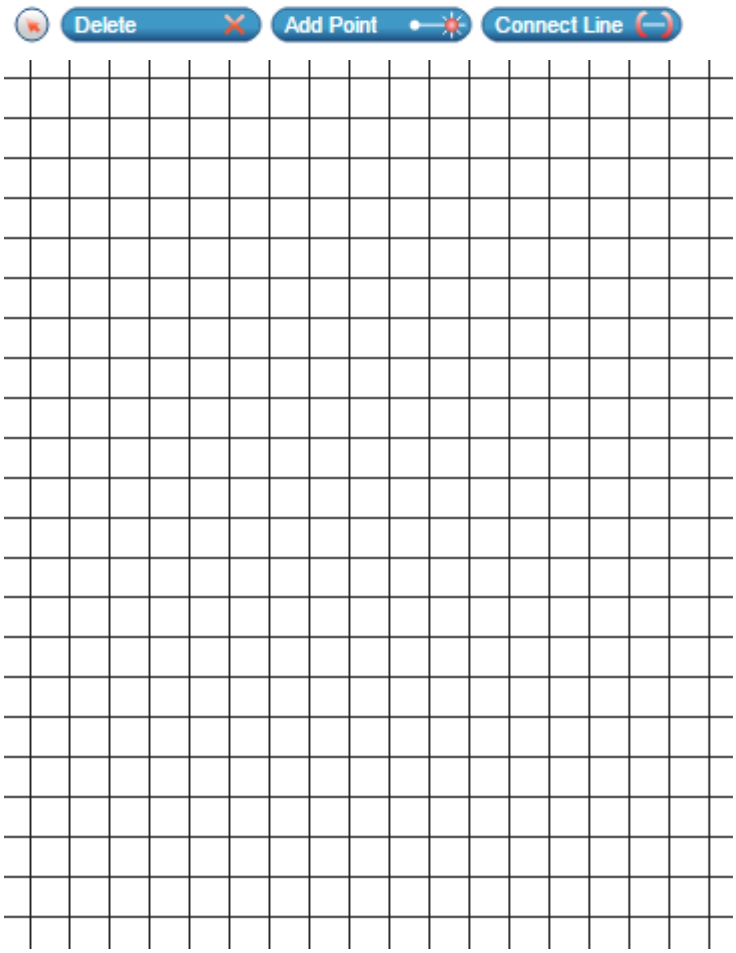
4. A landscape designer drew a blueprint of a garden she is designing for a client. The length of each square on her current grid is 1 centimeter (cm) and represents a length of 10 feet (ft) in the actual garden.

Maintaining the same actual garden dimensions, redraw the blueprint so that 1 cm represents a length of 5 ft in the actual garden.

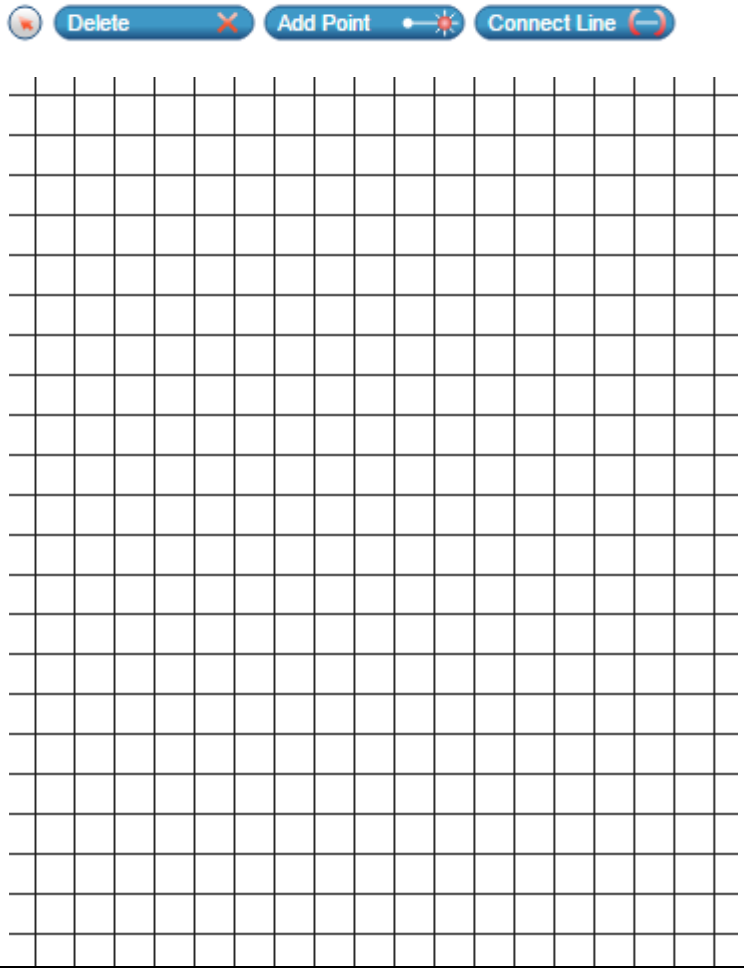
1 cm:10 ft

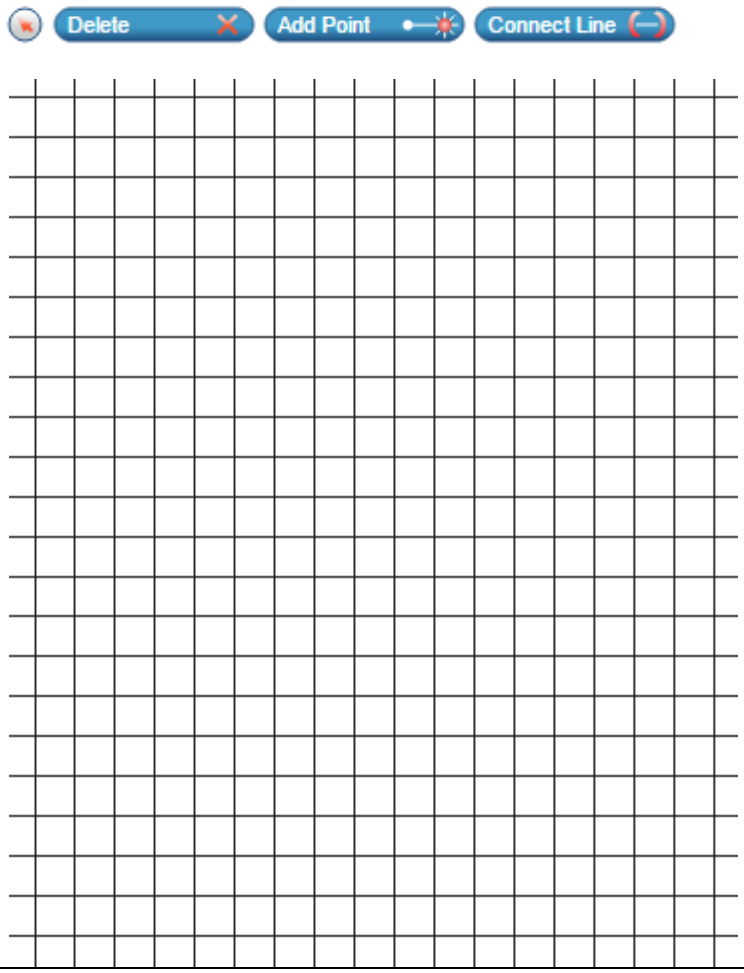


1 cm:5 ft



5. How did the new scale change the length of each side of the figure in the blueprint?

	MAFS.7.G.1.2		**Neutral-Questions for this standard may or may not allow the use of a calculator.**
1.	If possible, draw and label triangle *ABC* so that ∠*A* measures 110°, ∠*B* measures 30°, and ∠*C* measures 40°. 		
2.	Is it possible to draw another triangle so that the angle measures are the same as in the triangle above but the lengths of the sides are different from those in the triangle above? Explain.		

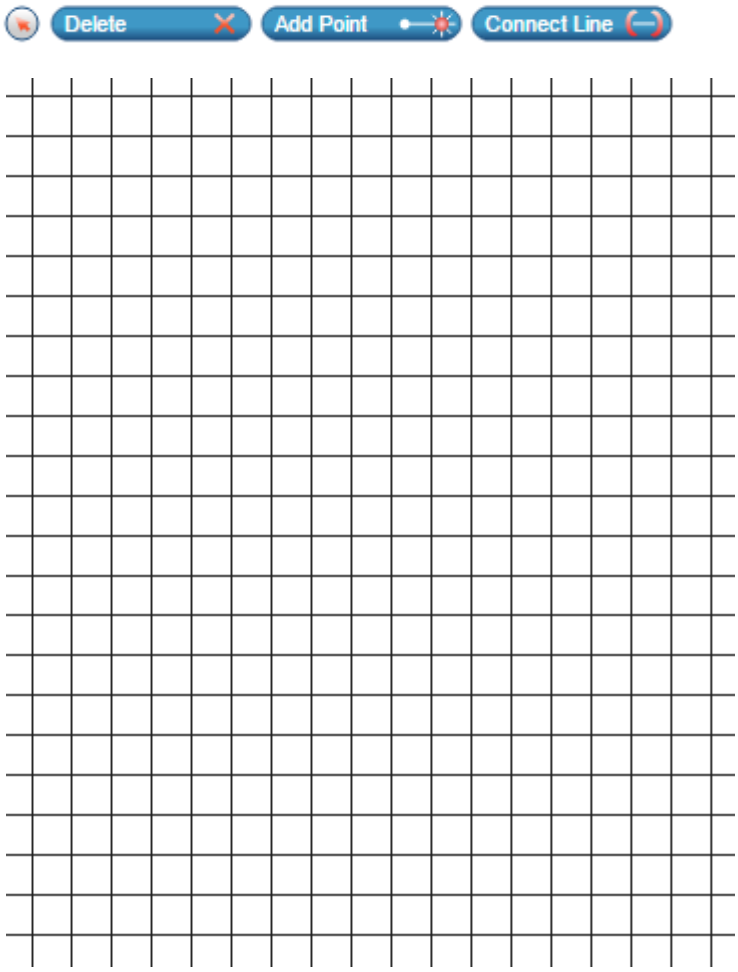
3.	If possible, draw and label triangle *DEF* so that side $\overline{DE}$ is 1½ inches long, side $\overline{EF}$ is 2 inches long, and the measure of the included angle, ∠*E*, is 100°. 
4.	Is it possible to draw another triangle so that one side is 1½ inches long, another side is 2 inches long, and the measure of the included angle is 100° while the remaining side and angles have measures different from those of triangle *DEF*? Explain.

5. Determine if each set of lengths can be used to construct a triangle. If not, explain why not.

Side Lengths	Yes	No
A. 5 cm, 8 cm, 12 cm	☐	☐
B. 12 in., 12 in., 12 in.	☐	☐
C. 3 ft, 6 ft, 10 ft	☐	☐

Explanation

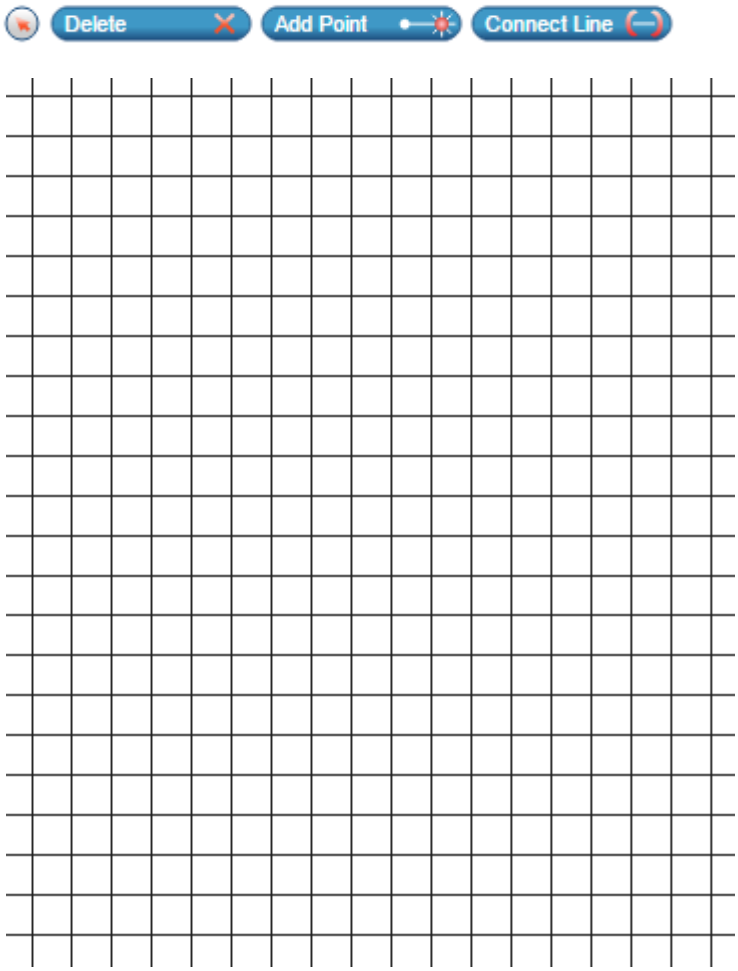
In general, what must be true of three lengths in order for them to construct a triangle?

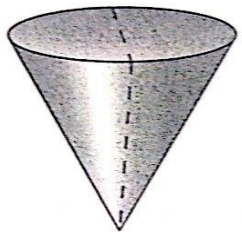
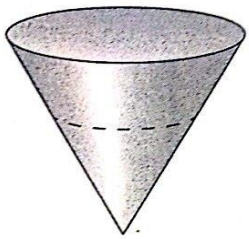
	MAFS.7.G.1.2-FSA Practice		**Neutral-Questions for this standard may or may not allow the use of a calculator.**
1.	If possible, draw and label triangle *ABC* so that side $\overline{AB}$ is 4 centimeters (cm) long, side $\overline{BC}$ is 7 cm long, and side $\overline{CA}$ is 9 cm long.  		
2.	Is it possible to draw another triangle so that the sides are 4 cm, 7 cm, and 9 cm in length while the angles have different measures from those of triangle *ABC*? Explain.		

3. Discuss why it is, or is not possible to create a triangle with the given side lengths.

		Is it possible? Explanation:
A.	10,7,2 cm	
B.	3,4,5 cm	
C.	8,3,11 cm	

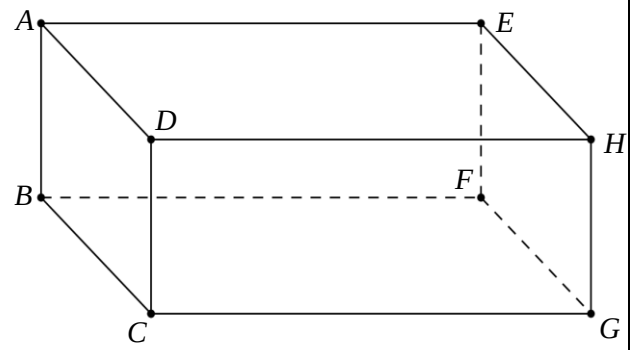
4. If you could change the length of the shortest side in part A, what is the maximum integer length it could be to form a triangle? Draw a picture or diagram to explain your reasoning.

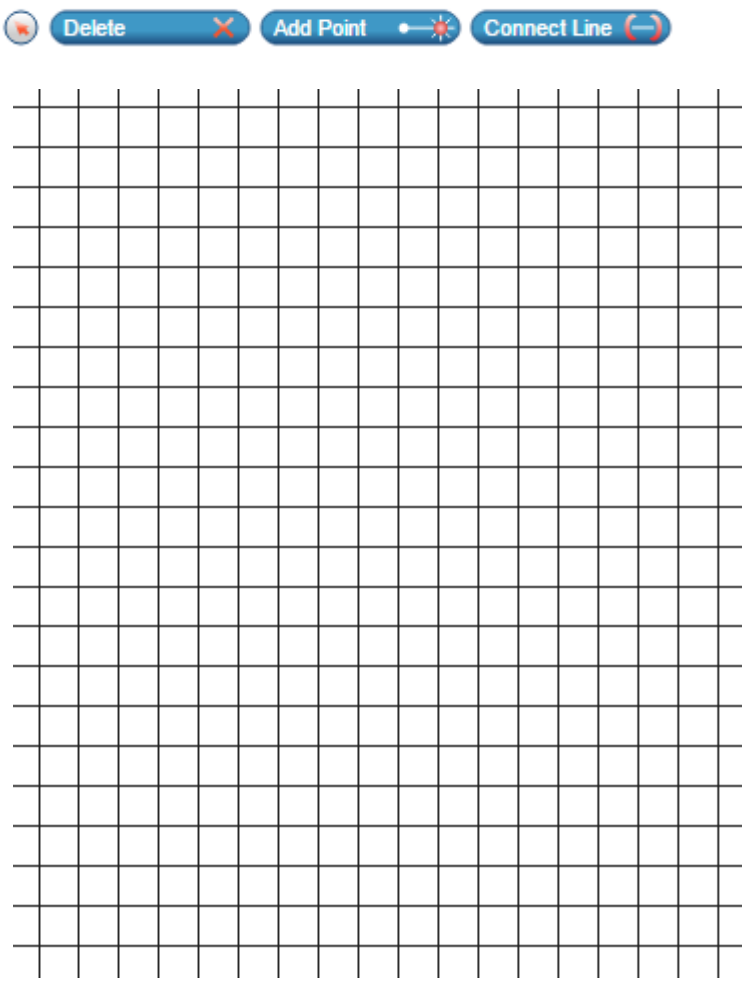


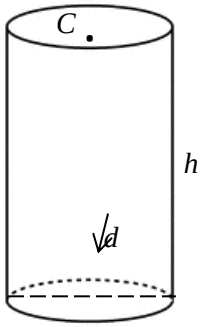
	MAFS.7.G.1.3		**Neutral-Questions for this standard may or may not allow the use of a calculator.**
1.	Misha has a cube and a right square pyramid that are made of clay. She placed both clay figures on a flat surface. Misha will make slices through each figure that are parallel and perpendicular to the flat surface. Which statements are true about the two-dimensional plane sections that **could** result from one of these slices? Select **all** that apply. Ⓐ A plane section that is triangular could result from one of these slices through the cube. Ⓑ A plane section that is square could result from one of these slices through the cube. Ⓒ A plane section that is rectangular but not square could result from one of these slices through the cube. Ⓓ A plane section that is triangular could result from one of these slices through the pyramid. Ⓔ A plane section that is square could result from one of these slices through the pyramid. Ⓕ A plane section that is rectangular but not square could result from one of these slices through the pyramid.		
2.	What two-dimensional shapes appear if you slice a cone as shown on each figure?  Vertical cut  Horizontal cut Write your answer in the space provided.		

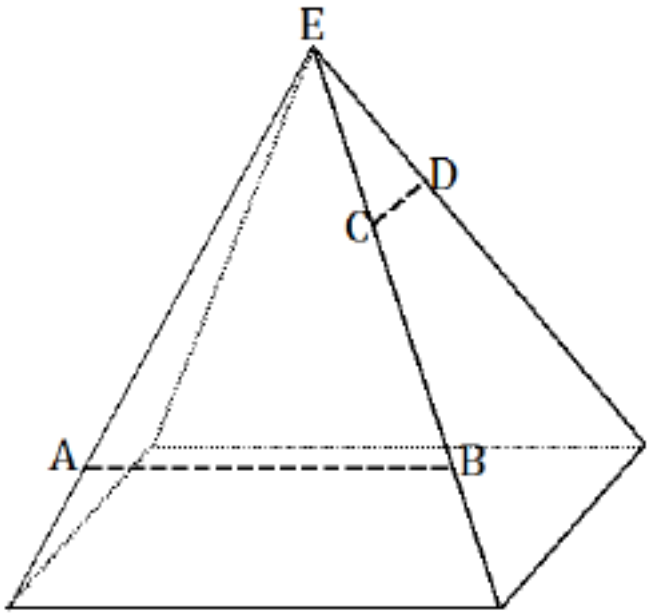
3. The figure shown to the right is a right rectangular prism.
Sketch the two-dimensional plane figure that results from making a horizontal slice, parallel to base *BCGF*. Describe how the dimensions of the cross-section compare to the dimensions of the prism.

$\overline{BC} = 6\ units, \overline{CG} = 10\ units, \overline{DC} = 4\ units$



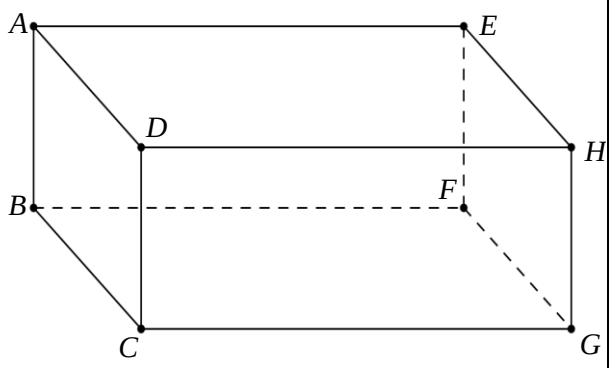


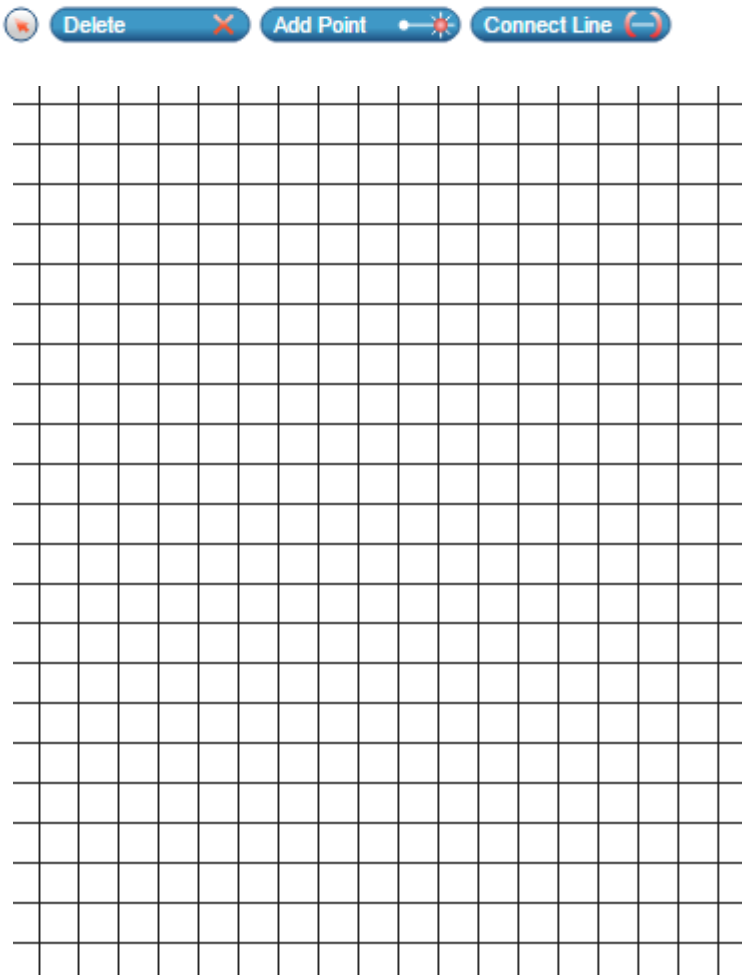
4.	Use the cylinder with height, *h=7 units*, center of base, *C*, and diameter, *d= 4 units*, to answer the following questions:  Describe the two-dimensional plane figure that results from making a horizontal slice, parallel to the base and how the dimensions of the cross-section compare to the dimensions of the cylinder. Write your answer in the space provided.

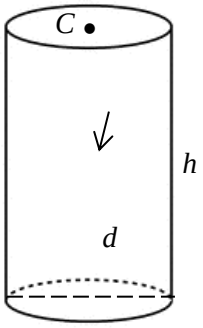
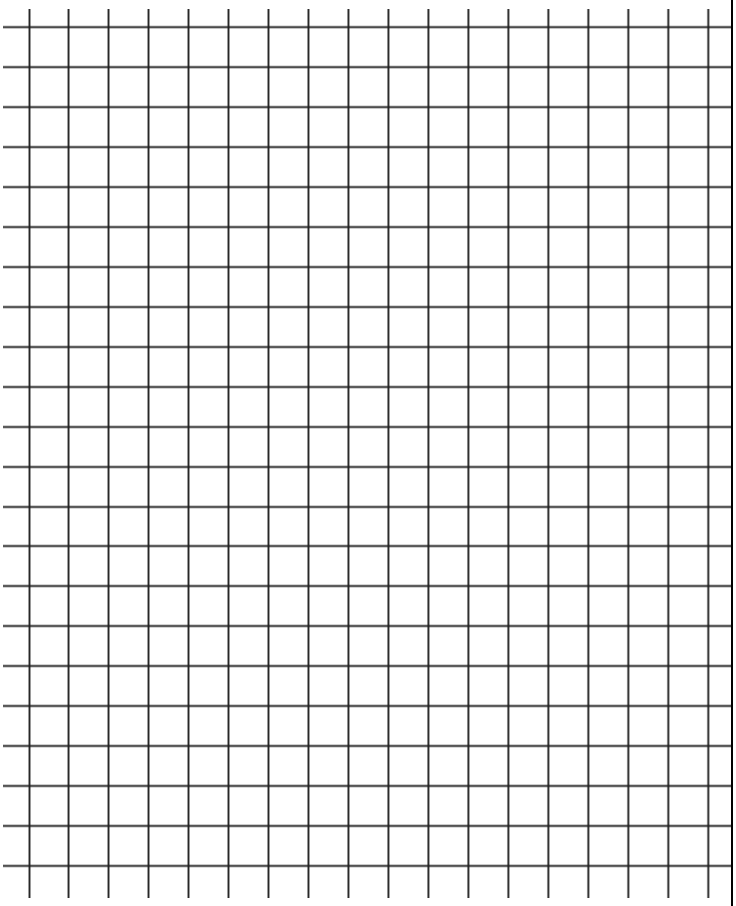
	MAFS.7.G.1.3-FSA Practice		**Neutral-Questions for this standard may or may not allow the use of a calculator.**
1.	Three vertical slices perpendicular to the base of the right rectangular pyramid are to be made at the marked locations: (1) through AB, (2) through CD, and (3) through vertex E Based on the relative locations of the slices on the pyramid, make a reasonable sketch of each slice. Include the appropriate notation to indicate measures of equal length.  		

2. Sketch the two-dimensional plane figure that results from making a vertical slice, perpendicular to base *BCGF*. Describe how the dimensions of the cross-section compare to the dimensions of the prism.

$\overline{BC} = 6\ units, \overline{CG} = 10\ units, \overline{DC} = 4\ units$





3.	Use the cylinder with height, *h=7 units*, center of base, *C*, and diameter, *d= 4 units*, to answer the following questions: Sketch the two-dimensional plane figure that results from making a vertical slice, perpendicular to the base, through its center, *C*. Describe how the dimensions of the cross-section compare to the dimensions of the cylinder.  
4.	How would the two-dimensional plane figure that results from making a vertical slice, perpendicular to the base, not through the center of the base, compare to the vertical slice created in number 3?

MAFS.7.G.2.4

A CALCULATOR IS ALLOWED

1. Use the information provided to answer Part A and Part B.

A circular mirror has a diameter of 12 inches.

Part A

What is the area, in square inches, of the mirror?

Ⓐ 6π

Ⓑ 12π

Ⓒ 36π

Ⓓ 72π

Part B

A circular frame that is 3-inches wide surrounds the mirror.

What is the combined area, in square inches, of the circular mirror and the frame?

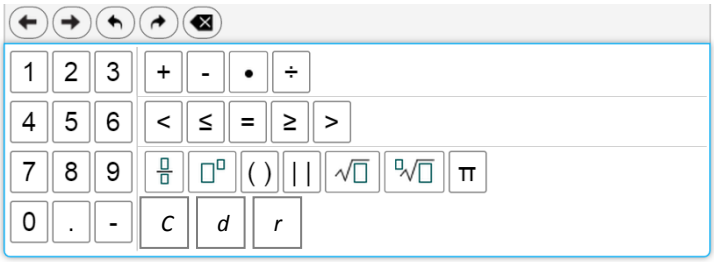
Ⓐ 9π

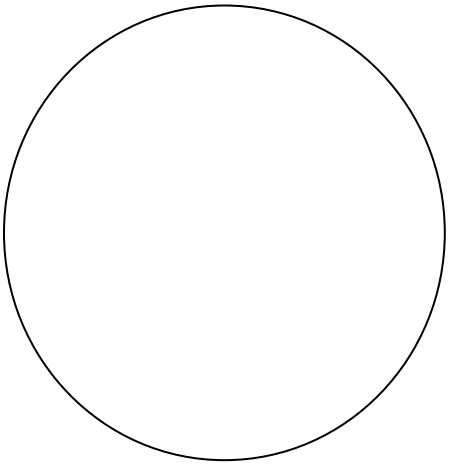
Ⓑ 18π

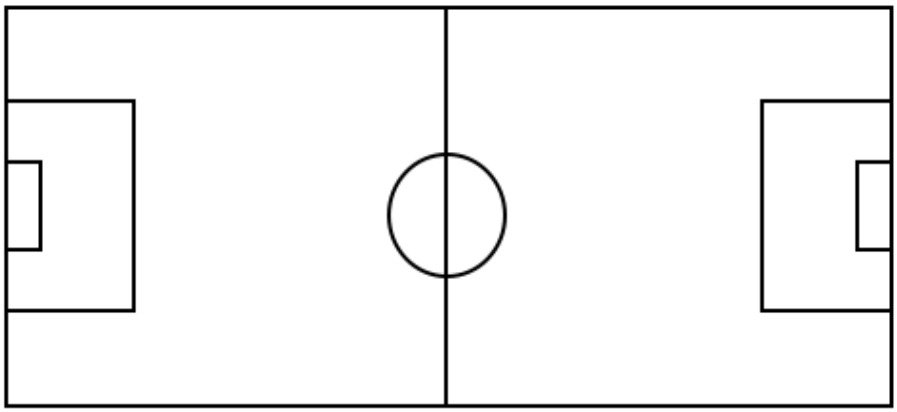
Ⓒ 54π

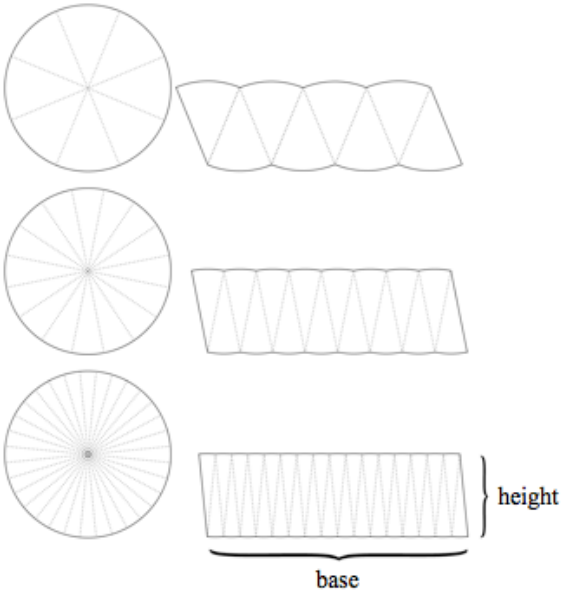
Ⓓ 81π

2. A. State the formula(s) for finding the circumference of a circle. Write each answer on a separate line.



	B. Explain what each symbol in the formula represents. C. On the diagram below, draw and label the dimensions represented by the variable(s) in the formula. 
3.	The London Eye is a giant Ferris wheel on the south bank of the river Thames in London, England. The height of the entire structure, including the support frame, is 135 meters. The wheel has a diameter of 120 meters. Find the circumference of the wheel.

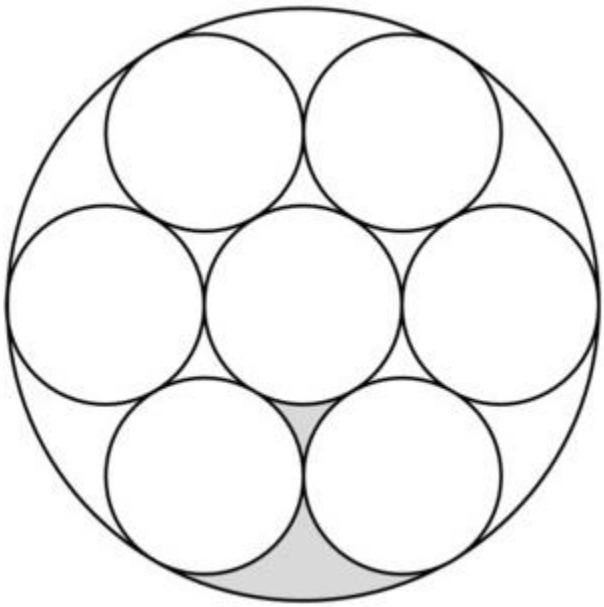
4.	The center circle of a soccer field prohibits a defender from being near the ball at the start or restart of a soccer game. On a professional soccer field this circle is 20 yards in diameter. Find the area of this circle. Show work or explain how you found your answer. 

5.	The area of a circle can be divided into equal pieces called sectors that can be rearranged to make a new shape with the same area. As the number of sectors increases, the sectors get smaller and smaller, and the new shape comes closer and closer to becoming a rectangle:  A. The height, *h*, of the rectangular shape is the same as the __?__ of the original circle. h = _____ B. The base, *b*, of the rectangular shape is what fraction of the circumference, *C*, of the original circle? b = _____ $\times C$ C. Write an equation for the area of the rectangular shape using your representations from Parts A and B.

MAFS.7.G.2.4-FSA Practice

A CALCULATOR IS ALLOWED

The figure below is composed of eight circles, seven small circles and one large circle containing them all. Neighboring circles only share one point, and two regions between the smaller circles have been shaded. Each small circle has a radius of 5 cm.



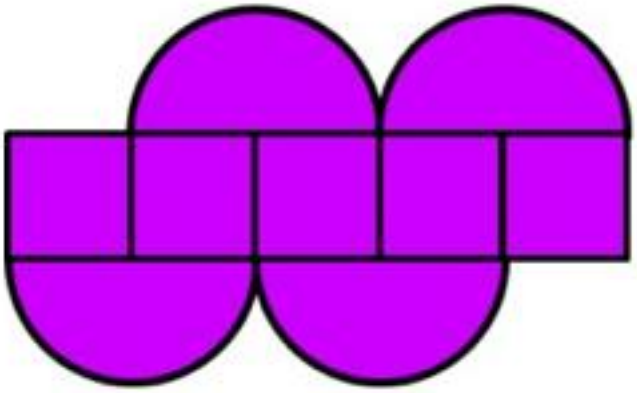
1. Calculate the area of the large circle.

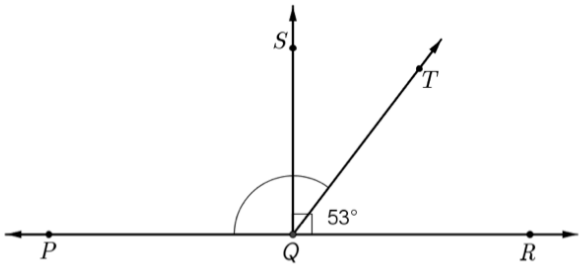
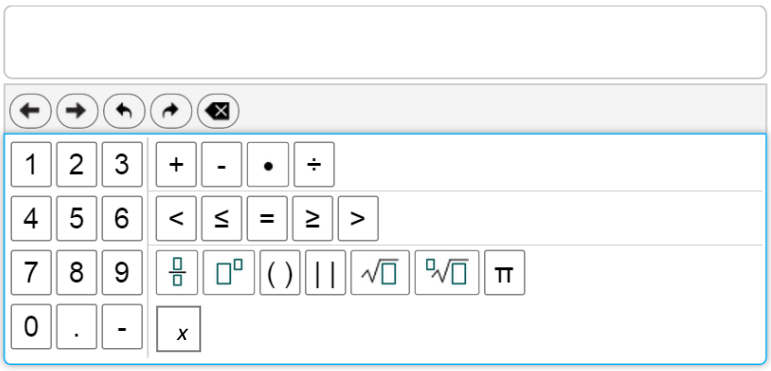
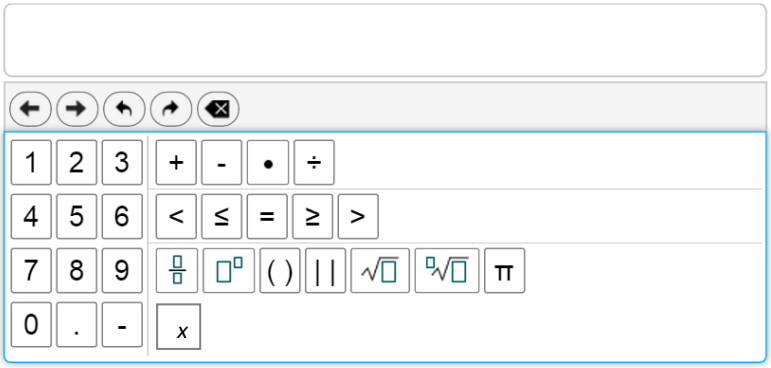
2. Calculate the area of the shaded part of the figure.

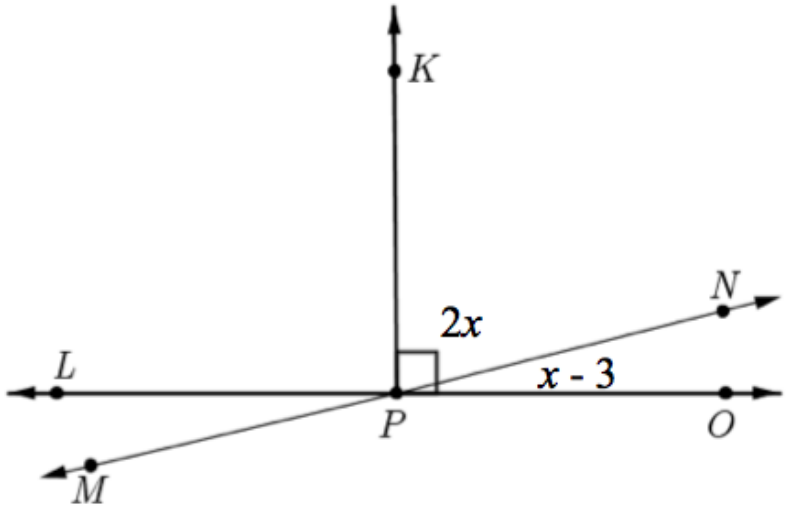
3. The number π can be defined as the circumference of a circle with diameter 1 (unit). Using your knowledge about circles (that is, *without measuring*), complete the following table. Explain how you know the circumferences of the different circles.

Diameter of Circle (inches)	**Circumference of Circle (inches)**	**$\frac{\text{Circumference of Circle}}{\text{Diameter of Circle}}$**
1		
2		
3		
$\frac{1}{2}$		

4. Find the area and the perimeter of the figure below. The figure is composed of small squares with a side-length of 1 unit and curves that are an arc of a circle.



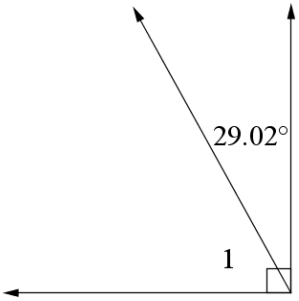
	MAFS.7.G.2.5	**A CALCULATOR IS ALLOWED**
1.	 A. Write and solve an equation to find *m∠PQT*, where *x* = *m∠PQT*.  B. Solve your equation.	
2.	A. Write an equation to find the *m∠SQT*, where *x* = *m∠SQT*.  B. Solve your equation.	

3.	 Write and solve an equation to find *x.* Show your work.
4.	What is *m∠KPN?* Show your work.
5.	What is *m∠MPL* ? Explain how you know. Write your answer in the space provided.

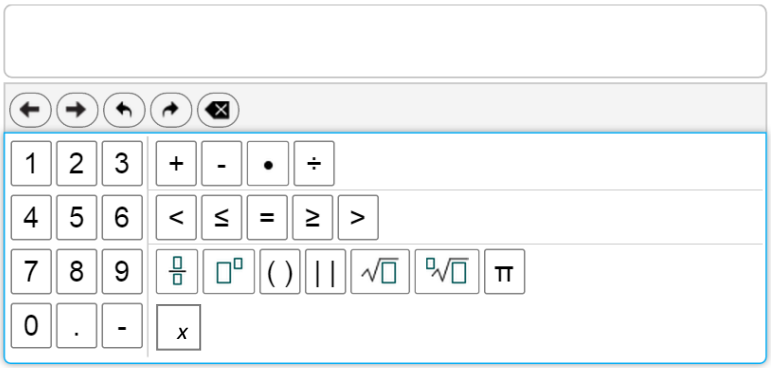
MAFS.7.G.2.5-FSA Practice

A CALCULATOR IS ALLOWED

1.

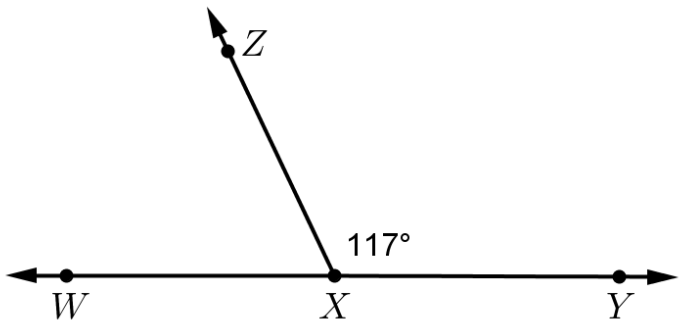


A. Write and solve an equation to find $m\angle 1$, where $x = m\angle 1$.

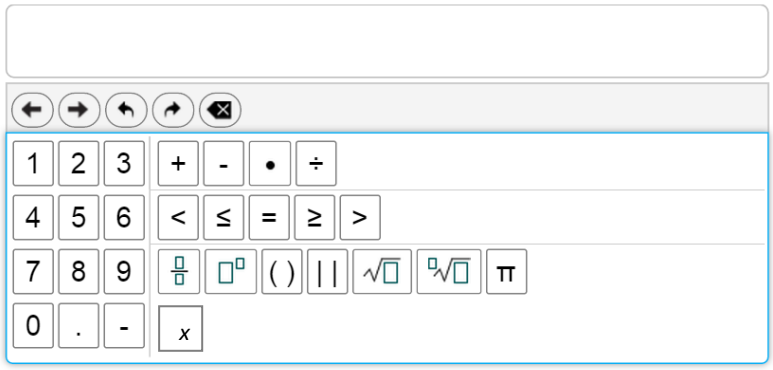


B. Solve your equation.

2. Points *W, X,* and *Y* are collinear (that is, on the same line). Write and solve an equation to find $m\angle WXZ$.

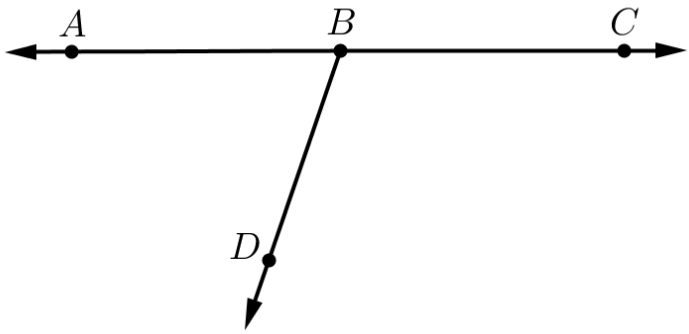


A. Write an equation to find the $m\angle WXZ$, where $x = m\angle WXZ$.

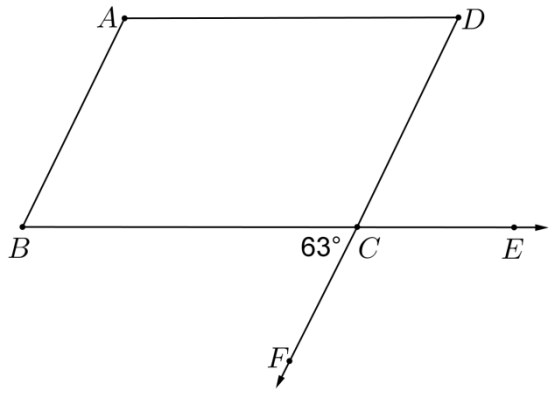


B. Solve your equation.

3. In the diagram below, $\angle ABC$ is a straight angle. The ratio of the measure of $\angle ABD$ to the measure of $\angle CBD$ is 2:3. Write and solve an equation to find $m\angle ABD$.



4. Use the diagram to answer the questions.



A. What is the measure of $\angle DCE$? Write and solve an equation or explain how you know.

B. Write and solve an equation to determine the measure of $\angle FCE$.

5. Which angle has the same measure as $\angle FCE$? Explain how you know.

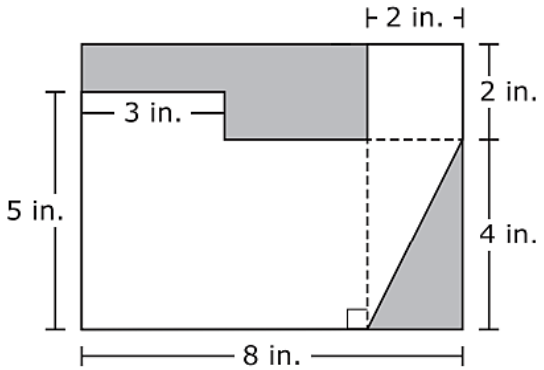
Write your answer in the space provided.

MAFS.7.G.2.6

A CALCULATOR IS ALLOWED

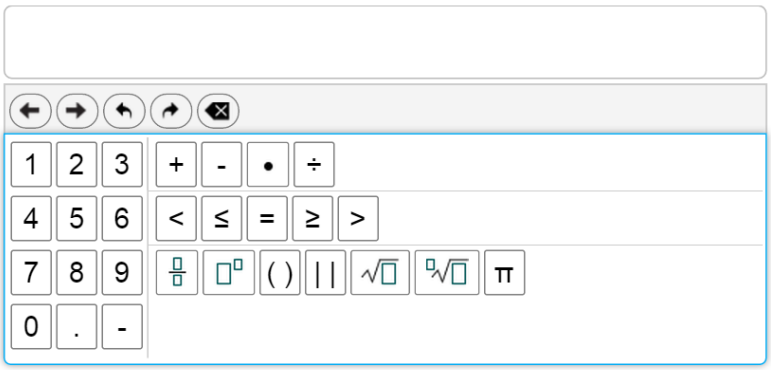
Use the information provided to answer Questions 1 and 2.

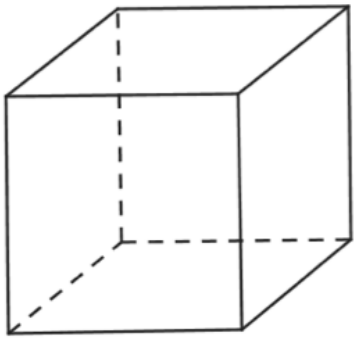
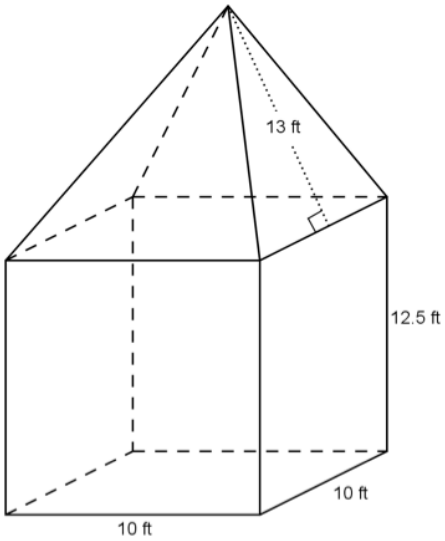
This figure shows two shaded regions and a non-shaded region. Angles in the figure that appear to be right angles are right angles.



1. What is the area, in square inches, of the triangular-shaped region that is shaded in this figure?

2. What is the area, in square inches, of the non-shaded region in this figure?

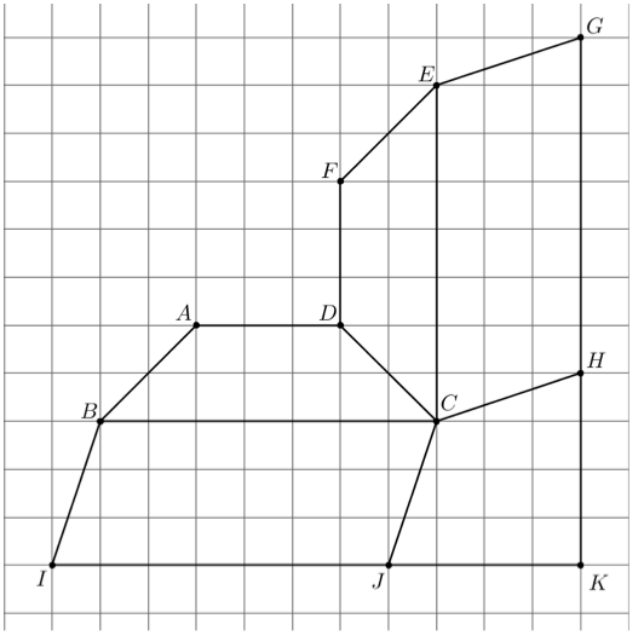


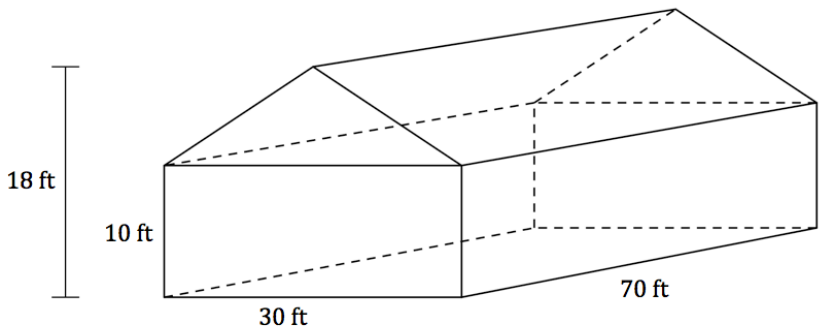
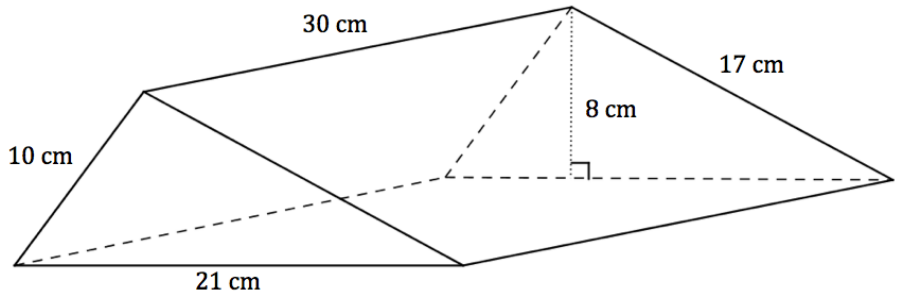
3.	The length of the edge of a cube is 8.2 cm. Label an edge length on the diagram and then find both the surface area and volume of the cube showing all work neatly and completely. Round to the nearest hundredth if necessary. 
4.	The structure shown below will be built for a carnival. The exterior surfaces are going to be painted. What is the total area of the exterior surfaces that need to be painted? Show all work neatly and completely. 

MAFS.7.G.2.6-FSA Practice

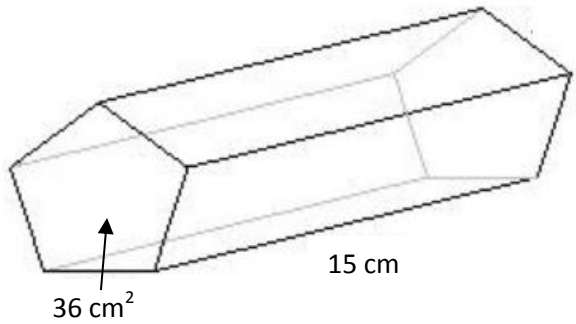
A CALCULATOR IS ALLOWED

1. Tyler and Samantha are building the set for a school play. The design shown below was cut out of wood and now needs to be covered in fabric. What is the total area of the wood that needs to be covered? Each square in the grid has a length of one foot. Show all work neatly and completely to justify your answer.

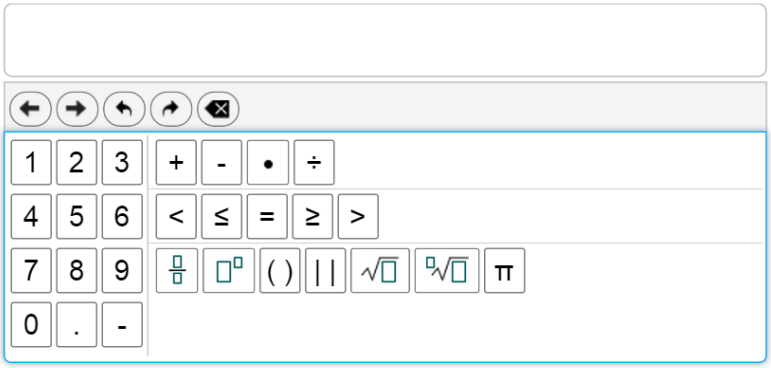


2.	Andrea needs a new air conditioning system for her house. An air conditioner needs to be big enough to cool a house, but it will wear out quickly if it is too big. Calculate the volume of the house pictured below to help Andrea choose the right air conditioner. 
3.	Find the surface area of the right triangular prism. Show all work and explain how you found your answer. 

4.



Find the volume of the pentagonal prism if the area of the base is 36 square centimeters and the height of the prism is 15 cm.



	MAFS.7.SP.1.1		**Neutral-Questions for this standard may or may not allow the use of a calculator.**
1.	Josephine owns a diner that is open every day for breakfast, lunch, and dinner. She offers a regular menu and a menu with daily specials. She wanted to estimate the percentage of her customers who order specials. She selected a random sample of 50 customers who had lunch at her diner during a three-month period. She determined that 28% of these customers ordered from the menu with specials. Which statement about Josephine's sample is true? Ⓐ The sample is the percentage of customers who order daily specials. Ⓑ The sample might not be representative of the population because it only included lunch customers. Ⓒ The sample shows that exactly 28% of Josephine's customers ordered daily specials. Ⓓ No generalizations can be made from this sample, because the sample size of 50 is too small.		
2.	A researcher wants to determine the mean height of 12-year-old boys in the United States. What might he do to gain the information needed to estimate the average height with confidence? Write your answer in the space provided.		
3.	Jeremy was asked to determine the favorite sport of all seventh graders at his school. After asking every student who entered the gym at last night's basketball game what their favorite sport is, Jeremy concluded that the favorite sport of seventh graders at his school is basketball. Is Jeremy's conclusion valid? Why or why not? Write your answer in the space provided.		

4. Benita and Jeff each surveyed some of the students in their eighth-grade homerooms to determine whether chicken or hamburgers should be served at the class picnic. The survey forms are shown below.

Benita's Survey
Homeroom: 8-A
Number of Students in Homeroom: 23

Student Surveyed	Chicken	Hamburger
Adam	✓	
Carlene	✓	
Nancy	✓	
Hugh	✓	

Jeff's Survey
Homeroom: 8-B
Number of Students in Homeroom: 20

Student Surveyed	Chicken	Hamburger
Becky		✓
Tanya	✓	
Joe	✓	
Ben		✓
Abby		✓
Linc	✓	
Marian		✓
Han		✓
Chris		✓
Tina		✓
Nate		✓
Darrell		✓

Benita reported that 100 percent of those in her survey wanted chicken. Jeff reported that 75 percent of those in his survey wanted hamburger.
Which survey, Benita's or Jeff's, would probably be better to use when making the decision about what to serve?

5. Explain why the survey you selected for Question 4 would be a better representation of their homeroom.

	MAFS.7.SP.1.1-FSA Practice		**Neutral-Questions for this standard may or may not allow the use of a calculator.**
1.	Palm Middle School is thinking about changing the flavor of ice cream sold in the cafeteria during lunch. The seventh grade student council members were asked to determine which flavor is the most popular. Of these four sampling methods, which will be most representative of the entire student population? A) Ask only the students who currently buy ice cream during lunch. B) Ask only the seventh grade students. C) Ask every third student who walks into the school. D) Ask every student council member.		
2.	Explain why each method in Question 2 would or would not be a good choice. Write your answer in the space provided.		
3.	In a poll of Mr. Briggs's math class, 67% of the students say that math is their favorite academic subject. The editor of the school paper is in the class, and he wants to write an article for the paper saying that math is the most popular subject at the school. Explain why this is not a valid conclusion and suggest a way to gather better data to determine what subject is most popular. Write your answer in the space provided.		
4.	You and a friend decide to conduct a survey at your school to see whether students are in favor of a new dress code policy. Your friend stands at the school entrance and asks the opinions of the first 100 students who come to campus on Monday. You obtain a list of all students at the school and randomly select 60 to survey. Your friend finds 34% of his sample in favor of the new dress code policy, but you find only 16%. Which do you believe is more likely to be representative of the school population? Explain your choice.		

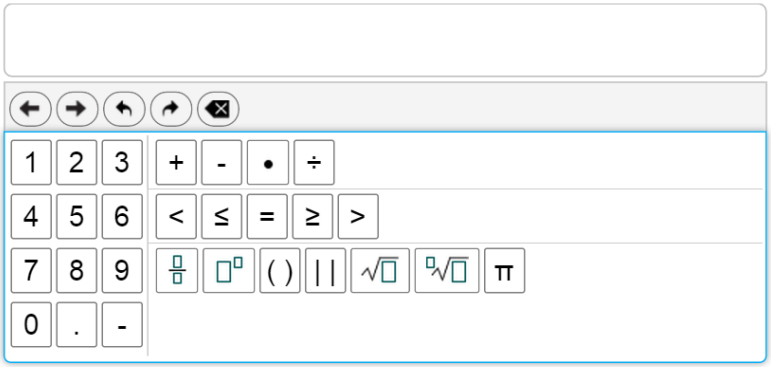
MAFS.7.SP.1.2

A CALCULATOR IS ALLOWED

1. A random sample of the 1,200 students at Moorsville Middle School was asked which type of movie they prefer. The results are compiled in the table below:

Action	Comedy	Historical	Horror	Mystery	Science Fiction
15	12	3	10	4	6

Use the data to estimate the total number of students at Moorsville Middle school who prefer horror movies.



2. Suppose another random sample of students were drawn for Question 1. Would you expect the results to be the same? Explain why or why not.

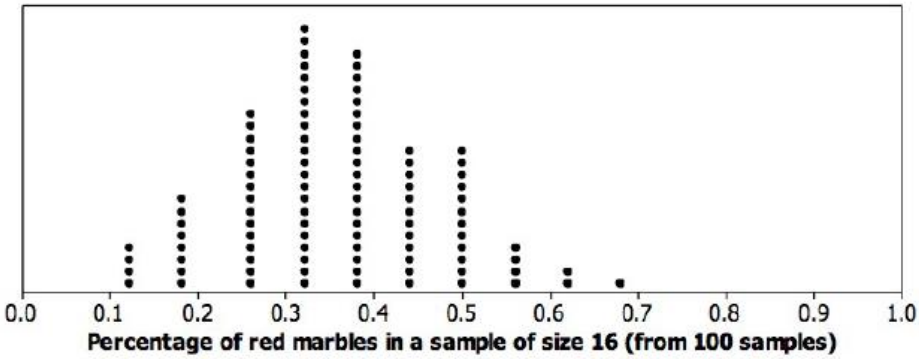
Write your answer in the space provided.

Use the following data for Questions 3, 4, and 5.

Any guest who makes an estimate that is within 9 percentage points of the true percentage of red marbles in the jar wins a prize, so any estimate from 24.6% to 42.6% will be considered a winner. To help with the estimating, a guest is allowed to take a random sample of 16 marbles from the jar in order to come up with an estimate. (Note: When this occurs, the marbles are then returned to the jar after counting.)

One of the hotel employees who does not know that the true percentage of red marbles in the jar is 33.6% is asked to record the results of the first 100 random samples. A table and dot plot of the results appears below.

Percentage of red marbles in the sample of size 16	Number of times the percentage was obtained
12.50%	4
18.75%	8
25.00%	15
31.25%	22
37.50%	20
43.75%	12
50.00%	12
56.25%	4
62.50%	2
68.75%	1
Total:	100



For example, 15 of the random samples had exactly 25.00% red marbles; only 2 of the random samples had exactly 62.50% red marbles, and so on.

3. a. Assume that each of the 100 guests who took a random sample used their random sample's red marble percentage to estimate the whole jar's red marble percentage. Based on the table above, how many of these guests would be "winners"?

b. How many of the 100 guests obtained a sample that was *more than* half red marbles?

4.	Should we be concerned that none of the samples had a red marble percentage of exactly 33.6% even though that value is the true red marble percentage for the whole jar? Explain briefly why a guest can't obtain a sample red marble percentage of 33.6% for a random sample size of 16.
5.	Recall that the hotel employee who made the table and dot plot above didn't know that the real percentage of red marbles in the entire jar was 33.6%. If another person thought that half of the marbles in the jar were red, explain briefly how the hotel employee could use the dot plot and table results to challenge this person's claim. Specifically, what aspects of the table and dot plot would encourage the employee to challenge the claim?

MAFS.7.SP.1.2-FSA Practice

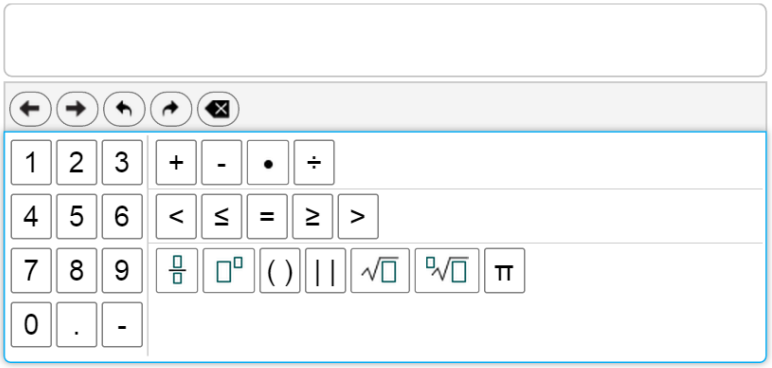
A CALCULATOR IS ALLOWED

1. Mr. Mann, principal at Franklin High School, wondered if the students at his school would prefer longer school days for four days a week or shorter school days for five days a week. The total number of hours spent in school would be the same in either scenario.

Out of the 2,600 students enrolled in Franklin High School, Mr. Mann randomly interviewed 50 students from three different grade levels. The results are compiled in the chart below:

Groups	Longer days, 4 days a week	Shorter days, 5 days a week
10th grade	32	18
11th grade	26	24
12th grade	34	16

Estimate the number of students out of the whole school who prefer longer days, four days a week.



2. What might be done to increase the confidence in the estimate for Question 1?

3. Amanda asked a random sample of 40 students from her school to identify their birth month. There are 300 students in her school. Amanda's data is shown in this table.

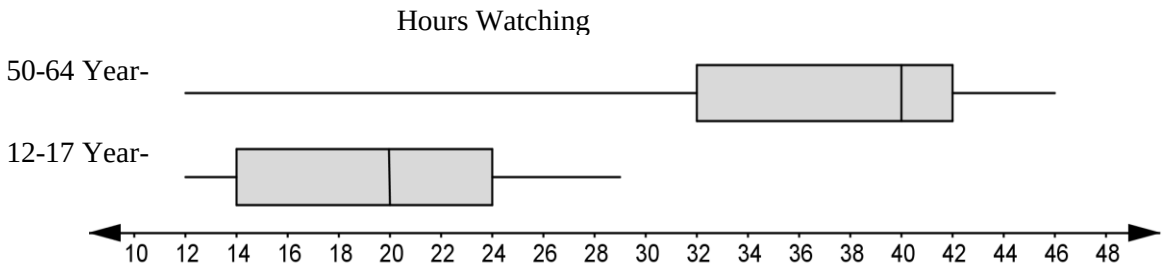
Student Birth Months

Birth Month	Number of Students
January	3
February	0
March	3
April	10
May	4
June	3
July	4
August	3
September	2
October	2
November	3
December	3

Which of these statements is **best** supported by the data?

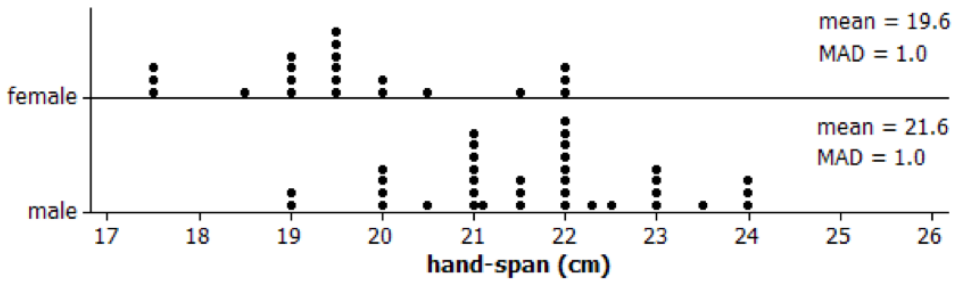
I. Exactly 25% of the students in Amanda's school have April as their birth month.
II. There are no students in Amanda's school that have a February birth month.
III. There are probably more students at Amanda's school with an April birth month than a July birth month.
IV. There are probably more students at Amanda's school with a July birth month than a June birth month.

4. Explain why the statement you chose is **best** supported by the data.

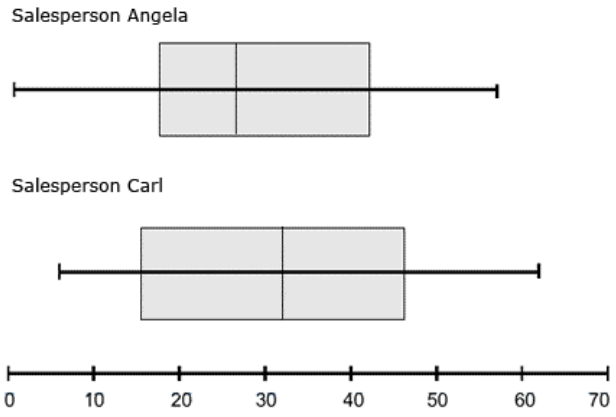
	MAFS.7.SP.2.3		**Neutral-Questions for this standard may or may not allow the use of a calculator.**
1.	Data on the number of hours per week of television viewing was collected on a sample of Americans. The graphs below summarize this data for two age groups.  What is the median number of hours of television viewing per week for each age group? 12-17 age group median _____ 50-64 age group median_____		
2.	What is the interquartile range for each age group? 12-17 age group interquartile range_____ 50-64 age group interquartile range _____		
3.	Describe the difference between the medians as a multiple of the interquartile range.		

	MAFS.7.SP.2.3-FSA Practice		**Neutral-Questions for this standard may or may not allow the use of a calculator.**

1. Students in a random sample of 57 students were asked to measure their hand-spans (distance from outside of thumb to outside of little finger when the hand is stretched out as far as possible). The graphs below show the results for the males and females.



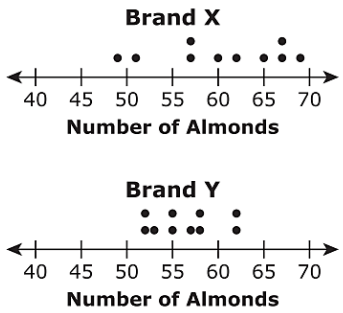
Based on these data, do you think there is a difference between the population mean hand-span for males and the population mean hand-span for females? Justify your answer.

2.	**The box plots shown compare Angela's vacuum sales to Carl's vacuum sales over a one-month period. Use the box plots shown to answer Questions 2-5.**  Who would you say was a more successful salesperson and why?
3.	What is the *difference* in their median sales?
4.	How much higher was Carl's maximum than Angela's?
5.	Who had a bigger *range* (or variation) in their sales?

MAFS.7.SP.2.4

Neutral-Questions for this standard may or may not allow the use of a calculator.

1. Alexis chose a random sample of 10 jars of almonds from each of two different brands, X and Y. Each jar in the sample was the same size. She counted the number of almonds in each jar. Her results are shown in the plots.



Based on the plots, which statement **best** compares the number of almonds in the jars from the two brands?

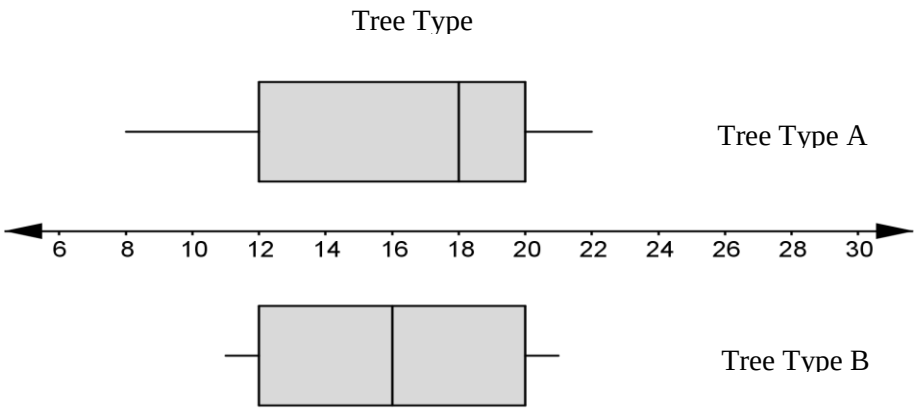
Ⓐ The number of almonds in jars from Brand X tends to be greater and more consistent than those from Brand Y.

Ⓑ The number of almonds in jars from Brand X tends to be greater and less consistent than those from Brand Y.

Ⓒ The number of almonds in jars from Brand X tends to be fewer and more consistent than those from Brand Y.

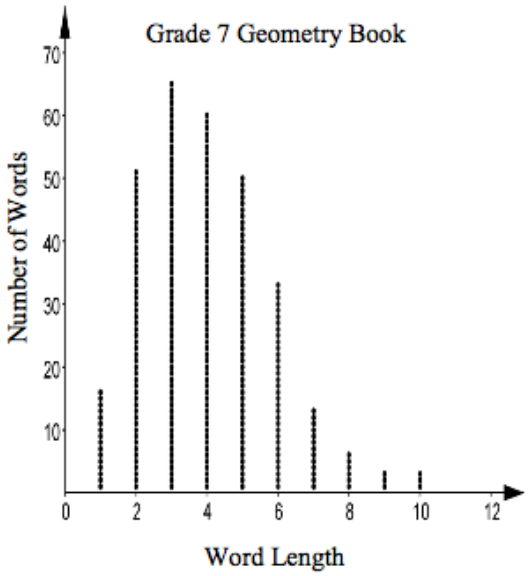
Ⓓ The number of almonds in jars from Brand X tends to be fewer and less consistent than those from Brand Y.

2. In a local park, Jeremy collected data on the heights of two types of trees by measuring the heights of randomly selected trees of these types: Tree Type A and Tree Type B. He displayed each distribution of sample heights in the following box plots:

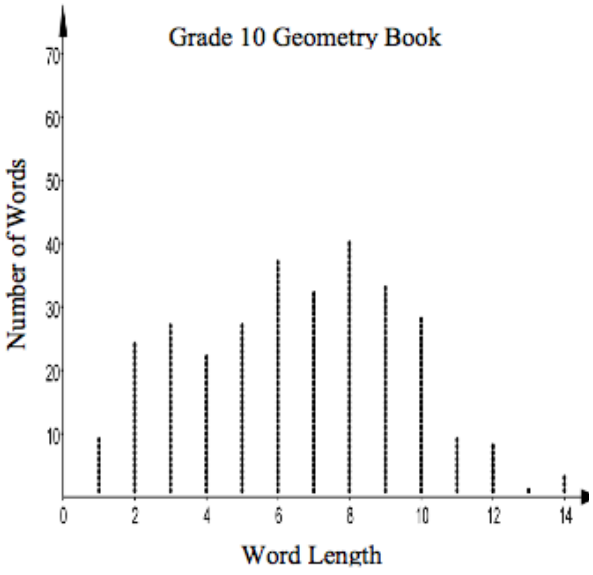


Compare the two distributions. What inferences can you draw about the heights of the two types of trees?

3. Peter is comparing the lengths of words in a seventh grade geometry book to the lengths of words in a tenth grade geometry book for a statistics project. He plotted the length of 300 randomly selected words from each book and calculated the mean and the mean absolute deviation (MAD) for each set of da



Grade 7 Mean = 4.0
MAD = 1.4

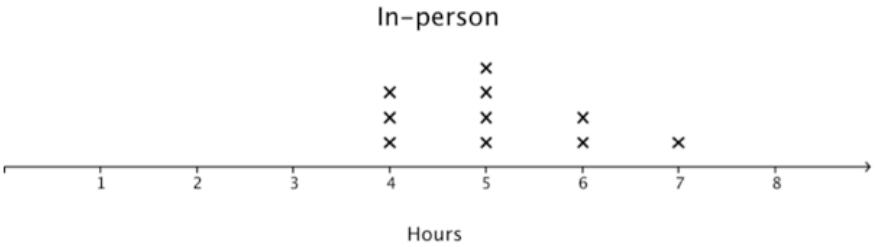


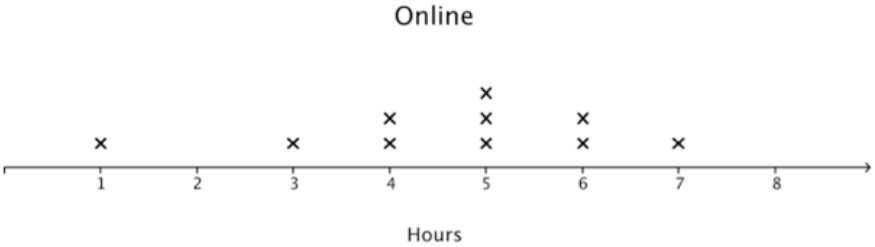
Grade 10 Mean = 6.5
MAD = 2.5

Use the mean and the MAD to compare the two distributions. What inferences can you draw about the lengths of words in the two textbooks?

	MAFS.7.SP.2.4-FSA Practice		**Neutral-Questions for this standard may or may not allow the use of a calculator.**

1. Mr. O is teaching a class that students can access in person or online. Mr. O is curious about how much time his online students spend on his class compared to his in-person students. Mr. O randomly selects 10 in-person students and 10 online students and asks them to record all the time that they spend on his class for one week, yielding the results below. Based on the center and variability of each distribution, what inferences can you draw about the two populations?





2.	Mr. P is a sales executive who is curious about the effectiveness of calling and emailing for acquiring new customers. Mr. P randomly selects two groups of 10 salespeople. For one week, he has the first group do only emailing, and he has the second group do only calling. Each salesperson records the number of new customers they have signed up, yielding the results below. Based on the center and variability of each distribution, what inferences can you draw about the two populations?

MAFS.7.SP.3.5

Neutral-Questions for this standard may or may not allow the use of a calculator.

1. Which of the following numbers could represent the probability of an event? For each, explain why or why not.

	Probability of an Event?	Yes	No	Explanation
A.	-1			
B.	4.2			
C.	0.6			
D.	0.888			
E.	0			
F.	0.39			
G.	-0.5			

2. What does each probability mean about the likelihood of an event occurring? Is the event likely, unlikely, or neither likely nor unlikely?

A. 1

B. $\frac{1}{100}$

C. 0

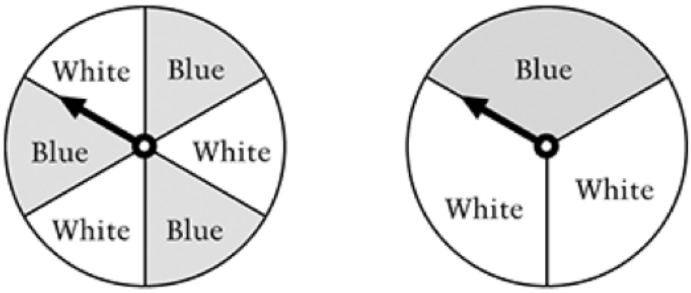
D. $\frac{1}{2}$

E. $\frac{9}{10}$

3. In a gumball machine there are 100 red, 75 blue, 50 green, and 125 yellow gumballs. These 350 gumballs are mixed up. Sam puts money in and one gumball comes out. Which color is most likely to come out?

A. Red
B. Blue
C. Green
D. Yellow

4.



Spinner A Spinner B

Lori has a choice of two spinners. She wants the one that gives her a greater probability of landing on blue.

Which spinner should she choose?

○ Spinner A ○ Spinner B

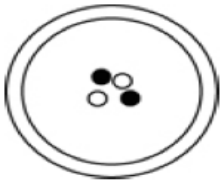
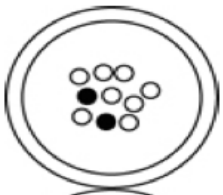
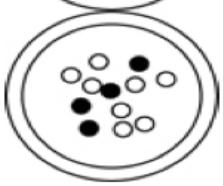
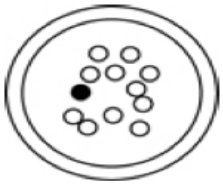
Explain why the spinner you chose gives Lori the greater probability of landing on blue.

5.

Stickers	Number
Red	III
Blue	IIII
Yellow	II
Green	~~IIII~~ II

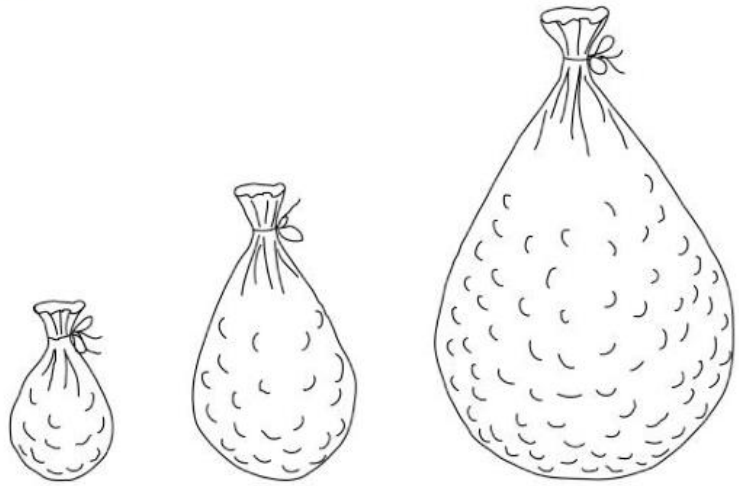
The 16 stickers listed above are placed in a box. If one sticker is drawn from the box, which color is it most likely to be?

A. Red
B. Blue
C. Yellow
D. Green

	MAFS.7.SP.3.5-FSA Practice		Neutral-Questions for this standard may or may not allow the use of a calculator.
1.	In each scenario for Questions 1-3, a probability is given. Describe each event as likely, unlikely, or neither likely nor unlikely. Explain your choice of description. The probability of a hurricane being within 100 miles of a location in two days is 40%.		
2.	The probability of a thunderstorm being located within 5 miles of your house sometime tomorrow is 9/10.		
3.	The probability of a given baseball player getting at least three hits in the game today is 0.08.		
4.	A person is going to pick one marble without looking. For which dish is there the greatest probability of picking a black marble? A.  B.  C.  D. 		

5.

There is only one red marble in each of the bags shown below. Without looking, you are to pick a marble out of one of the bags. Which bag would give you the greatest chance of picking the red marble?



10 marbles 100 marbles 1000 marbles

A. Bag with 10 marbles
B. Bag with 100 marbles
C. Bag with 1000 marbles
D. It makes no difference

	MAFS.7.SP.3.6		**Neutral-Questions for this standard may or may not allow the use of a calculator.**
1.	Reagan will use a random number generator 1,200 times. Each result will be a digit from 1 to 6. Which statement **best** predicts how many times the digit 5 will appear among the 1,200 results? Ⓐ It will appear exactly 200 times. Ⓑ It will appear close to 200 times but probably not exactly 200 times. Ⓒ It will appear exactly 240 times. Ⓓ It will appear close to 240 times but probably not exactly 240 times.		
2.	For the past three months, Sydney recorded the number of eggs that her hen laid each week. The results are as follows: 4, 3, 5, 4, 6, 4, 5, 4, 3, 5, 7, and 6. Approximate the probability that the hen will lay exactly five eggs next week.		
3.	Approximate the probability that the hen will lay four or fewer eggs the next week.		
4.	A quarter is flipped 50 times. Which of the following is most likely to be the number of times heads comes up? A. 2 B. 3 C. 11 D. 26 E. 50		

5.

RESULTS

G	157
Y	352
R	491

Jerry spun one of the spinners below 1,000 times and obtained the results shown in the table above. Which spinner did Jerry probably use?

A.

B.

C.

D.

E.

	MAFS.7.SP.3.6-FSA Practice		**Neutral-Questions for this standard may or may not allow the use of a calculator.**
1.	A bag contains green marbles and purple marbles. If a marble is randomly selected from the bag, the probability that it is green is 0.6 and the probability that it is purple is 0.4. Dylan draws a marble from the bag, notes its color, and returns it to the bag. He does this 50 times. How many times would you expect Dylan to draw a green marble?		
2.	Is it possible for Dylan to draw a green marble exactly five times? Explain your reasoning.		

3. Olivia rolled two number cubes with sides numbered one through six. The sum of the two numbers she rolled was eight, and the probability of getting a sum of eight is $\frac{5}{36}$. The probability of getting other possible sums when two number cubes are rolled is given in the table.

Estimate the number of times that the sum will be 10 if the two number cubes are rolled 600 times. Show work and explain.

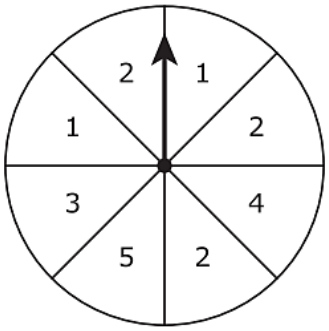
Sum	Probability
2	$\frac{1}{36}$
3	$\frac{1}{18}$
4	$\frac{1}{12}$
5	$\frac{1}{9}$
6	$\frac{5}{36}$
7	$\frac{1}{6}$
8	$\frac{5}{36}$
9	$\frac{1}{9}$
10	$\frac{1}{12}$
11	$\frac{1}{18}$
12	$\frac{1}{36}$

4. If Olivia rolls the number cubes 600 times, do you think she will get exactly the number you calculated? Why or why not?

MAFS.7.SP.3.7

A CALCULATOR IS ALLOWED

1. The spinner face shown is divided into 8 equal sections.



The arrow on this spinner is spun once.

What is the probability that the arrow will land on a section labeled with a number **greater** than 3?

Ⓐ $\frac{1}{8}$

Ⓑ $\frac{1}{4}$

Ⓒ $\frac{1}{3}$

Ⓓ $\frac{1}{2}$

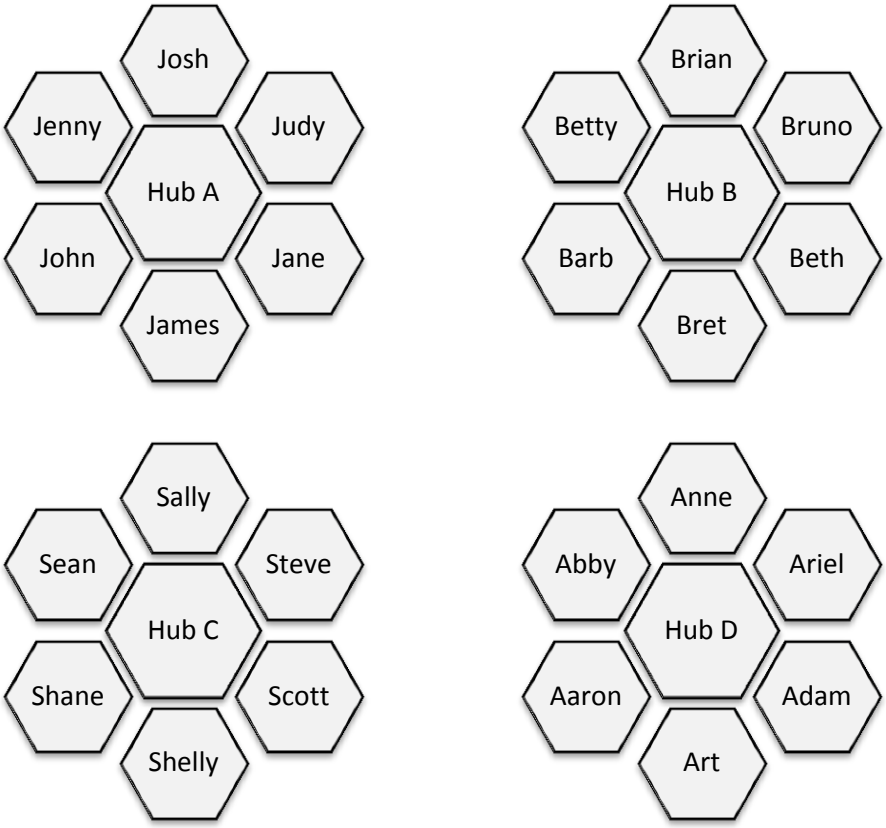
2. Susan put blue tiles, green tiles, and yellow tiles into a bag. All the tiles are the same size and shape. Susan will select one tile from the bag without looking, record its color, and then put the tile back into the bag. She will repeat this experiment 240 times. Based on the number of tiles of each color in the bag, Susan predicted the results shown in the frequency table below.

Predicted Results

Color of Tile	Frequency
blue	120
green	40
yellow	

A total of 12 tiles are in the bag.

Based on the table, what is the best prediction for the number of times Susan will select a yellow tile from the bag? Show or explain how you got your answer.

3.	Based on the table, determine the number of blue tiles, the number of green tiles, and the number of yellow tiles that are in Susan's bag. Show or explain how you got **each** of your answers.
4.	Use the seating chart for Mr. Elroy's Computer Science class (shown below) to answer the questions.  Suppose one of the computers was delivered with a defective monitor. What is the probability that Sally was assigned that computer with the defective monitor?

5.	What is the probability that a boy in Hub A was assigned the defective monitor?

	MAFS.7.SP.3.7-FSA Practice	**A CALCULATOR IS ALLOWED**
1.	Each week, Mrs. Stafford picks a runner from her homeroom to run errands. In order to remain unbiased in her selection, she flips a coin to determine if the runner will be a boy or a girl. She assigns *heads* to girls and *tails* to boys. Based on this procedure, what is the probability of selecting a boy? Explain how you determined this probability.	
2.	Suppose after 20 weeks, Mrs. Stafford has tossed tails 16 times. Based on this observed frequency, what is the probability that a boy will be selected next week?	
3.	Why might the two probabilities you calculated be different? Explain.	

4. Mr. Stokes placed five marbles in a bag. He asked a student in his Statistics class to randomly select a marble, note its color, and return it to the bag. This trial was repeated 150 times.

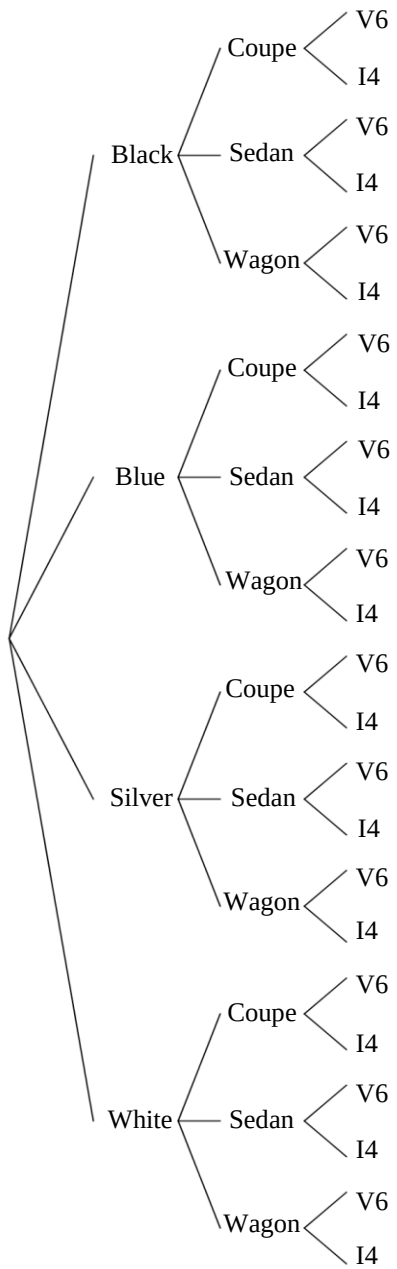
Color	Frequency	Probability
blue	29	
yellow	57	
green	34	
red	30	
purple	0	

The outcomes of the experiment are recorded in the table. Determine the probability of each outcome based on the experiment and enter it in the table.

5. Based on the observed frequencies, does each outcome appear to be equally likely? If not, explain the possible causes of the different probabilities.

	MAFS.7.SP.3.8		**Neutral-Questions for this standard may or may not allow the use of a calculator.**

1. A model of car is available in four colors (black, blue, silver, and white) and three body styles (coupe, sedan, and wagon). Also, there are two engines from which to choose (six-cylinder, called a V6, and four-cylinder, called an I4). The possible combinations are shown in the tree diagram below.

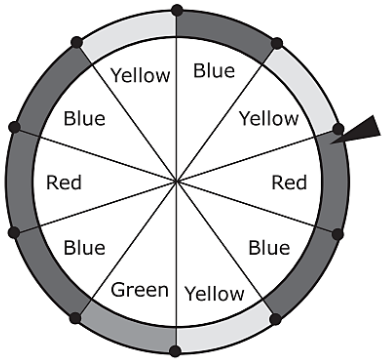


A. If options are selected at random, what is the probability that the car will be a V6 wagon?

B. Explain how you used the sample space to find your answer.

2.	Tom bought a new cell phone. He wants to use a three-digit code to keep his phone locked. He decides to use the digits 1, 2, 3 and will randomly choose how to order the digits. Each digit can be used more than once. A. Make an organized list to show all possible number combinations for Tom's code. B. How many combinations contain a repeated digit?

3. A game at a carnival has 4 colors on a wheel, as seen in the diagram. Each section of the wheel is the same size.



Lori wants to design a computer simulation to study how many spins it takes to land on each color once. Using the digits 0 through 9, she will assign a digit to each section of the wheel. Which option describes how the digits can be assigned?

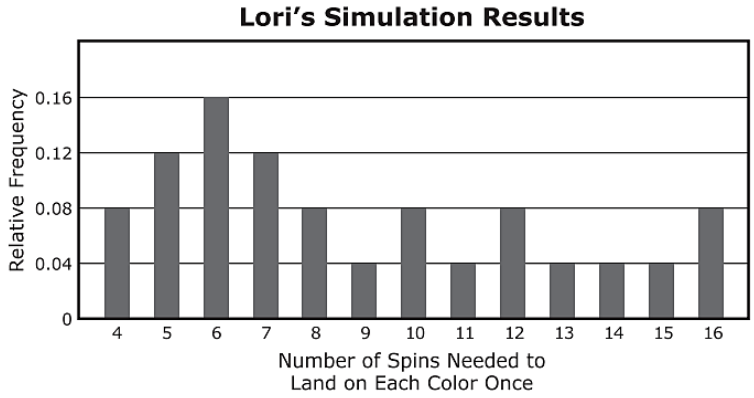
Ⓐ Assign the digit 0 to blue, 1 to yellow, 2 to red, and 3 to green.

Ⓑ Assign the digit 4 to blue, 3 to yellow, 2 to red, and 1 to green.

Ⓒ Assign the digits 0, 1, and 2 to blue; 3, 4, and 5 to yellow; 6, 7, and 8 to red; and 9 to green.

Ⓓ Assign the digits 0, 1, 2, and 3 to blue; 4, 5, and 6 to yellow; 7 and 8 to red; and 9 to green.

4. Lori designs a computer simulation with 25 trials and uses the data from the simulation to create a graph. The graph shows the relative frequency of the number of spins in her simulation to land on each color once. Using the graph, what is the probability that a player lands on each color once in less than 7 spins?



	MAFS.7.SP.3.8-FSA Practice		**Neutral-Questions for this standard may or may not allow the use of a calculator.**
1.	Matt has the following clothes for work: • Two solid-colored pairs of work pants: brown and navy blue. • Four solid-colored shirts: white, green, orange, and yellow. • Two ties: red and purple. A. Draw a tree diagram to display all possible combinations of pants, shirts, and ties. You may use letters to represent the colors (e.g., use G for green). B. What is the probability that Matt's outfit for work will include an orange shirt for the day?		
2.	A. How many different outcomes are represented in your tree diagram for #1? B. If the three primary colors are red, yellow, and blue, how many outcomes in #1 contain at least one primary color?		

3. Lindsey would like to know the number of people at a movie theater who will buy a movie ticket and popcorn. Based on past data, the probability that a person who is selected at random from those that buy movie tickets will also buy popcorn is 0.6. Lindsey designs a simulation to estimate the probability that exactly two in a group of three people selected randomly at a movie theater will buy both a movie ticket and popcorn. For the simulation, Lindsey uses a number generator that generates random numbers.

- Any number from 1 through 6 represents a person who buys a movie ticket and popcorn.
- Any number from 7 through 9 or 0 represents a person who buys only a movie ticket.

In the simulation, one result was "100." What does this result simulate?

A. No one in a group of three randomly-chosen people who buy movie tickets also buys popcorn.

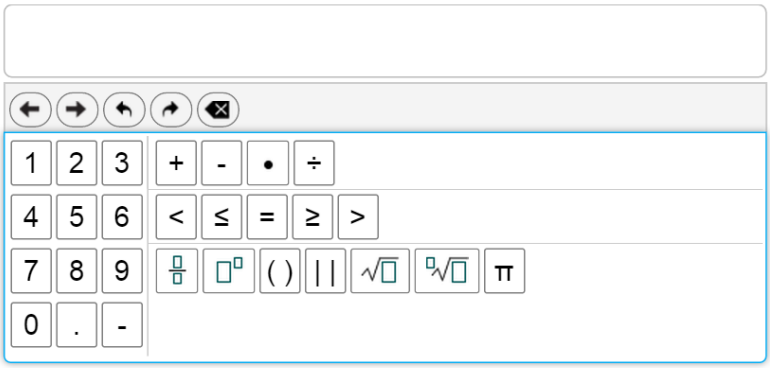
B. Exactly one person in a group of three randomly-chosen people who buy movie tickets also buys popcorn.

C. Exactly two people in a group of three randomly-chosen people who buy movie tickets also buy popcorn.

D. All three people in a group of three randomly-chosen people who buy movie tickets also buy popcorn.

For each trial, Lindsey generates three numbers. Lindsey ran 30 trials of the simulation and recorded the results in the following table:

266	342	847	672	567
268	252	465	429	573
100	818	139	730	910
494	922	155	585	426
593	903	556	981	966
491	186	865	044	147

4.	Use the results of the simulation to estimate the probability that exactly two of three people selected at random from those who buy movie tickets will also buy popcorn. Enter your answer in the space provided. Enter only your answer. 
5.	An animal shelter estimates that $\frac{1}{6}$ of the cats it takes in have orange coats. Design a simulation that would help answer the following question: What is the probability that none of the next four cats the shelter takes in will have orange coats?