CHAPTER 7 SOL PROBLEMS

SSM: Super Second-grader Methods

SOL Problems; not Dynamic Variable Problems

25 This figure shows a pattern of triangles and regular hexagons.
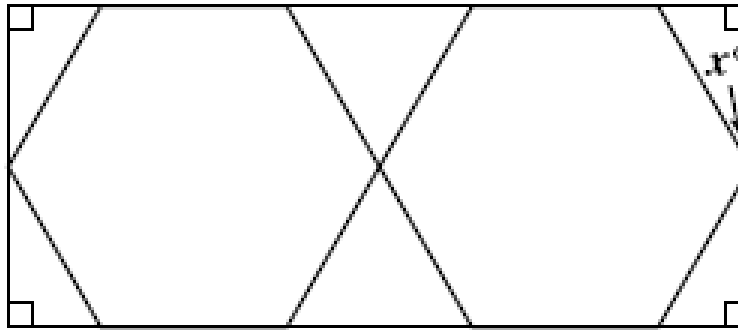
What is the value of x ?

A   30

B   60

C   90

D   120

SSM:
- **x is acute so C and D are wrong.**
- **x is smaller acute (compared to other acute angle in Δ)**

Regular hexagon: each angle is [(n − 2)×180 = 720] ÷6 = 120

120 is an exterior angle to triangle → so 90 + x = 120

$$x = 30$$

26 Which figure has all sides of equal measure but not necessarily all angles of equal measure?

    F   Square
    G   Rectangle
    (**H**) Rhombus
    J   Trapezoid

SSM:
• **Look to find examples of each figure**
• **Rectangles and squares have 4 – 90° angles**
• **One side of a trapezoid is shorter or longer than the others**

**Squares and Rhombus are only quadrilaterals with four equal sides.
Squares have all 90 angles.**

29 In rectangle $ABCD$, the slope of $\overline{AB}$ is $\dfrac{1}{2}$. What is the slope of $\overline{CD}$?

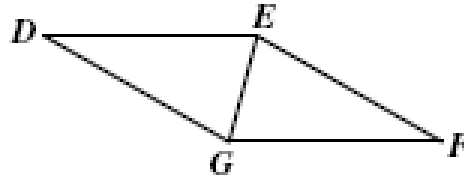A $^{-}2$

B $\dfrac{^{-}1}{2}$

C $\dfrac{1}{2}$

D 2

SSM:
- look at the opposite sides of a rectangle
- They are parallel!

Rectangles are parallelograms
Parallelograms opposite sides are parallel
parallel lines have the same slope

31 $DEFG$ is a rhombus with $m\angle EFG = 28°$.

What is $m\angle GDE$?

A 14°

B 28°

C 30°

D 56°

SSM:
- compare $\angle EFG$ to $\angle GDE$
- they are the same!

rhombus is a parallelogram
opposite angles in parallelogram are equal

32 This figure is a traffic sign in the shape of a regular octagon.

STOP

$x°$

SSM:
- **x is an acute angle; eliminate H and J**
- **fold corner of paper in half to compare to 45 → equal!**

What is the value of x ?

F   45

G   60

H   135

J   180

x is an exterior angle of an octagon (8 sides)
8x = 360 (sum of exterior angles = 360)
 x = 45

33 A rectangular rug is 24 feet long and 10 feet wide. A rhombus design is formed inside the rug by joining the midpoints of each side of the rectangle. What is the length of each side of the rhombus?

A 13 ft

B 26 ft

C 169 ft

D 240 ft

SSM:

• **Numbers in C and D don't fit inside the sides of the rectangle**

Drawing a picture gives us a right-triangle in a corner →
so Pythagorean Thrm applies
midpoints divide rectangle sides in half!

$$5^2 + 12^2 = x^2$$
$$25 + 144 = x^2$$
$$169 = x^2$$
$$13 = x$$

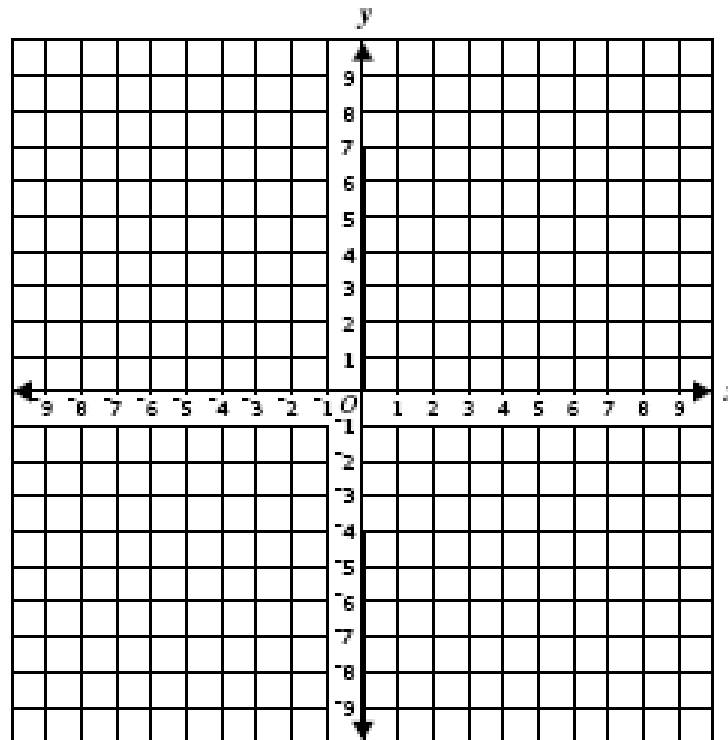**44** Parallelogram $RSTV$ has coordinates $R(0, 0)$, $S(2, 4)$, $T(6, 0)$, and $V(4, ^-4)$. Which ordered pair represents the intersection of the diagonals of this parallelogram? (The coordinate grid may be used to help answer this question.)

F   (2, 0)

G   (3, 0)

H   (3, 1)

J   (4, $^-1$)

Midpoint formula:

Use to find each mid-point

SSM:
- **plot the answers (points)**
- **see which point corresponds to intersection**

24 **Which of the following quadrilaterals is *not* a parallelogram?**

F   Rectangle
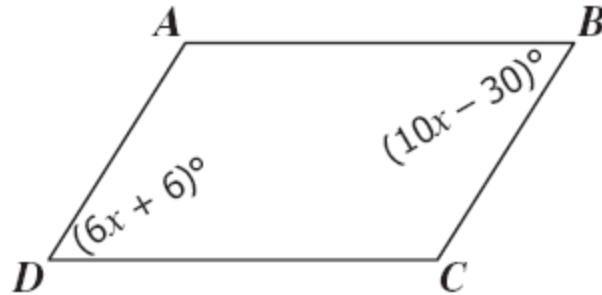G   Rhombus
H   Square
J   Trapezoid

SSM:
• **draw the answer and see if it looks like a parallelogram**

Remember Quadrilateral hierarchy:

Parallelogram   **Trapezoid**
Rectangle   Rhombus
         Square

25

SSM:
- $\angle C$ is medium obtuse answers A and B are wrong

In parallelogram $ABCD$, the measure of $\angle C$ is —

A   82.5°
B   97.5°
C   120.0°
D   130.0°

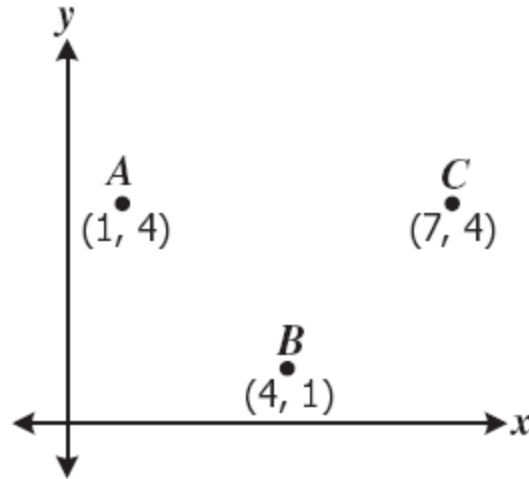**Opposite angles are congruent:**

$$6x + 6 = 10x - 30$$
$$6 = 4x - 30$$
$$36 = 4x$$
$$9 = x$$

Consecutive angles are supplementary:
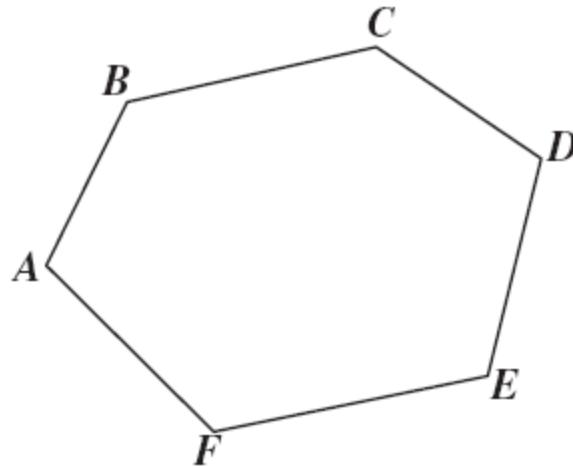
$6(9) + 6 = 60 \qquad 180 - 60 = 120$

SSM:
- **graph all answers (points)**
- **pick the one that makes it a square (4,7)**

In the drawing above, what must be the coordinates of D to show $ABCD$ is a square?

A   (7, 7)
B   (4, 7)
C   (4, 5)
D   (4, 4)

Square – all sides equal

up 3 and right 3 to get from B to C, so
up 3 and right 3 to get from A to D (4, 7)

28

SSM:
- **start with n = 3 and S = 180**
- **add 1 to n and 180 to S**
- **repeat until n = 6**

Given the polygon shown above, $m\angle A + m\angle F + m\angle E + m\angle D + m\angle C + m\angle B =$

F   360°

G   540°

H   720°

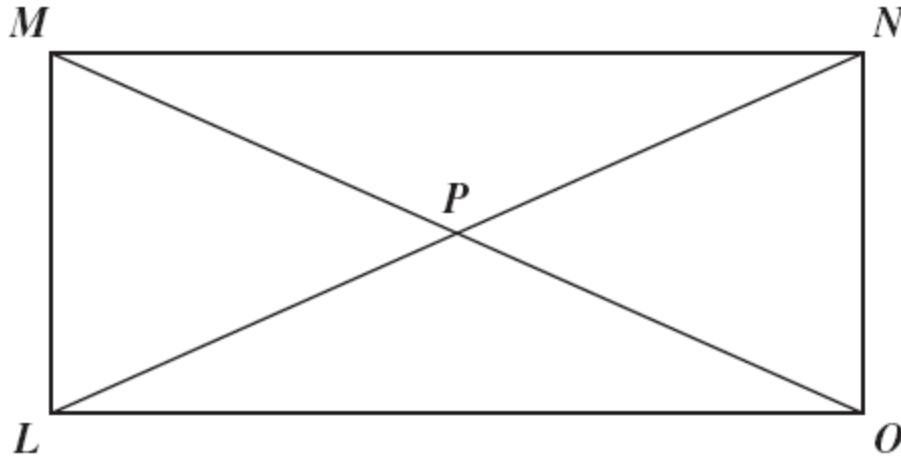**J**   900°

Sum of $\angle$'s = (n − 2) × 180

$$= (6 - 2) \times 180$$

$$= 720$$

30 Rectangle $LMNO$ represents a park that has walking paths $\overline{LN}$ and $\overline{MO}$ that intersect at P. The length of $\overline{PN}$ is 195 feet, and the length of $\overline{MN}$ is 360 feet. What is the length of $\overline{MO}$, one of the walking paths?
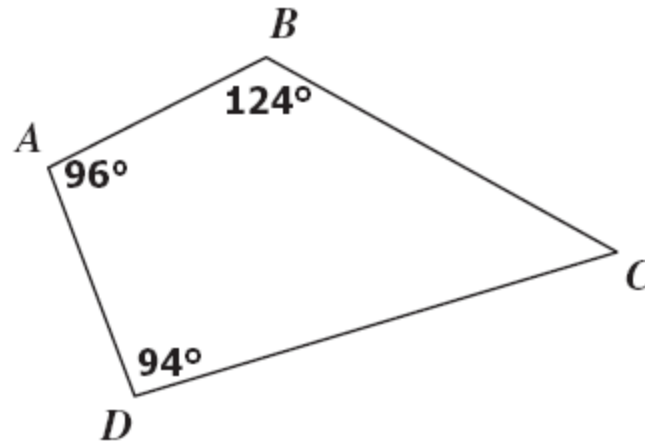

F 150 ft
G 195 ft
H 360 ft
J 390 ft

SSM:
- measure PN
- compare with MP and PO
- add together

Rectangle's diagonals bisect each other and are equal
2 (PN) = MO
2 (195) = 390 = MO

31 What is the measure of $\angle C$ in quadrilateral $ABCD$?

A 46°
B 56°
C 86°
D 96°

SSM:
- $\angle C$ is middle acute so answers C and D are wrong
- compare with corner of paper folded in half (45° angle)

Sum of $\angle$'s = 360

$360 = 94 + 96 + 124 + x$

$360 = 314 + x$

$46 = x$

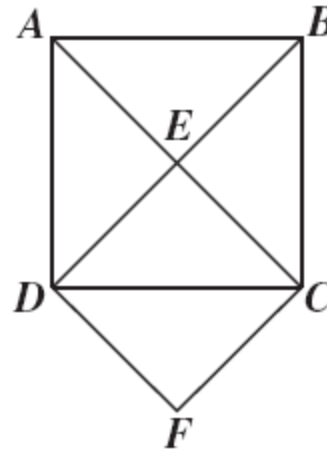33 When tiles are tessellated in a plane, what angle measure sum is required of the tiles surrounding a single point?

  A   90°
  B   180°
  C   360°
  D   720°

SSM:
• **once around a point is 360**

tessellation → no gaps or overlaps
< 360°   or   360° >

24

ABCD and *DECF* are both squares. If $AC = 28$ millimeters, what is the perimeter of *DECF* ?

F   14 mm

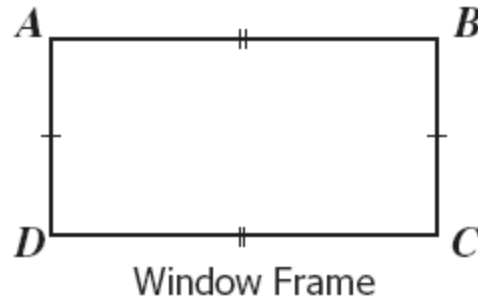**G**   28 mm

H   42 mm

J   56 mm

Square's diagonals bisect each other
$$EC = \tfrac{1}{2}\,AC = 14$$
EC is one of the 4 equal sides of DECF
$$P_{DECF} = 4 \times 14 = 56$$

25 **The opposite sides of a window frame are congruent.**

A B

D C

Window Frame

SSM:
• **no help**

Which additional piece of information would verify that the frame is a rectangle?
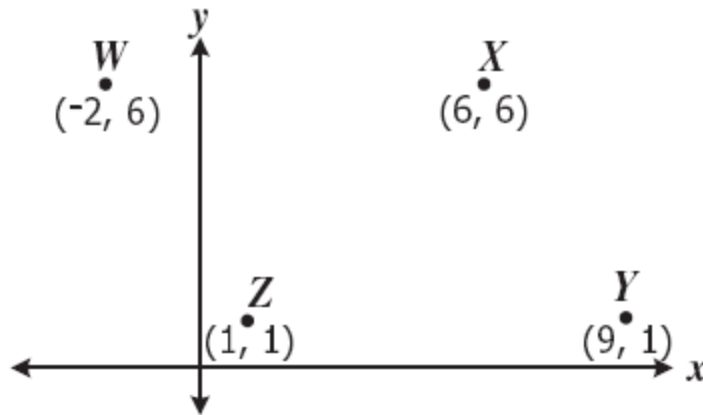
A $\angle B \cong \angle D$

B $\overline{AC} \cong \overline{BD}$

C $\overline{AC} \perp \overline{BD}$

D $m\angle A + m\angle D = 180°$

Rectangle characteristic (often tested) is that the diagonals are equal

26

W
(-2, 6)

X
(6, 6)

Z
(1, 1)

Y
(9, 1)

In parallelogram $WXYZ$**, what are the coordinates of the point of intersection of** $\overline{WY}$ **and** $\overline{ZX}$ **?**
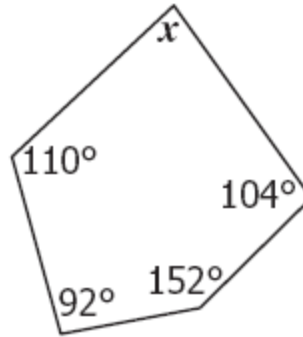
F (2.5, 2.5)
G (7.5, 3.5)
H (5.5, 3.5)
J (3.5, 3.5)

Parallelogram's diagonals bisect each other:

So the midpoints of either WY or XZ is the intersection point

XZ midpoint is ((1+6)/2 , (1+6)/2) or (3.5, 3.5)

27   The pentagon has the angle measures shown.

SSM:
- **Angle x is a large acute angle**
- **Only answer that is acute is A**

What is $m\angle x$ **?**

A   82°
B   92°
C   108°
D   112°

Pentagon's interior angles sum to 540 = (n -2)×180

540 = x + 104 + 152 + 92 + 110

540 = x + 458

82 = x

28 For a regular polygon with three sides, each interior angle has a measure of —

F 180°

G 60°

H 45°

J 30°

SSM:
• **3 sided polygon is a triangle**
• **regular all angles equal**
• **180/3 = 60**

Triangle's interior angles sum to 180 = (n -2)×180

180 = x + x + x

180 = 3x

60 = x

29 Each interior angle of a regular polygon measures 156°. How many sides does the polygon have?

A   13

B   14

C   15

D   16

SSM:

• **not much help**

Interior angle + exterior angle = 180

156 + x = 180

x = 24

360 = n × exterior angle

360 = 24 n

15 = n

31 If $ABCD$ is a parallelogram and $x = 5$, what is $m\angle D$?
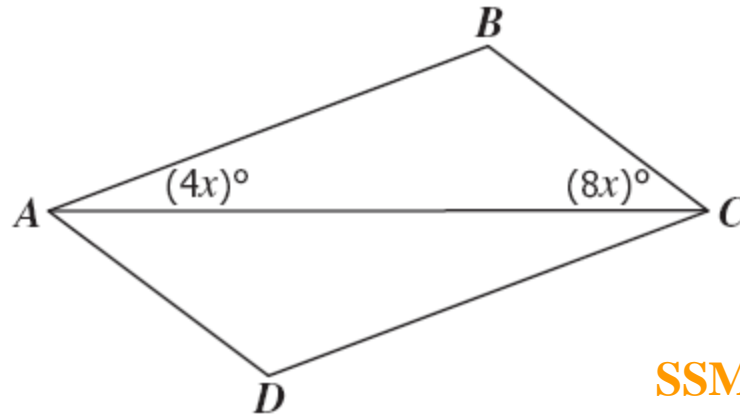
A 100°

B 120°

C 140°

D 160°

SSM:
- Use corner of scrap paper: Angle D is a medium obtuse angle eliminate answers A and D

Triangle's interior angles sum to $180 = \angle B + 4x + 8x$
  where $x = 5$
$180 = \angle B + 4(5) + 8(5)$
$180 = \angle B + 60$
$120 = \angle B$

Opposite angles equal in parallelogram so $\angle D = 120$

3 One exterior angle of a regular polygon measures 72°. What is the measure of one interior angle?

A 18°

B 108°

C 360°

D 540°

SSM:
- **interior angle < 180**
- **180 (72 + 108) is a "magic" #**

Interior + Exterior = 180   (linear pair)
180 − 72 = 108

24 Gene's horse corral, labeled *ABCD* in the drawing, is shaped as a parallelogram and is adjacent to the shed, labeled *ZAD*.
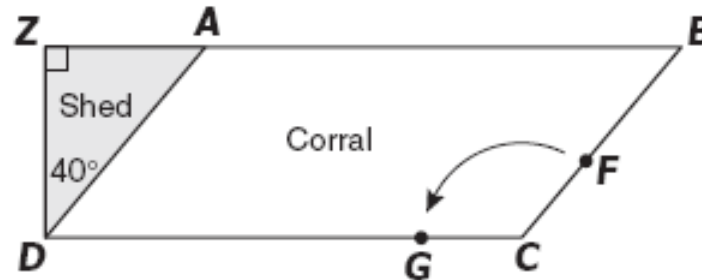
SSM:
• **angle is obtuse**

If a gate, labeled *CF*, opens all the way to the corral fence, position labeled *CG*, through how many degrees does the gate swing?

F 40°

G 50°

H 130°

J 140°

Parallelograms: consecutive angles are supplementary

angle D forms a right angle with 40° angle, so angle D = 50
180 – 50 = 130

or

Parallelograms: opposite angles congruent

angle A is exterior angle to shed so angle A = 40 + 90 = 130
angle C must be 130

25 A diagonal of parallelogram *DEFG* forms angles with measures as shown.
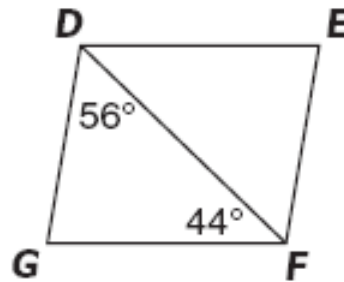
SSM:
- angle is *large* acute
- only C applies

What is the measure of $\angle DEF$**?**

A $44°$
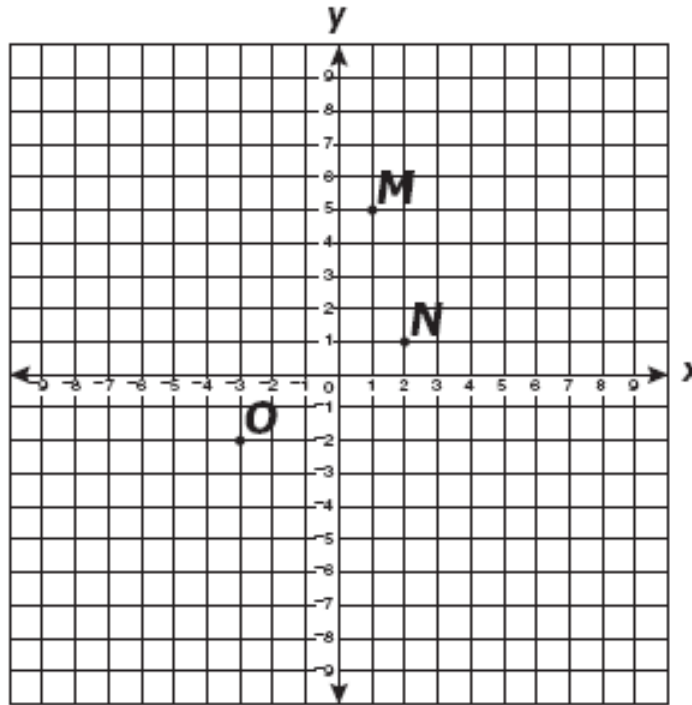
B $56°$

C $80°$

D $100°$

Parallelograms: diagonals form alternate interior angles

so angle D is 56 + 44 = 100

Parallelograms: consecutive angles supplementary

angle E = 180 − 100 = 80

26

SSM:
- plot each of the answer points (-5, 2), (-4, 2), (-3, 2) and (0,2)
- Use eyes to see which is correct

Quadrilateral *MNOP* is a parallelogram. The coordinates of three of its vertices are $M(1,5)$, $N(2,1)$, and $O(^-3, ^-2)$. If $(x,2)$ are the coordinates of *P*, what is the value of *x* ?

F $^-5$

G $^-4$

H $^-3$

J 0

Parallelograms: opposite side parallel

so slope from MN must be same for PO

over (left) 1 and up 4 gets to (-4, 2)

27 Rectangular flowerbeds are built on each side of a fishpond in the shape of a regular octagon.
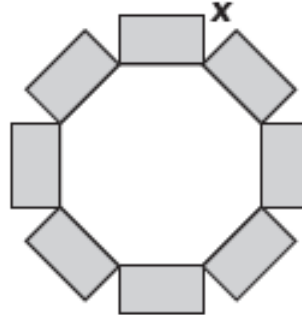
SSM:
- **angle is acute**
- **answer D is wrong**

What is the measure of the angle, x, between two consecutive flowerbeds?

A   30°

B   45°

C   60°

D   90°

Octagon: 360 / 8 = 45 (exterior angle measure)

Once around a point is 360°
Interior angle + exterior angle = 180
two rectangle corners (90+90) = 180

so x must be the same as the exterior angle!

x = 45

28

24°

SSM:
• no real help

A portion of a regular polygon is shown. The polygon has —

F   15 sides
G   16 sides
H   18 sides
J   20 sides

number of sides, n is obtain by:

n = 360 / ext angle
  = 360 / 24
  = 15

29 Each interior angle of a regular polygon has a measure of 162°. The polygon has a total of —

A   17 sides
B   18 sides
C   19 sides
D   20 sides

SSM:
• **no real help**

Exterior angle + interior angle = 180
          ext   +   162   = 180
                                        ext = 18

number of sides, n is obtain by:

n = 360 / ext angle
   = 360 / 18
   = 20

31
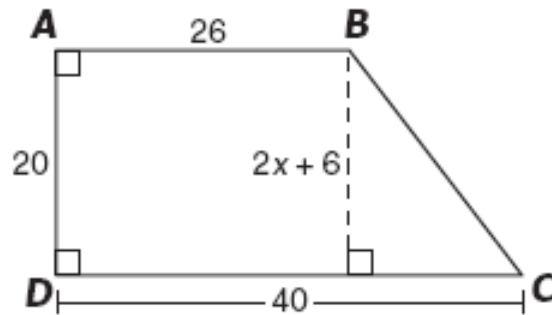
SSM:
- **measure side with x in it**
- **compare with other sides**
- **must be equal to 20**
- **plug in answers to see which equals 20**

What is the value of *x* in trapezoid *ABCD* ?

A   17
B   13
C   10
D   7

side with 2x + 6 forms a rectangle
opposite side of a rectangle are equal

2x + 6 = 20
2x   = 14
x   = 7

25 *XYZW* is a rectangle.

Which of the following is *not* *necessarily* true?

A $XY = WZ$

B $\overline{YZ} \perp \overline{WZ}$

C $XZ = WY$

D $XY = XW$

Answer A (opposite sides are congruent; parallelogram)
Answer B (all angles are right angles; rectangle)
Answer C (diagonals are congruent; rectangle)
Answer D (only true if it is a square too!)

26 In the drawing, a *regular* polygon is partially covered by a rectangle.

SSM:
• **no real help**

135°
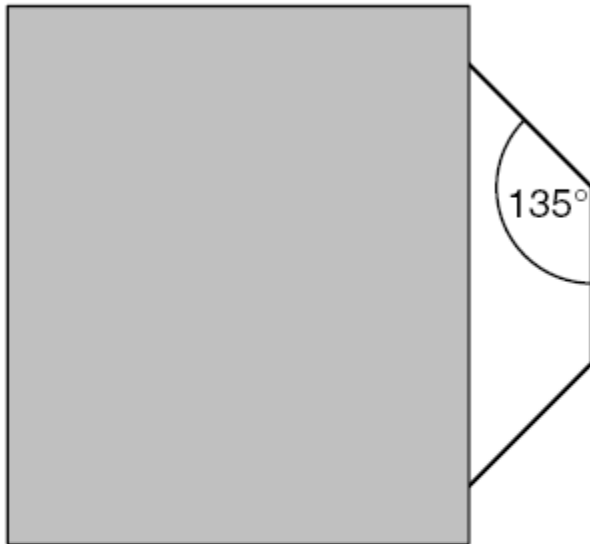
What is the number of sides of this polygon?

F 12

G 10

H 8

J 6

int angle + ext angle = 180
135   +   ext   = 180
**   ext   = 45**

number of sides, n is obtain by:

n = 360 / ext angle
** = 360 / 45**
** = 8**

27

If $\angle E \cong \angle C$, what is $m\angle E$?
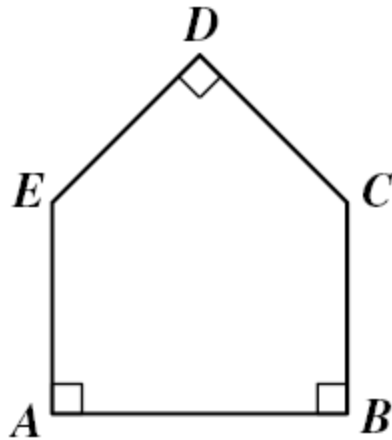
A   110°
B   120°
C   135°
D   150°

SSM:
• **Angle is obtuse**
• **Use scratch paper folded side**
• **angle is halfway beyond 90**

sum of interior angles for a pentagon
3×180 = 540

3×90 = 270

540 − 270 = 270 = 2∠E

135 = ∠E

28 Three vertices of a parallelogram have coordinates $(1, {}^-4)$, $(3, 8)$, and $(5, 0)$.
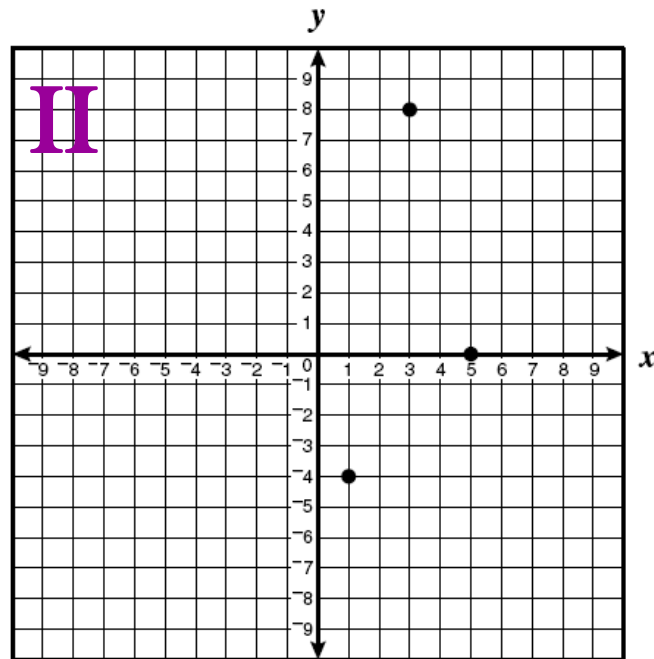
What are the coordinates of the second-quadrant vertex?

F $({}^-3, 12)$

G $({}^-1, 4)$

H $(1, {}^-4)$

J $(9, 4)$

SSM:
- **Plot answer points**
- **Only F & G are Quadrant II**

Opposite sides are parallel

Form triangle from (5,0) to (3,8) (left 2 and up 8)

Go left 2 and up 8 from (1,-4)

31 A regular pentagon and a regular hexagon share a side as shown in the figure.
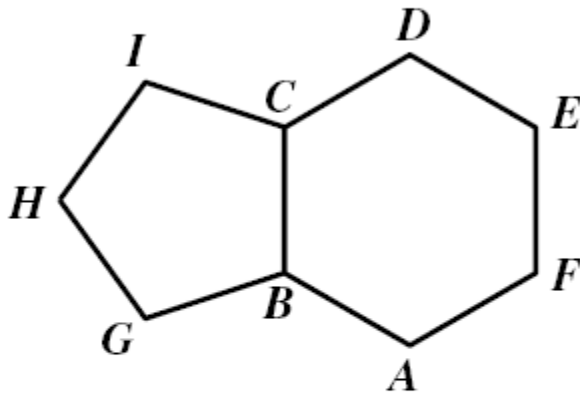
What is the measure of $\angle ABG$?

A   108°

B   120°

C   132°

D   144°

SSM:
- **Use scratch paper folded to check how close obtuse angle is to 135**
- **Slightly less, but pretty close**

Interior angles for hexagon: 120
Interior angles for pentagon: 108

Once around a point is 360

360 − 228 = 132

32 In the rectangle *PQRS*, m∠1 = 50°.
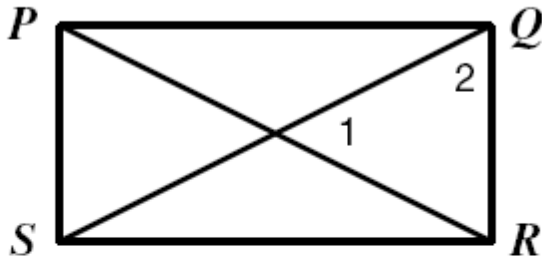
SSM:
- **Angle 2 is middle acute**
- **Eliminate answers F and G**

What is m∠2?

F   130°

G   85°

H   70°

J   65°

diagonals form isosceles triangles

angle 1 is 50

so angle 2 is ½ (180 – 50) = ½ (130) = 65

43

$B(1, 7)$ $C(7, 7)$

$A(1, 1)$ $D(7, 1)$
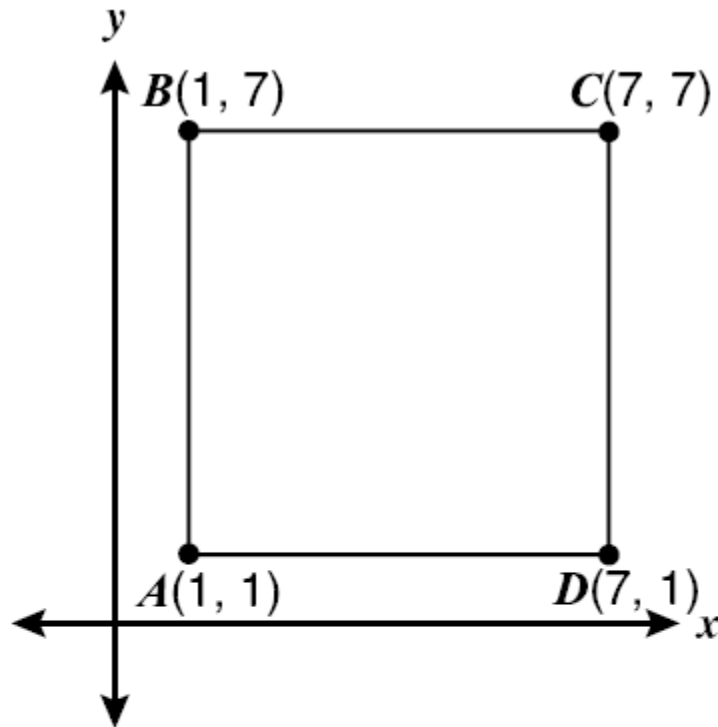
SSM:
- **draw on graph paper**
- **must be on line y = x**
- **eliminates B and D**

What is the point of intersection of $\overline{BD}$ and $\overline{AC}$?

A (3, 3)

B (3, 4)

C (4, 4)

D (4, 3)

• Midpoint ((1+7)/2, (1+7)/2) = (8/2, 8/2) = (4,4)

4   The polygon shown is convex.
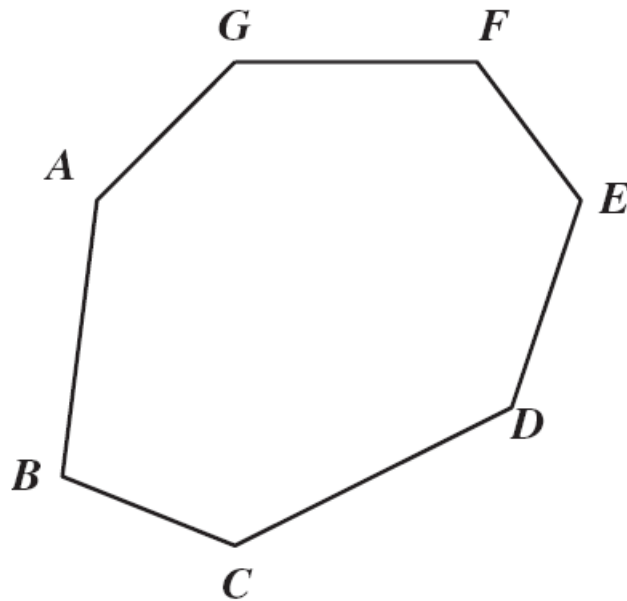
SSM:
• **not much help**

The sum of its interior angle measures
is —

F   900°

G   1,260°

H   1,620°

J   2,520°

n, number of sides, is 7

Sum of angles = (n − 2)×180 = 5 × 180 = 900

7   Quadrilateral *QRST* is placed on a
    coordinate grid as shown.
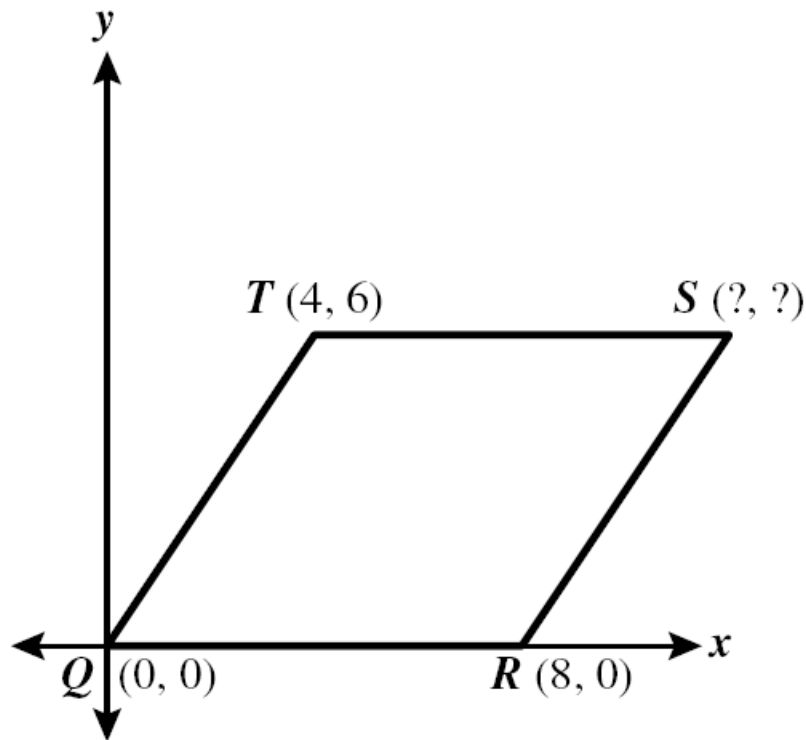
SSM:
- y value is along 6
  eliminates B and D
- x value is beyond 8
  eliminates A

To get from Q to T: we go left 4
and up 6

To get from R to S: we do the same

What coordinates for *S* make *QRST* a
parallelogram?

    A   (8, 6)

    B   (8, 10)

    C   (12, 6)

    D   (12, 10)

24

In rectangle $ABCD$, which of the following pairs of segments are *not* necessarily congruent?

F $\overline{BD}$ and $\overline{AC}$

G $\overline{AB}$ and $\overline{CD}$

H $\overline{BC}$ and $\overline{DC}$

J $\overline{BE}$ and $\overline{CE}$

Three answers are correct; one incorrect

Answer H does not fit the drawing

25 The town plaza in a certain town is a parallelogram. The town's planning committee has decided to build a fountain at the center of the plaza. This sketch shows the corner points when placed on a coordinate grid.

Which coordinates show where the fountain will be located?
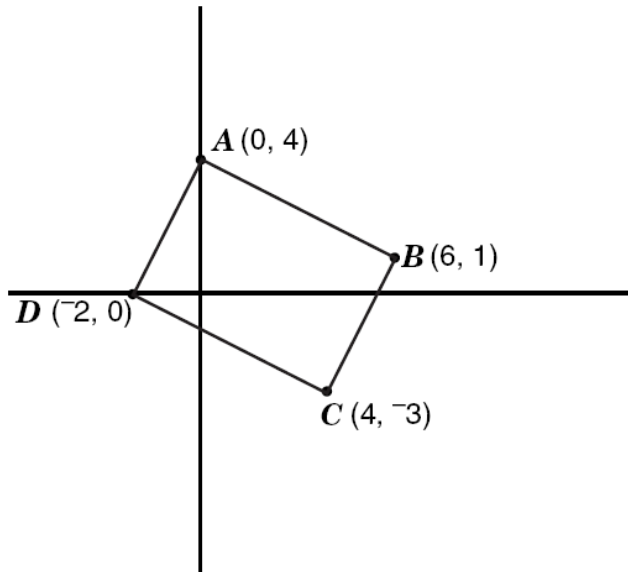
A (2, 0.5)
B (0.5, 2)
C (3, 1.5)
D (1.5, 1)

SSM:
- **plot all answer points**
- **see which one is "center"**

parallelogram: diagonals bisect each other

midpoint formula: ($(x_1+x_2)/2$, $(y_1+y_2)/2$)

((-2 + 6)/2 , (0+1)/2) = (4/2 , ½)

= (2, 0.5)

26 Quadrilateral *ABCD* is a parallelogram.

A   B

D   C
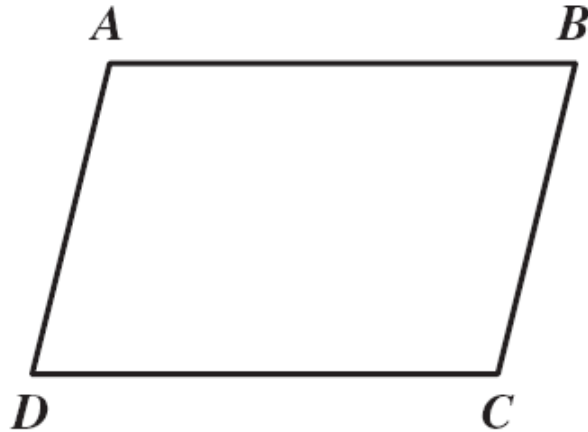
SSM:
• Look at the picture
• Use your scrap paper to
  measure the answers F & G
• J is only one the makes sense

Which of the following *must* be true?

F $\overline{AB} \cong \overline{AD}$

G $\overline{AC} \cong \overline{BD}$

H $\angle A \cong \angle D$

J $\angle B \cong \angle D$

Parallelogram characteristics:

Opposite angles are congruent

27 *ABCD* is a rhombus.
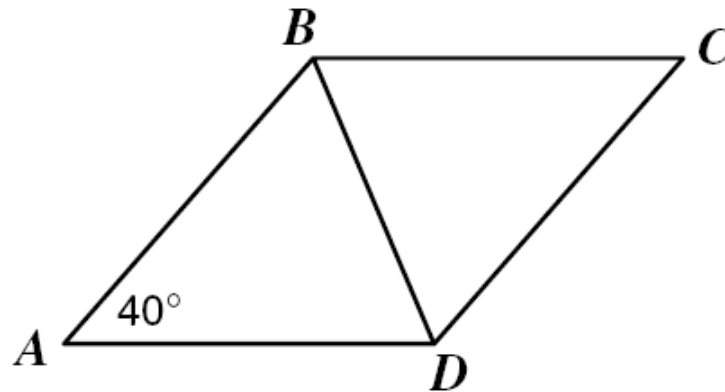
What is the measure of ∠*CBD*?

A 50°

B 60°

C 70°

D 75°

Angle B must be supplementary to angle A (from parallelogram's characteristics)

so angle B is 140

rhombus diagonals act as angle bisectors so they divide B into two 70° angles

28 If each interior angle of a regular
    polygon measures 120°, how many
    sides does the polygon have?

F 14

G 12

H 8

J 6

interior angle + exterior angle = 180

120 + Ext = 180

exterior angle = 60

360 / exterior angle = n (nr of sides)

360 / 60 = 6 = n

29 Which angle measure below is *not* a
    possible measure of an exterior angle
    of a regular polygon?

    A   36°

    B   40°

    C   45°

    D   54°

Three answers are correct; one incorrect

**divide answers into 360 to get number of sides
and it must be a whole number**

Answer D does not fit the drawing

30
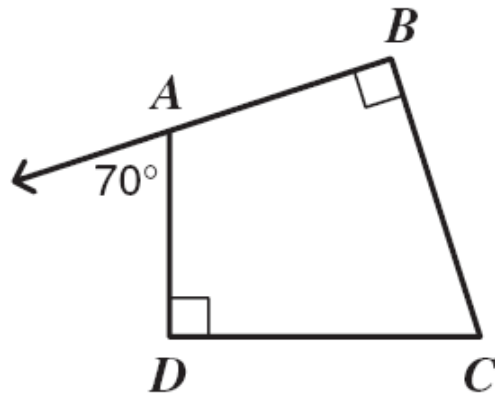
SSM:
- **Look at the picture**
- **angle C is acute**
  eliminates all answers but F

In the figure, what is the measure of ∠*C*?

F 70°

G 90°

H 100°

J 110°

All angles inside figure must add to 360 for quadrilateral

Angle A forms linear pair with 70° exterior angle → so angle A = 110

360 – (90 + 90 + 110) = angle C = 70

24   A ——————————— B
          22°

                    D   C
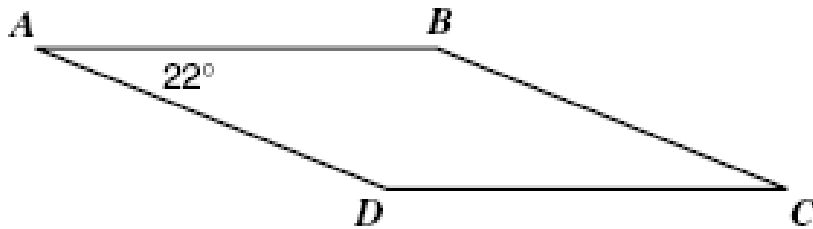
SSM:
- **angle C is small acute**
- **only answer F fits**

Quadrilateral *ABCD* is a parallelogram.
The measure of ∠*C* is —

F   22°

G   68°

H   112°

J   158°

parallelogram:

opposite angles are congruent

25   The vertices of parallelogram *ABCD* have coordinates *A*(1, 8), *B*(4, ⁻2), and *C*(⁻2, ⁻7).

What are the coordinates of *D*?

A (⁻5, 3)
B (⁻3, 5)
C (2, 3)
D (5, ⁻3)
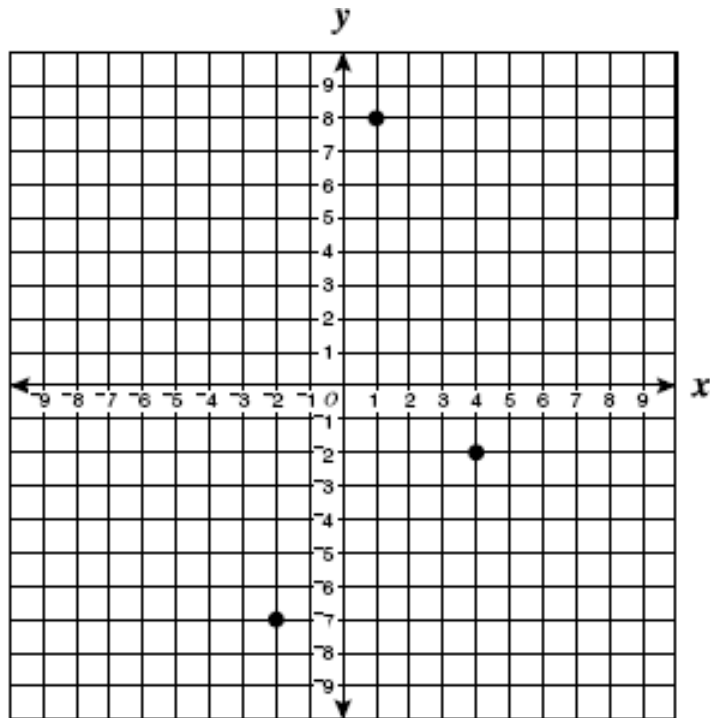
SSM:
• plot answer points on graph paper
• D is in QII

Since opposite sides of a parallelogram are parallel:

B to A is left 3 and up 10
C to D must be left 3 and up 10

C to D(-2 – 3, -7 + 10) = (-5, 3)

26 A desktop was made from the scrap of
    plywood shown by cutting (in a
    straight line) from C to E.
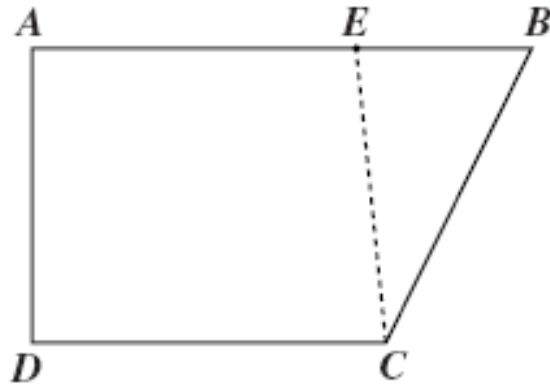
SSM:
* look at picture and see which
  answers make any sense

Which measurement would ensure that
the desktop is rectangular?

F $AE = EB$

G $AC = BD$

H $EC = CD$

J $DE = CA$

**Key characteristic of a rectangle is that the
diagonals are congruent !**

27 Which of the following is *not* true about a parallelogram?

   A   Any two opposite sides are congruent.

   B   Any two opposite angles are congruent.

   C   The diagonals bisect each other.

   D   Any two consecutive angles are complementary.

SSM:
- **3 are true and 1 is false**

complementary → two angles add to 90
consecutive angles of a parallelogram are supplementary

28

90°   90°

100°   105°

x
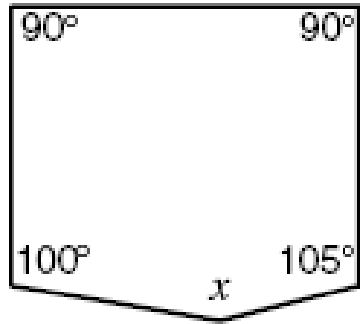
What is the value of x in the pentagon above?

F 90°

G 155°

H 245°

J 335°

Sum of the interior angles of a pentagon, n = 5

$(n - 2) \times 180 = (3) \times 180 = 540$

$540 = 2 \times 90 + 100 + 105 + x$

$540 = 385 + x$

$155 = x$

29
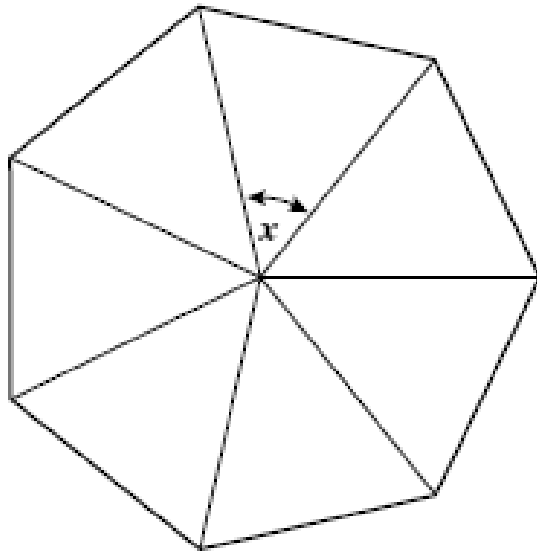
SSM:
- **x is medium acute**
- **circle → 360°**
- **7 even pieces**

Which is the *closest* to the measure of a central angle *x* in this regular polygon?

A 40°

B 45°

C 50°

D 60°

Once around the circle is 360°

$$360 \div 7 = 51.42$$

30

A

B

C
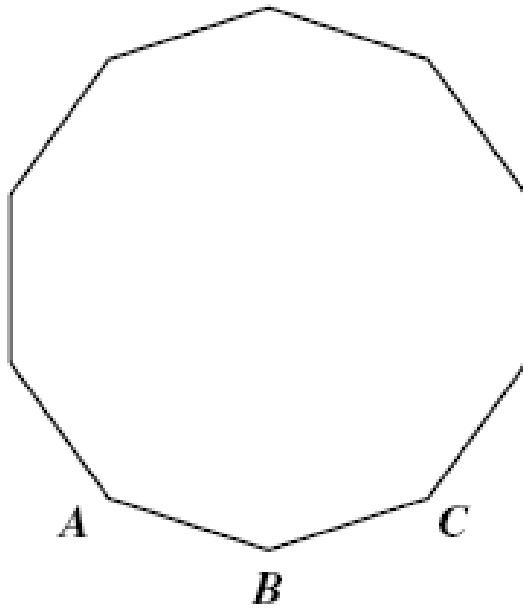
What is the measure of interior angle
ABC of the regular polygon shown?

F   225°

G   180°

H   160°

J   144°

$n = 10 \rightarrow$ **decagon**

$360 \div 10 = 36$ **(exterior angle)**

$180 - 36 = 144$ **(interior angle)**

4
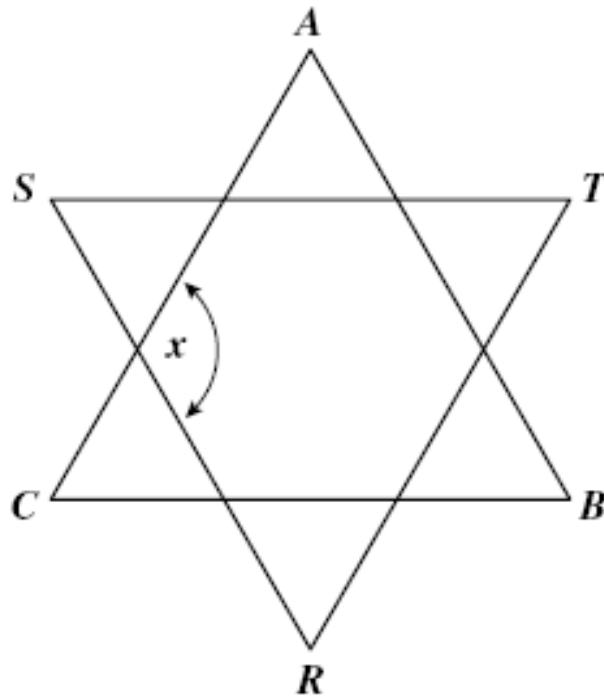
SSM:
• **x is an obtuse angle**

In the diagram, $\triangle ABC$ and $\triangle RST$ are congruent equilateral triangles with corresponding sides parallel. What is the value of x?

x and the angle next to it toward S form a linear pair

F 90°

G 120°

the angle next to x is 60 (angle S is 60 from equilateral triangles and angle C is 60 for same reason; angle to the right of S in small triangle is an alternate interior angle to C and also equal to 60)

H 135°

J 144°

180 – 60 = 120 = x

24 In rhombus $ABCD$, $AC = 30$ inches and
    $BD = 40$ inches.
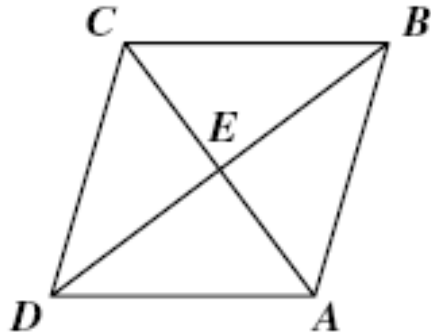
SSM:
- Use AC as a ruler to estimate CD
- CD < 30 (by a little)
- multiply estimate by 4 and H is only close answer
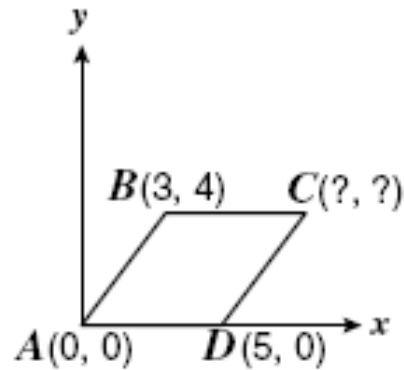
What is the perimeter of the rhombus?

F   25 in.

G   50 in.

H   100 in.

J   200 in.

Rhombus' diagonals are perpendicular and bisect each other

We get 4 right triangles that are pythagorean triples
15, 20, 25 (hypotenuse and outside segment of rhombus)

$25 \times 4 = 100$

25 *ABCD* is a rhombus.

What are the coordinates of vertex *C*?

A (5, 4)

B (6, 4)

C (8, 4)

D (4, 3)

**Rhombus' sides are equal
so we have to add 5 to the x value of (3, 4)**
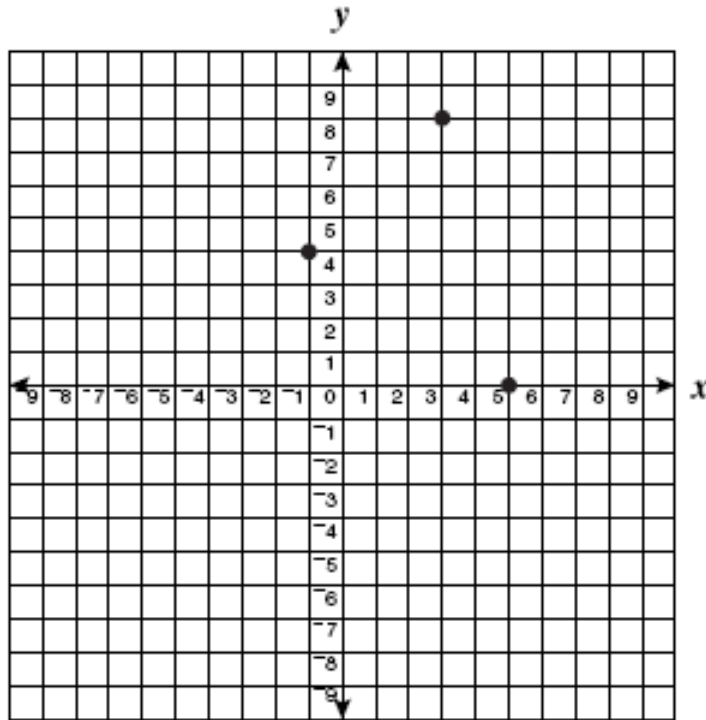
26 The quadrilateral *ABCD* is a
    parallelogram.

Which of the following pieces of
information would suffice to prove
that *ABCD* is a rectangle?

F $AC = BD$

G $AB = AD$

H $m\angle B = m\angle D$

J $\angle A$ and $\angle D$ are supplementary
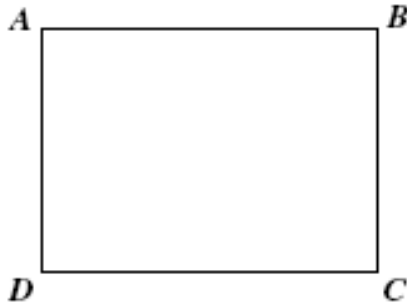
SSM:
• **looking at the picture:**
  answer G is wrong

Rectangle key characteristic is that the diagonals are equal

27　Three vertices of parallelogram *ABCD* have coordinates $(^-1, 4)$, $(3, 8)$, and $(5, 0)$.

SSM:
- **graph the points**
- **answers A and B are QII**

What are the coordinates of the other first-quadrant vertex?

A　$(^-3, 12)$

B　$(^-1, 4)$

C　$(1, 4)$

D　$(9, 4)$

Answers C and D are only Quadrant I points

plotting points shows answer D forms a parallelogram

29
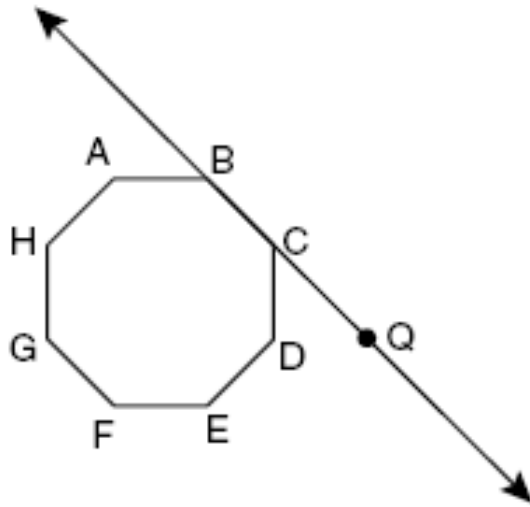
SSM:
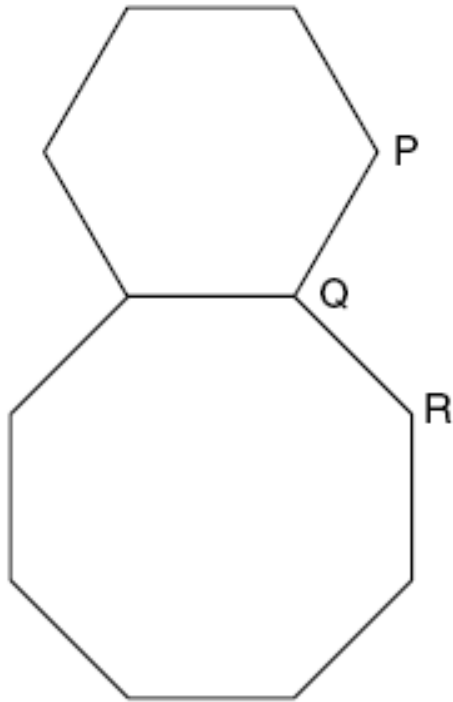- **angle is medium acute eliminates A and possibly B**
- **use folded corner of scrap paper → its 45!**

Figure *ABCDEFGH* is a regular octagon. What is the measure of ∠DCQ?

A   135°
B   60°
C   45°
D   30°

angle DCQ is an exterior angle

360 ÷ 8 (number of sides) = exterior angle

45 = exterior angle

30

P

Q

R

Add two interior angles and subtract from 360
or
Add two exterior angles together

$360 \div 6 = 60$ (ext $\angle$ for hexagon)
$360 \div 8 = 45$ (ext $\angle$ for octagon)

$60 + 45 = 105 = \angle PQR$

The two adjacent figures are a regular hexagon and a regular octagon. What is the measure of $\angle PQR$?
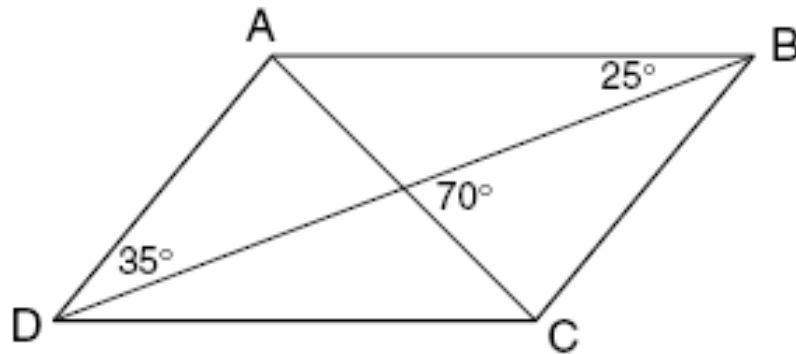
F   87.5°

G   90°

H   105°

J   120°

24

A

B

25°

70°

35°

D

C

SSM:
• ∠BDC is medium acute eliminates F

In parallelogram *ABCD*, what is m∠*BDC*?

F 70°

G 45°

H 35°

J 25°

angle BDC and 25° angles are alternate interior and therefore equal

25

L
$3x°$
M
$95°$
K
$(x+25)°$
$80°$
N
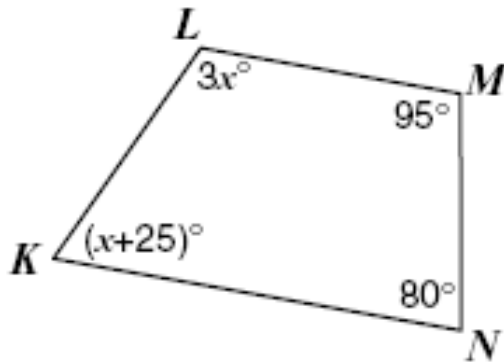
SSM:
- **3x is a medium obtuse, but x + 25 is medium acute**
- **plug in answers and see which work (all of them do, but D)**

Given quadrilateral *KLMN*, what is the value of *x*?

A   35

B   40

C   45

D   50

interior angles of a quadrilateral sum to 360

360 = 3x + 95 + 80 + (x + 25)
360 = 4x + 200
160 = 4x
 40 = x

26 Three vertices of a parallelogram have coordinates (0, 1), (3, 7), and (4, 4). You may want to plot the points on this grid.
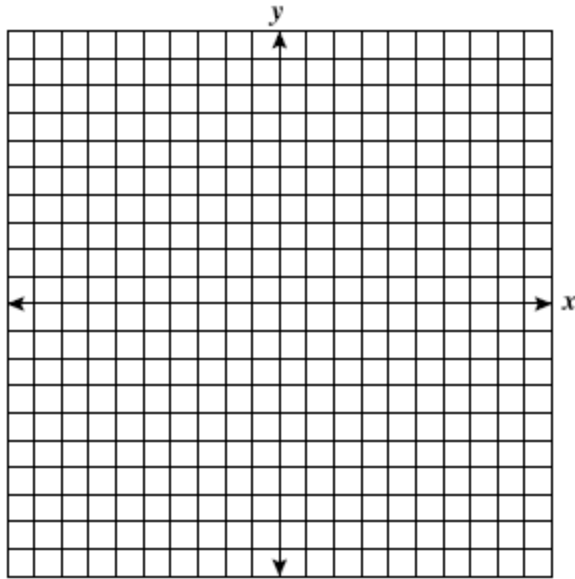
SSM:

• **answers G and H are fourth quadrant points**

What are the coordinates of the fourth-quadrant vertex?
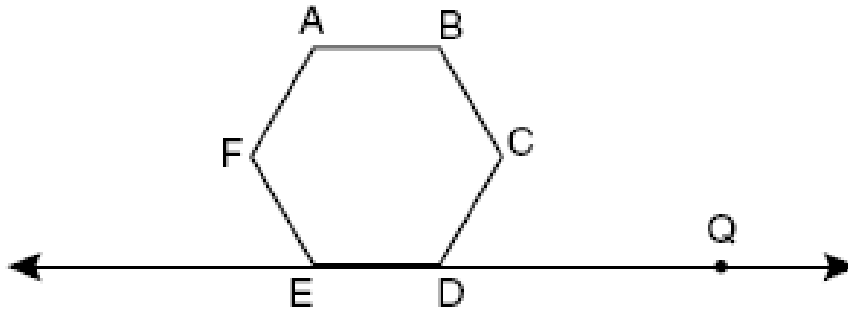
F (−2, 1)

G (1, −2)

H (2, −1)

J (3, 3)

from (3, 7) to (4, 4) is down 3 and right 1

from (0, 1) down 3 and right 1 is (0+1 , 1 − 3) = (1, -2)
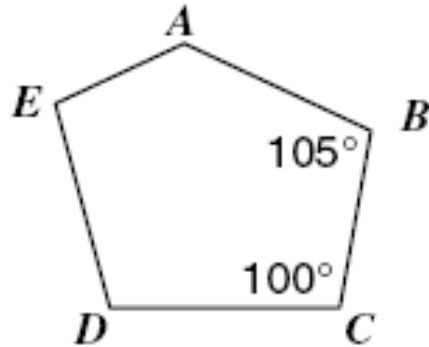
27

SSM:
• ∠CDQ is medium acute eliminates C and D

Figure *ABCDEF* is a regular hexagon. What is the measure of ∠CDQ?

A   45°

B   60°

C   90°

D   120°

exterior angle of hexagon is 360 ÷ 6 = 60°

28 In pentagon $ABCDE$, m$\angle E$ = m$\angle C$ and
m$\angle D$ = m$\angle B$.

SSM:
• $\angle A$ is a medium obtuse angle
   eliminates F and G

What is the measure of $\angle A$?

F   410°

G   335°

H   155°

J   130°

Sum of the interior angles of a pentagon = 540
540 = 100 + 100 + 105 + 105 + A
540 = 410 + A
130 = A

24

A (2, 3)   B (?, ?)

D (0, 0)   C (5, 0)
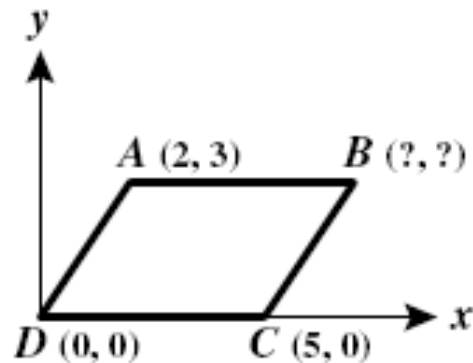
SSM:
- **y-coordinate of B must be 3**
- **only answer J has that**

If *ABCD* is a parallelogram, what are the coordinates of *B*?

F   (3, 7)

G   (5, 5)

H   (7, 8)

J   (7, 3)

opposite sides of parallelogram are congruent

so DC = 5 and AB = 5

so B (2 + 5, 3 + 0) = (7, 3)

25 Which of the following quadrilaterals could have diagonals that are congruent but do *not* bisect each other?

A   A rhombus

B   A rectangle

C   A parallelogram

D   A trapezoid

Since parallelogram's diagonals bisect each other, anything that is a parallelogram will not work.

A rhombus and a rectangle are also parallelograms, so the trapezoid is the only answer left. An isosceles trapezoid has diagonals that are equal, but do not bisect each other.

26 Three vertices of a square have
coordinates (5, 1), (2, -2), and (-1, 1).
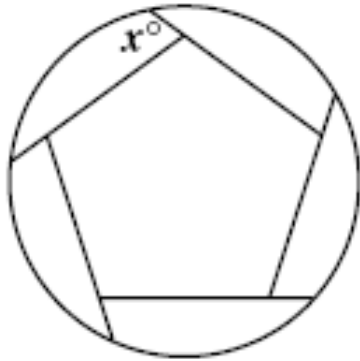You may want to plot the points on this
grid.
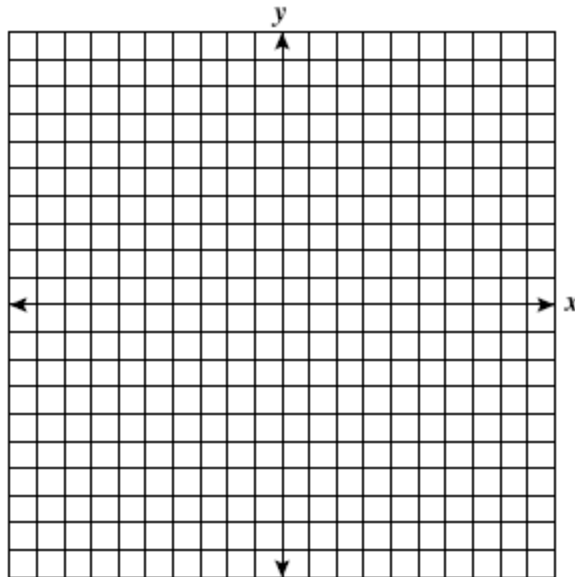
SSM:
- plot the points on graph paper and see which fits
- Answer G is one of the points already give

What are the coordinates of the fourth vertex?

F   (-2, 2)

G   (2, -2)

H   (2, 4)

J   (4, 2)

Since a square is a rectangle, the diagonals have to be equal.
Points (5, 1) and (-1, 1) form one diagonal
Point (2, -2) and (2, ?) must form the other diagonal

28

SSM:

• x is the measure of an acute angle
  only answer F fits

A floor tile is designed with a
regular pentagon in the center of the
tile with its sides extended. What is
the value of x?

F   72°

G   90°

H   110°

J   120°

x is the measure of the exterior angle of a pentagon

pentagon sides number 5

$360 \div 5 = 72°$

29 Each exterior angle of a certain
regular polygon measures 30°. How
many sides does the polygon have?
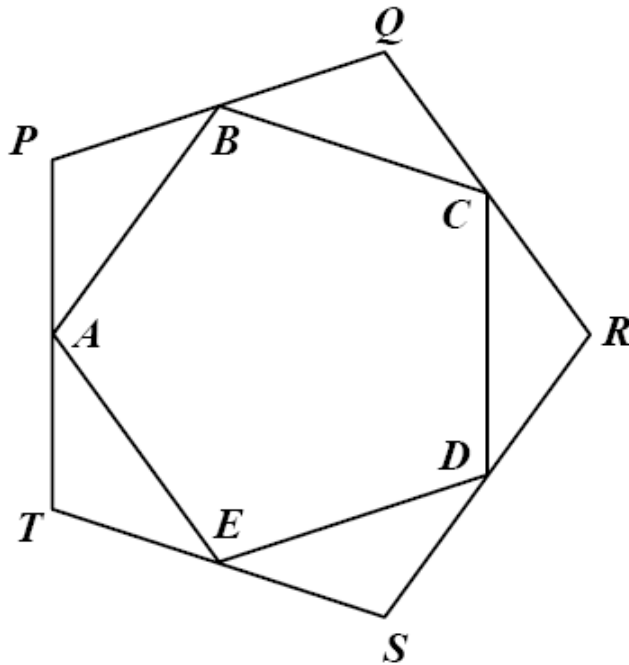
    A 6

    B 9

    C 10

    D 12

SSM:

• not much help

exterior angle = 360 ÷ n (number of sides)

n × exterior angle = 360

n × 30 = 360

n = 10

4

Regular pentagon *ABCDE* is formed by joining the midpoints of the sides of regular pentagon *PQRST*.

What is the measure of ∠*PAB*?

F   30°

G   36°

H   60°

J   72°

PT is a straight side
so ∠PAB + ∠BAE + ∠TAE = 180
∠BAE = 108 (regular pentagon)
Assume ∠PAB = ∠TAE

$2x + 108 = 180$
$2x = 72$
$x = 36$

5
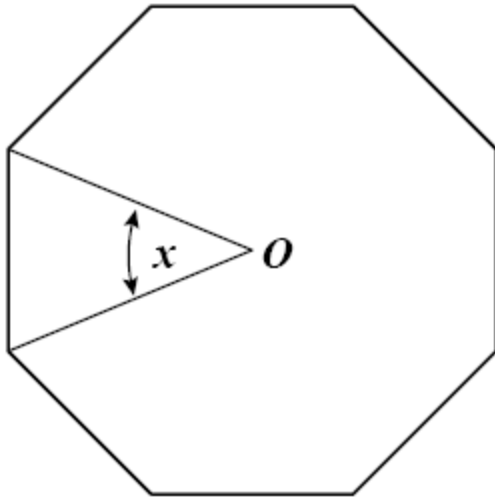
The polygon in the drawing is a regular octagon with O as its center. What is the value of x?
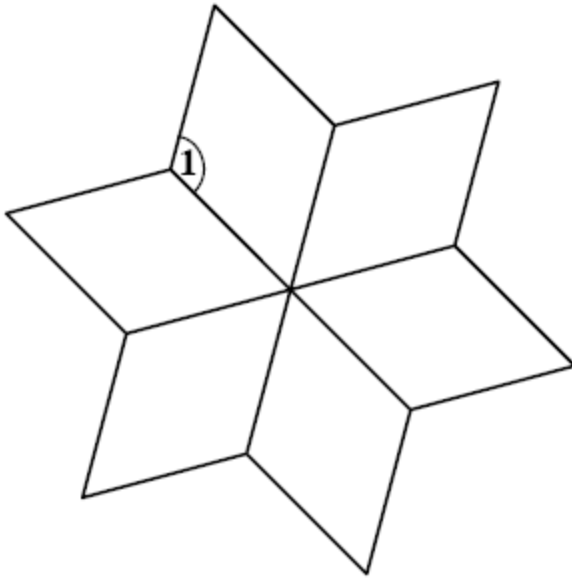
A   30°

B   45°

C   60°

D   72°

Once around a point is 360

eight parts of the circle

360 ÷ 8 = 45

24

SSM:
- **angle 1 is obtuse**
- **eliminates F and G**

The design for a quilt piece is made up of 6 congruent parallelograms. What is the measure of ∠1?
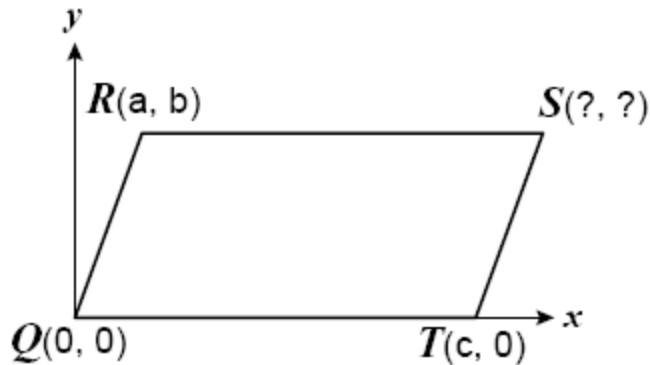
F 30°

G 60°

H 120°

J 150°

once around circle = 360
so acute angle of parallelogram is
$360 \div 6 = 60$
consecutive angles of parallelogram
are supplementary so
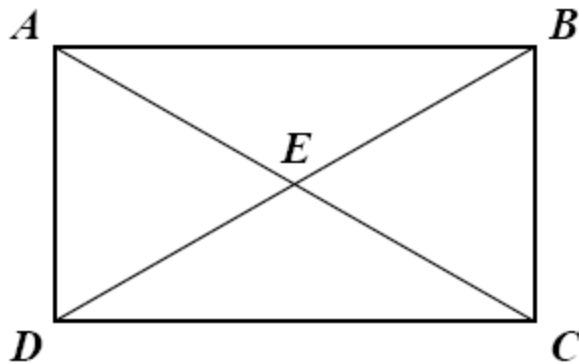$\angle 1 = 180 - 60 = 120$

25 *QRST* is a parallelogram.

SSM:
- Use points R and T to help figure S
- y-value is same as R
- x-value is greater than T's

What are the coordinates of vertex S?

A (c, b)

B $(a + b, c)$

C $(c - a, b)$

D $(c + a, b)$

opposite side in parallelogram are congruent
QT is c long, so RS has to be c long
if R starts at a the S must end at a+c

26

SSM:
- Use scrap paper to measure AC
- Use that measurement to estimate DE
- 2 DE = AC

Figure $ABCD$ is a rectangle. $\overline{AC}$ and $\overline{BD}$ are diagonals. $AC = 25$ meters and $BC = 15$ meters. What is the length of $\overline{DE}$?

F   10 m

G   12.5 m

H   13.5 m

J   15 m

rectangle's diagonals bisect each other and are congruent
so $AC = BD$ and $2DE = BD$
$$2DE = 25$$
$$DE = 12.5$$

27 Some of the angle measures are given
for one of the fish-shaped polygons in
this tessellation.
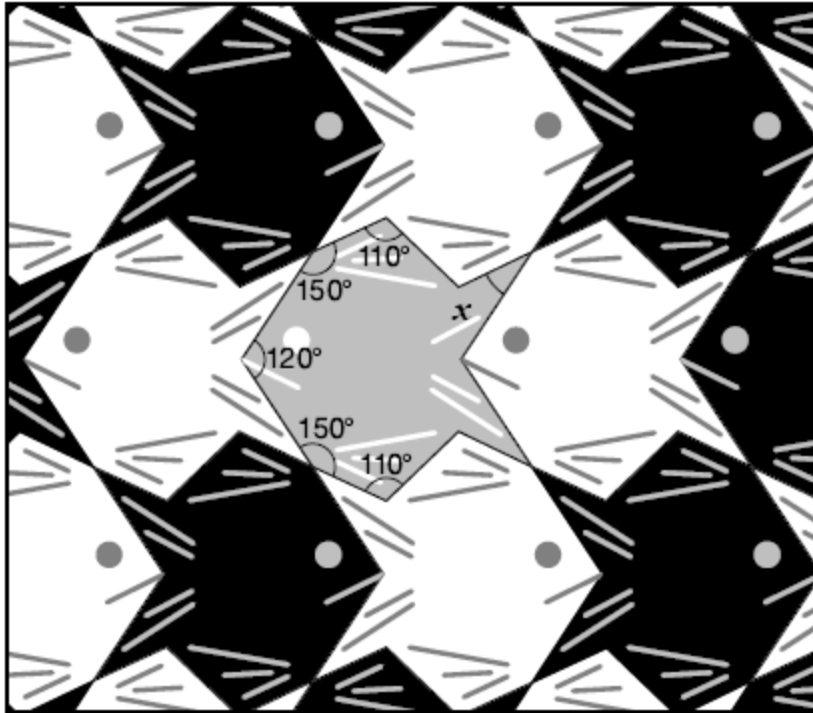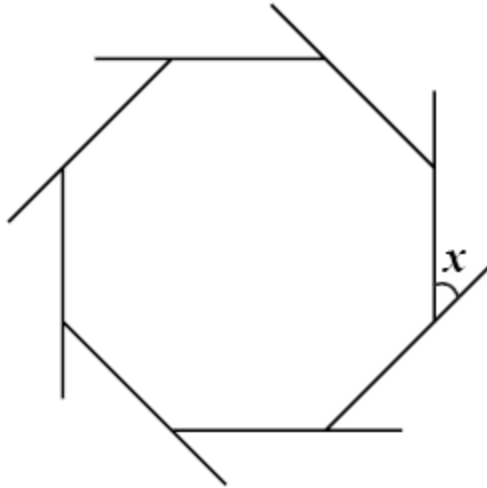

SSM:
- x is small acute
- use folded corner of scrap paper
- x < 45

What is the value of x?

A 60°

B 45°

C 40°

D 30°

**line up angle that forms linear pair with x
its below the mouth of the fish → 150
so 180 – 150 = 30 = x**

28 The figure is a regular octagon with each side extended.

SSM:
- **x is acute**
- **use folded corner of scrap paper**
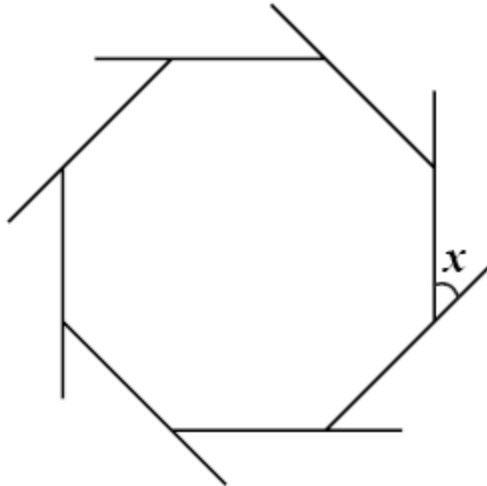- **x = 45**

x

What is the value of x?

F 45°

G 60°

H 75°

J 135°

x is an exterior angle

since ext angle × number of sides = 360

then 360 ÷ 8 (number of sides) = 45 = x

28 The figure is a regular octagon with each side extended.

SSM:
- **x is acute**
- **use folded corner of scrap paper**
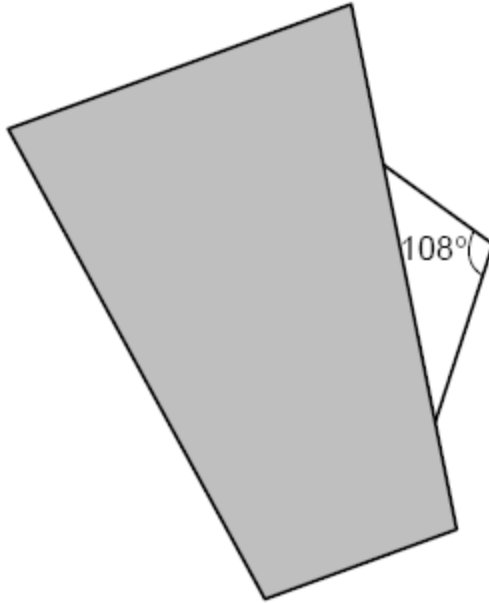- **x = 45**

x

What is the value of x?

F 45°

G 60°

H 75°

J 135°

x is an exterior angle

since ext angle × number of sides = 360

then 360 ÷ 8 (number of sides) = 45 = x

29 In the drawing, a *regular* polygon is
    partially covered by the trapezoid.

108°

SSM:
• **not much help**

How many sides does the covered
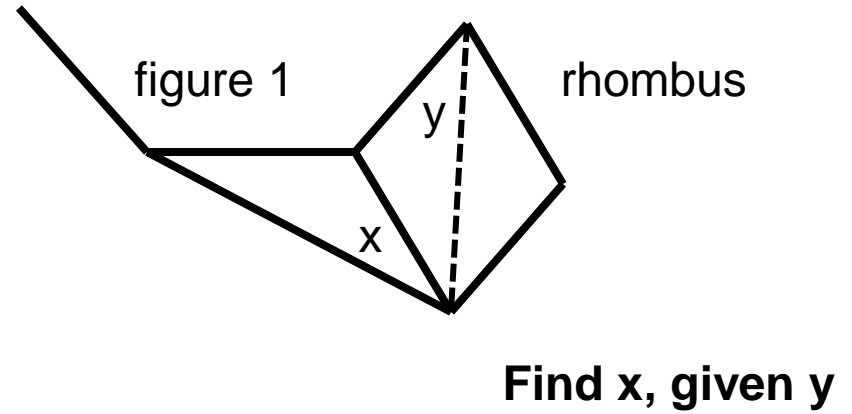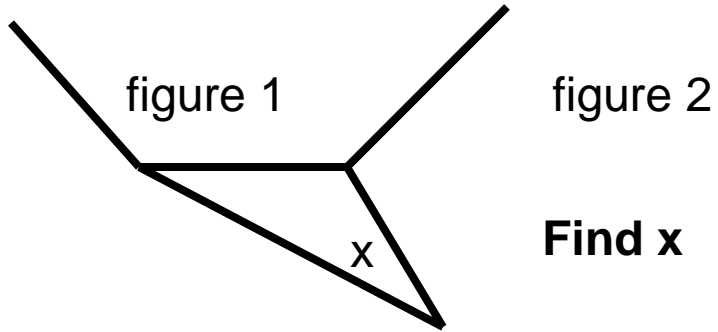polygon have?

A 4

B 5

C 6

D 8

108 is an interior angle

since interior + exterior = 180, then ext = 72

then 360 ÷ 72 = (number of sides) = 5 = x

Given certain regular figures

figure 1   figure 2

x   **Find x**

figure 1   rhombus

y

x

Find x, given y

Given the number of sides, n, find the interior and exterior angles of the polygon