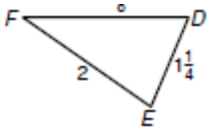
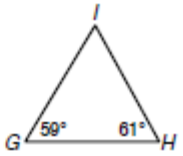
3. Write the angles of $\triangle DEF$ in order from smallest to largest.

$\angle F; \angle D; \angle E$



4. Write the sides of $\triangle GHI$ in order from shortest to longest.

$\overline{HI}; \overline{GH}; \overline{GI}$



Tell whether a triangle can have sides with the given lengths. If not, explain why not.

5. 8, 8, 16 no; $8 + 8 = 16$

6. 0.5, 0.7, 0.3 yes

7. $10\frac{1}{2}$, 4, 14 yes

8. $3x + 2$, x^2, $2x$ when $x = 4$ yes

9. $3x + 2$, x^2, $2x$ when $x = 6$ no; $12 + 20 < 36$

The lengths of two sides of a triangle are given. Find the range of possible lengths for the third side.

10. 8.2 m, 3.5 m

$4.7 \text{ m} < s < 11.7 \text{ m}$

11. 298 ft, 177 ft

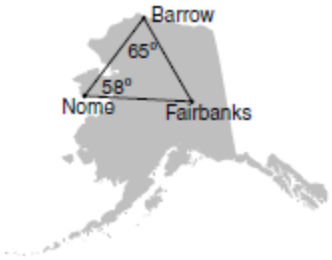
$121 \text{ ft} < s < 475 \text{ ft}$

12. $3\frac{1}{2}$ mi, 4 mi

$\frac{1}{2} \text{ mi} < s < 7\frac{1}{2} \text{ mi}$

1. A charter plane travels from Barrow, Alaska, to Fairbanks. From Fairbanks, it flies to Nome, and then back to its starting point in Barrow. Which of the three legs of the trip is the longest?

Fairbanks to Nome

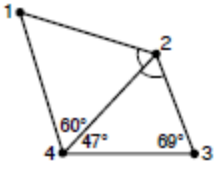


2. Three cell phone towers are shown at the right. The measure of $\angle M$ is 10° less than the measure of $\angle K$. The measure of $\angle L$ is 1° greater than the measure of $\angle K$. Which two towers are closest together?

towers *K* and *L*

Use the figure for Exercises 3 and 4.

In disc golf, a player tries to throw a disc into a metal basket target. Four disc golf targets on a course are shown at right.



3. Which two targets are closest together?

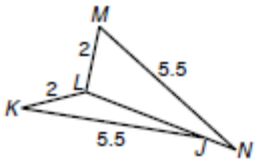
targets 2 and 3

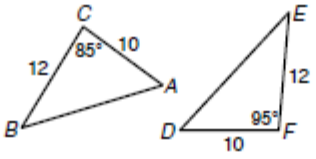
4. Which two targets are farthest apart?

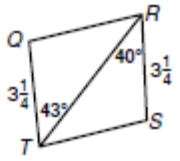
targets 1 and 4

5-6 Key

Compare the given measures.







1. m∠*K* and m∠*M*

m∠*K* < m∠*M*

2. *AB* and *DE*

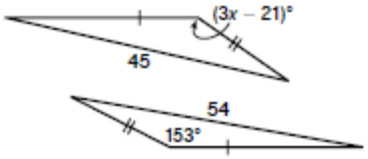
AB < *DE*

3. *QR* and *ST*

QR > *ST*

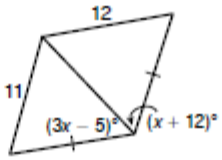
Find the range of values for *x*.

4.



$7 < x < 58$

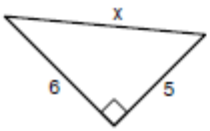
6.



$\frac{5}{3} < x < \frac{17}{2}$

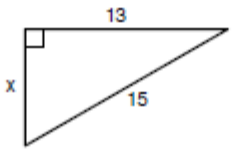
5-7 Key

1.



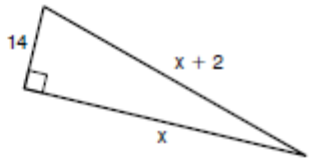
$\sqrt{61}$

2.



$2\sqrt{14}$

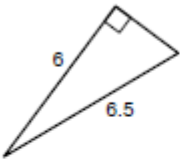
3.



48

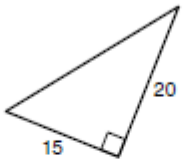
Find the missing side lengths. Give your answer in simplest radical form. Tell whether the side lengths form a Pythagorean Triple.

6.



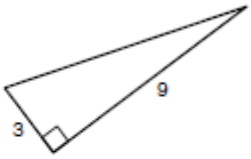
2.5; no

7.



25; yes

8.



$3\sqrt{10}$; no

Tell whether the measures can be the side lengths of a triangle. If so, classify the triangle as acute, obtuse, or right.

9. 15, 18, 20

yes; acute

10. 7, 8, 11

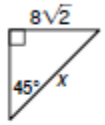
yes; obtuse

11. 6, 7, $3\sqrt{13}$

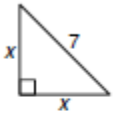
yes; obtuse

5-8 key

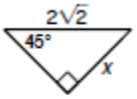
Find the value of *x* in each figure. Give your answer in simplest radical form.

1. 

16

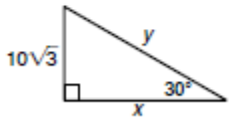
2. 

$\frac{7\sqrt{2}}{2}$

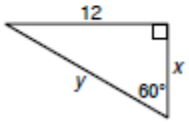
3. 

2

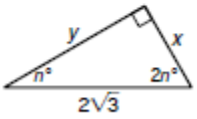
Find the values of *x* and *y*. Give your answers in simplest radical form.



4. $x =$ 30 $y =$ $20\sqrt{3}$

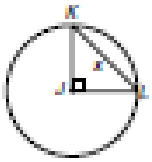


5. $x =$ $4\sqrt{3}$ $y =$ $8\sqrt{3}$



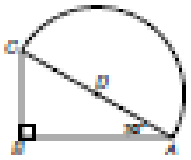
6. $x =$ $\sqrt{3}$ $y =$ 3

1. The circumference of circle *J* is 14π. What is the value of *x*?



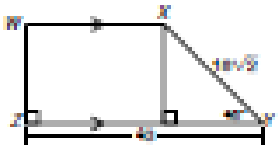
$7\sqrt{2}$

2. The area of semicircle *D* is 18π. What is the perimeter of △*ABC*?



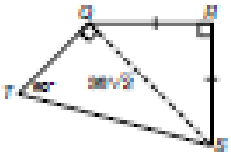
$18 + 6\sqrt{3}$

3. Find the perimeter of quadrilateral *WXYZ*.



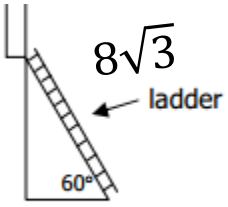
$86 + 18\sqrt{2}$

4. Find the perimeter of quadrilateral *QRST*.



$72 + 36\sqrt{6}$

23) An extension ladder forming a 60° angle with the ground is placed against an outside wall. The top of the ladder touches a window sill that is 12 feet high. To what length is the ladder extended? How far from the wall is the bottom of the ladder? Give answers in radical form and decimal to nearest tenth.



$4\sqrt{3}$

6-1 key

Tell whether each figure is a polygon. If it is a polygon, name it by the number of its sides.

1. 

polygon; nonagon

2. 

not a polygon

3. 

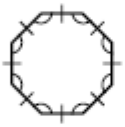
not a polygon

4. For a polygon to be regular, it must be both equiangular and equilateral. Name the only type of polygon that must be regular if it is equiangular. triangle

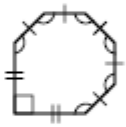
Tell whether each polygon is regular or irregular. Then tell whether it is concave or convex.

5. 

irregular; concave

6. 

regular; convex

7. 

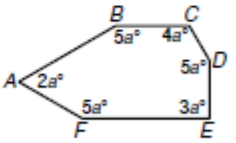
irregular; convex

8. Find the sum of the interior angle measures of a 14-gon. 2160°

9. Find the measure of each interior angle of hexagon *ABCDEF*.

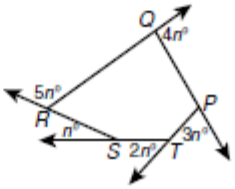
$m\angle A = 60°$; $m\angle B = m\angle D = m\angle F = 150°$;

$m\angle C = 120°$; $m\angle E = 90°$



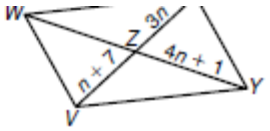
10. Find the value of *n* in pentagon *PQRST*.

24



6-2 key

***VWXY* is a parallelogram. Find each measure.**



10. *VX*

21

11. *XZ*

10.5

12. *ZW*

15

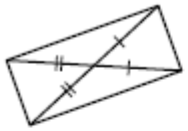
13. *WY*

30

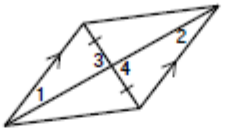
14. Three vertices of $\square ABCD$ are $B(-3, 3)$, $C(2, 7)$, and $D(5, 1)$. Find the coordinates of vertex *A*. (0, −3)

6-3 key

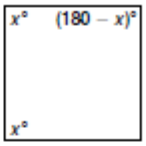
Determine whether each quadrilateral must be a parallelogram. Justify your answers.

3. 

No, the diagonals do not necessarily bisect each other.

4. 

Yes, the triangles with numbered angles are ≅ by AAS. By CPCTC, the parallel sides are congruent.

5. 

No, $x° + x°$ may not be 180°.

Use the given method to determine whether the quadrilateral with the given vertices is a parallelogram.

6. Find the slopes of all four sides: $J(-4, -1)$, $K(-7, -4)$, $L(2, -10)$, $M(5, -7)$

slope of $\overline{JK}$ = slope of $\overline{LM}$ = 1; slope of $\overline{KL}$ = slope of $\overline{JM}$ = $-\frac{2}{3}$; $JKLM$ is a parallelogram.

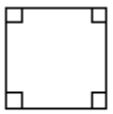
7. Find the lengths of all four sides: $P(2, 2)$, $Q(1, -3)$, $R(-4, 2)$, $S(-3, 7)$

$PQ = RS = \sqrt{26}$; $QR = PS = 5\sqrt{2}$; $PQRS$ is a parallelogram.

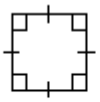
8. Find the slopes and lengths of one pair of opposite sides:

$T\left(\frac{3}{2}, -2\right)$, $U\left(\frac{3}{2}, 4\right)$, $V\left(-\frac{1}{2}, 0\right)$, $W\left(-\frac{1}{2}, -6\right)$ Possible answer: $UV = TW = 2\sqrt{5}$; slope of $\overline{UV}$ = slope of $\overline{TW}$ = 2; $TUVW$ is a parallelogram.

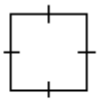
6-4

1. 

rectangle

2. 

square

3. 

rhombus

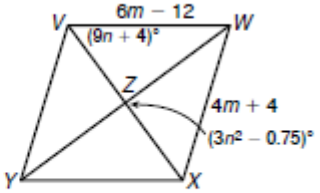
***VWXY* is a rhombus. Find each measure.**

8. XY = 36

9. m∠YVW = 107°

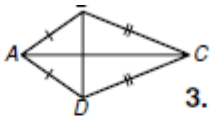
10. m∠VYX = 73°

11. m∠XYZ = 36.5°



6-6 key

In kite $ABCD$, $m\angle BAC = 35°$ and $m\angle BCD = 44°$. For Exercises 1–3, find each measure.

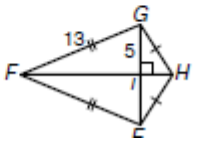


1. $m\angle ABD$ — 55°

2. $m\angle DCA$ — 22°

3. $m\angle ABC$ — 123°

4. Find the area of $\triangle EFG$. — 60 unit^2



10. $QS = 8z^2$, and $RT = 6z^2 + 38$. Find the value of z so that $QRST$ is isosceles.

$z = \sqrt{19}$ or $-\sqrt{19}$

7-1 key

4. The ratio of the angle measures in a quadrilateral is 1 : 4 : 5 : 6. Find each angle measure. — 22.5°; 90°; 112.5°; 135°

5. The ratio of the side lengths in a rectangle is 5 : 2 : 5 : 2, and its area is 90 square feet. Find the side lengths. — 15 ft; 6 ft

11. $\frac{9}{s} = \frac{s}{25}$ — $s =$ ±15

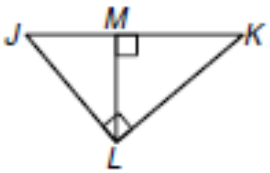
12. $\frac{50}{2t+4} = \frac{2t+4}{2}$ — $t =$ 3, −7

13. $\frac{u+3}{8} = \frac{5}{u-3}$ — $u =$ ±7

14. Given that $12a = 20b$, find the ratio of a to b in simplest form. — 5 to 3

8-1 key

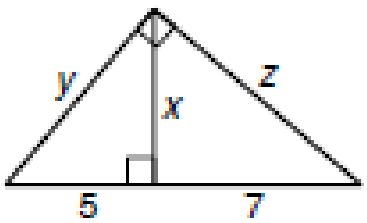
1.



Possible answers: $\triangle JKL \sim \triangle JLM \sim \triangle LKM$

Find x, y, and z.

10.

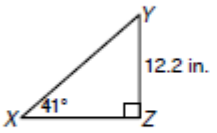


$\sqrt{35}$; $2\sqrt{15}$; $2\sqrt{21}$

8-2 key

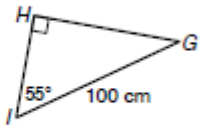
Find each length. Round to the nearest hundredth.

16.



XZ 14.03 in.

17.

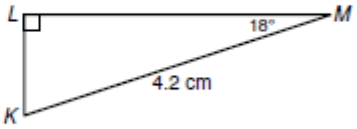


HI 57.36 cm

1. A ramp is used to load a 4-wheeler onto a truck bed that is 3 feet above the ground. The angle that the ramp makes with the ground is 32°. What is the horizontal distance covered by the ramp? Round to the nearest hundredth.

4.80 ft

2. Find the perimeter of the triangle. Round to the nearest hundredth.

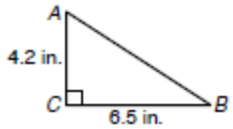


9.49 cm

8-3 key

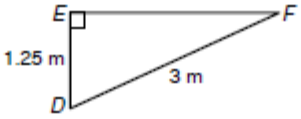
Find the unknown measures. Round lengths to the nearest hundredth and angle measures to the nearest degree.

13.



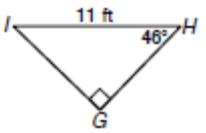
$AB = 7.74$ in.; $m\angle A = 57°$; $m\angle B = 33°$

14.



$EF = 2.73$ m; $m\angle D = 65°$; $m\angle F = 25°$

15.



$GH = 7.64$ ft; $GI = 7.91$; $m\angle I = 44°$

8-4 key

1. $\angle 1$ angle of elevation
2. $\angle 2$ angle of depression
3. $\angle 3$ angle of depression
4. $\angle 4$ angle of elevation

5. The sun is directly overhead. The shadow of the balloon falls 14 feet 6 inches from the tether. Frank sights an angle of elevation of 67°. Find the height of the balloon.

34 ft 2 in.

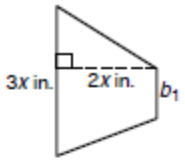
6. Find the length of the cord that tethers the balloon.

37 ft 1 in.

7. The wind picks up and the angle of elevation changes to 59°. Find the height of the balloon.

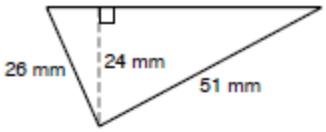
31 ft 10 in.

9-1 key

4. 

b_1 of the trapezoid in which $A = 4x^2$ in^2

$b_1 = x$ in.

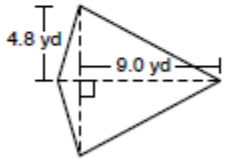
5. 

the area of the triangle

$A = 660$ mm^2

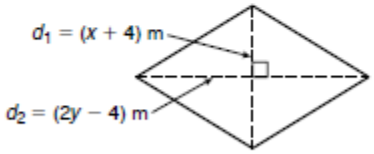
6. the area of a trapezoid in which $b_1 = 3a$ km, $b_2 = 6a$ km, and $h = (10 + 4c)$ km

$A = (45a + 18ac)$ km^2

7. 

the perimeter of the kite in which $A = 49.92$ yd^2

$P = 30.4$ yd

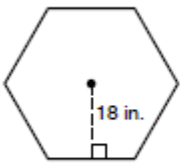
8. 

the area of the rhombus

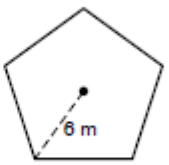
$A = (xy - 2x + 4y - 8)$ m^2

9-2key

Find the area of each regular polygon. Round to the nearest tenth.

11. 

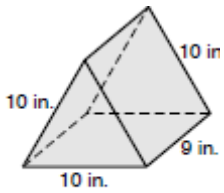
$A \approx 1122.4$ in^2

12. 

$A \approx 85.6$ m^2

10.4-10-7 Key

1. What is the surface area of the prism?

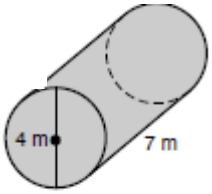


$270 + 50\sqrt{3}$ in^2

2. The dimensions of a square prism are 2 centimeters by 2 centimeters by 12 centimeters. What is its surface area?

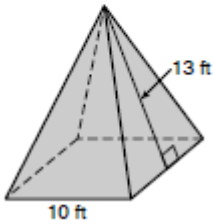
104 cm^2

3. What is the surface area of the cylinder?



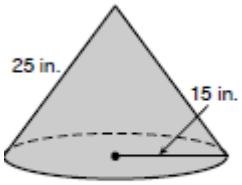
36π m^2

4. What is the surface area of the regular pyramid?



360 ft^2

5. What is the surface area of the cone?



600π in^2

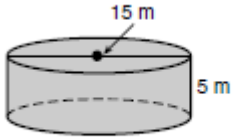
6. The dimensions of a rectangular crate are 4 feet, 6 feet, and 8 feet. What is the volume?

192 ft^3

7. What is the volume of a prism with a height of 4 feet and base area of 9 square feet?

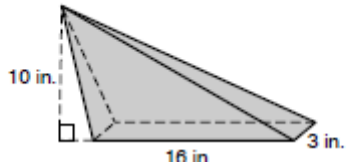
36 ft^3

8. What is the volume of the cylinder?



$\frac{1125}{4}\pi$ m^3

9. What is the volume of the pyramid?



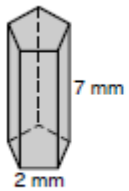
160 in^3

10. What is the volume of a cone with diameter 12 centimeters and height 4 centimeters?

48π cm^3

For #11-12 Use the diagram below:

11. Find the SA of the prism below:



the regular pentagonal prism

$S = 83.8$ mm^2

12. Find the Volume:

V=48.2 mm^2