Practice Regents #1

1. In $\triangle AEC$, $\overline{DB} \parallel \overline{EC}$, $AC = 10$,
   $AB = 8$, and $AD = 12$.
   Find DE.
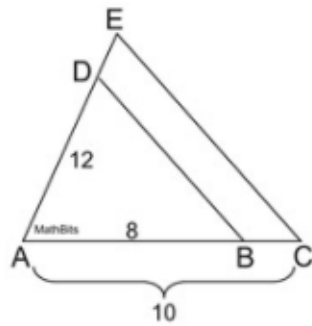
○ [1] 1.75   ○ [2] 2   ○ [3] 3   ○ [4] 4

2. What is the equation of the line parallel to the line whose equation is $5y + 8 = -2x$?
   ○ [1] $y = -2x + 3$ ○ [2] $y = 2x + 1$ ○ [3] $y = -2/5\ x + 4$ ○ [4] $y = 5/2\ x - 1$

3. Which three dimensional figure will be created if a rectangle is rotated about one of its lines of symmetry?
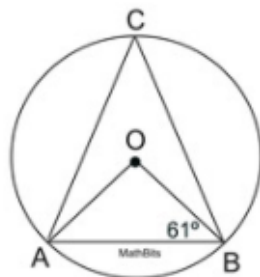   ○ [1] cone   ○ [2] cube   ○ [3] sphere   ○ [4] cylinder

4. Which rigid transfromation will verify that $\triangle ABC$ is congruent to $\triangle DEF$, as shown at the right?
   ○ [1] reflection in the y-axis
   ○ [2] reflection in the x-axis
   ○ [3] reflection in the line $y = 1$
   ○ [4] translation $T_{0,-2}$
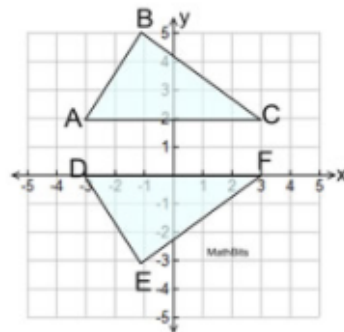
5. In circle O, $m\angle ABO = 61°$. Find $m\angle ACB$.
   ○ [1] 61°
   ○ [2] 58°
   ○ [3] 30.5°
   ○ [4] 29°

6. Which of the following choices is a precise definition of the term "supplementary angles" ?
   ○ [1] Angles whose sum of their measures is 180°.
   ○ [2] Angles whose sum of their measures is 90°.
   ○ [3] Two angles whose sum of their measures is 180°.
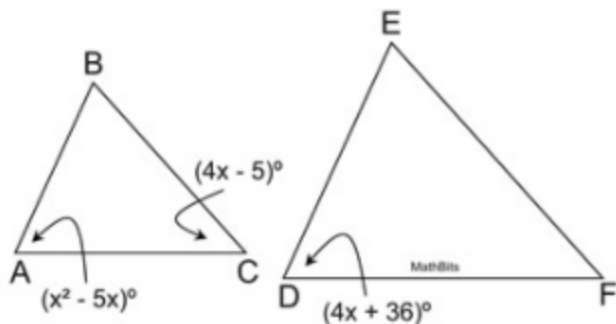   ○ [4] Two angles whose sum of their measures is 90°.

7. The altitude of an equilateral triangle is 9 inches. Find the perimeter of the triangle in inches.

    ○ [1] $6\sqrt{3}$　　　　○ [2] $18\sqrt{3}$　　　　○ [3] $27\sqrt{3}$　　　　○ [4] $54\sqrt{3}$

8. $\triangle ABC$ is similar to $\triangle DEF$.
$m\angle BAC = (x^2 - 5x)°$, $m\angle BCA = (4x - 5)°$ and
$m\angle EDF = (4x + 36)°$. Find $m\angle F$.

   ○ [1] 43°
    ○ [2] 36°
    ○ [3] 30°
    ○ [4] 12°

9. Which equation represesnts the perpendicular bisector of $\overline{AB}$ whose endpoints are A (4,1) and B (0,3)?

    ○ [1] $y = -\frac{1}{2}x + 3$　　　○ [2] $y = 2x - 2$　　　○ [3] $y = \frac{1}{2}x + 1$　　　○ [4] $y = -2x + 6$

10. The proof of the construction shown at the right utilizes
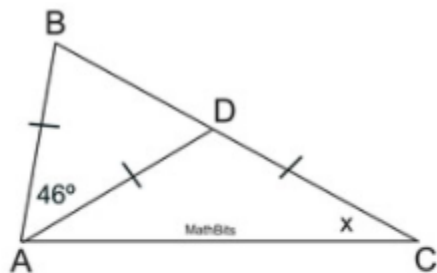   ○ [1] congruent triangles and the Side-Angle-Side postulate.
    ○ [2] congruent triangles and the Side-Side-Side postulate.
    ○ [3] similar triangles and the Angle-Angle postulate for similarity.
    ○ [4] similar triangle and the Side-Angle-Side postulate for similarity.
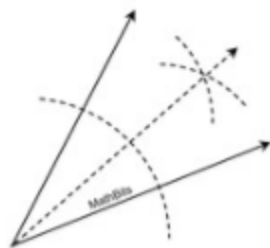
11. In $\triangle ABC$, $AB = AD = DC$ and $m\angle BAD = 46°$.
Find $m\angle BCA$.
    ○ [1] 33.5°　　　　　　　○ [2] 46°
    ○ [3] 48.5°　　　　　　　○ [4] 67°

12. In parallelogram $ABCD$, diagonals $\overline{AC}$ and $\overline{BD}$ are drawn and intersect at E. $AE = x^2 - 24$ and $EC = 2x$. Find AC.

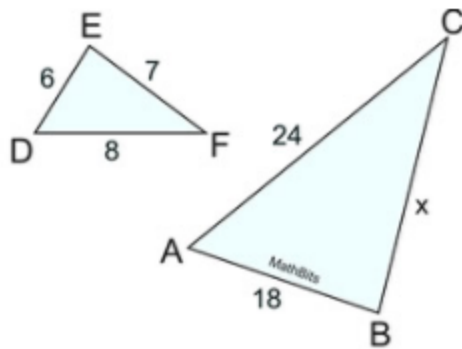   ○ [1] 4　　　　　　○ [2] 6　　　　　　○ [3] 12　　　　　　○ [4] 24

13. Find the length of $\overline{AB}$ where A (-4, -6) and B (1, -3).

    ○ [1] $\sqrt{106}$　　　　○ [2] $\sqrt{90}$　　　　○ [3] $\sqrt{34}$　　　　○ [4] $\sqrt{18}$

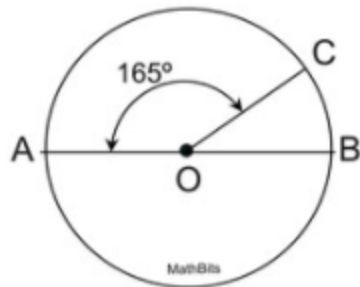**14.** $\triangle ABC$ is similar to $\triangle DEF$, as shown at the right. Find BC.

- ○ [1] 6
- ○ [2] 7
- ○ [3] 18
- ○ [4] 21

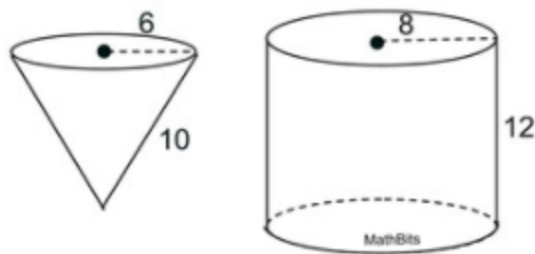**15.** Circle O has diameter $\overline{AB}$, $OA = 3$ units and $m\angle AOC = 165°$. Which of the choices expresses the arc length of minor arc $\overset{\frown}{AC}$?

- ○ [1] $\dfrac{3\pi}{4}$
- ○ [2] $\dfrac{9\pi}{4}$
- ○ [3] $\dfrac{11\pi}{4}$
- ○ [4] $\dfrac{15\pi}{4}$

16. A right circular cone has a radius of 6 inches and a slant side length of 10 inches. A right cylinder has a radius of 8 inches and a height of 12 inches. How many cones full of water are needed to fill the cylinder?

- ○ [1] 4
- ○ [2] 8
- ○ [3] 10
- ○ [4] 12

17. The line $y = 3x + 2$ is dilated by a scale factor of 2 centered at the origin. Which equation represents the image of the line after the dilation?

- ○ [1] $y = 3x + 4$
- ○ [2] $y = 3x + 9$
- ○ [3] $y = 2x + 2$
- ○ [4] $y = 6x + 4$

18. In right $\triangle ABC$, the right angle is located at vertex C. If $\sin(A) = 3x - 0.5$ and $\cos(B) = 2x - 0.1$, find x.
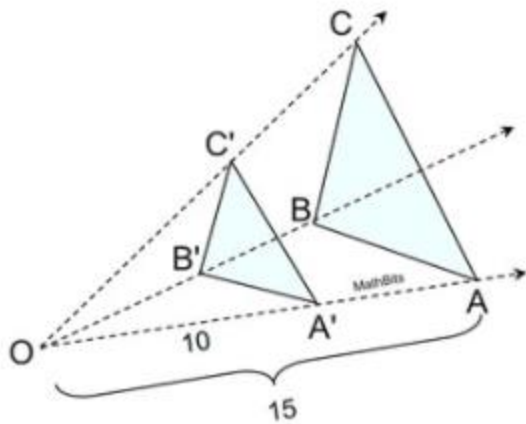
- ○ [1] 0.5
- ○ [2] 0.4
- ○ [3] 9.06
- ○ [4] 18.12

19. From a point on the ground 62 feet from the foot of statue, the angle of elevation of the top of the statue is $37°$. Find the height of the statue to the *nearest foot*.

- ○ [1] 37 feet
- ○ [2] 47 feet
- ○ [3] 50 feet
- ○ [4] 82 feet

20. A dilation centered at O is shown at the right. The image of $\triangle ABC$ is $\triangle A'B'C'$, $OA' = 10$ and $OA = 15$. What is the scale factor of the dilation?

○ [1] $\dfrac{2}{3}$ ○ [2] $\dfrac{3}{2}$
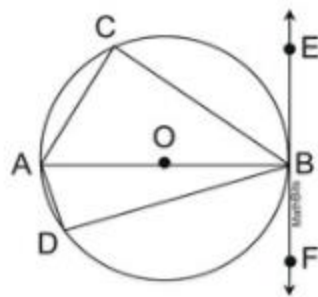
○ [3] $\dfrac{1}{2}$ ○ [4] 2

21. If $\triangle ABC \cong \triangle DEF$, which choice is not necessarily true?

○ [1] $\overline{CB} \cong \overline{FE}$ ○ [2] $\overline{DF} \cong \overline{AC}$
○ [3] $\angle ACB \cong \angle DEF$ ○ [4] $\angle CAB \cong \angle FDE$
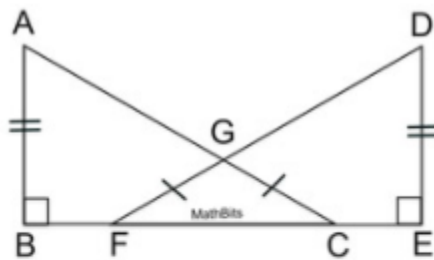
22. Circle O has diameter $\overline{AB}$ and tangent $\overline{EF}$ at point B. Which of the following angles is not a right angle?

○ [1] $\angle ACB$ ○ [2] $\angle ADB$
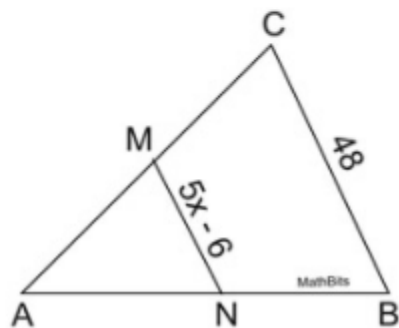○ [3] $\angle EBA$ ○ [4] $\angle FBD$

23. Given right $\triangle ABC$ and right $\triangle DEF$ marked as shown at the right. $\triangle FGC$ is isosceles. Which of the following methods will prove $\triangle ABC$ is congruent to $\triangle DEF$?

○ [1] Angle-Side-Angle   ○ [2] Hypotenuse-Leg
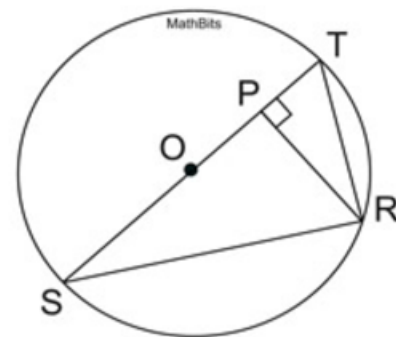○ [3] Angle-Angle-Side   ○ [4] Side-Angle-Side

24. Given $\triangle ABC$, midpoints M and N, $MN = 5x - 6$ and $CB = 48$, find x.

○ [1] 3.6   ○ [2] 6
○ [3] 8.6   ○ [4] 10.8

25. Given circle O with diameter $\overline{ST}$ and $\overline{RP} \perp \overline{ST}$.
PT is 12 less than SP and $RP = 8$.
Find PT.

26. $\triangle ABC$ is a dilation of $\triangle DEF$ by a scale factor of 3. If $m\angle E = 90°$,
$DE = 5$ and $DF = \sqrt{89}$, express the $\sin(\angle A)$ as a fraction.

27. A cube of cheese has side lengths of 8 inches. Using a cheese
cutter, the cube is sliced into two sections with a cut along the diagonal
from one side, as shown. Find the area of the cross section formed by
the slice.
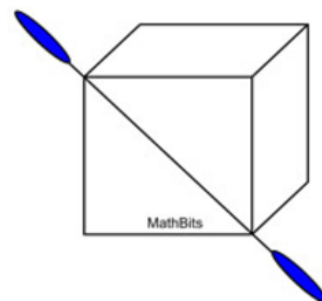
28. You are given three clues to find a specific point on a coordinate axis.
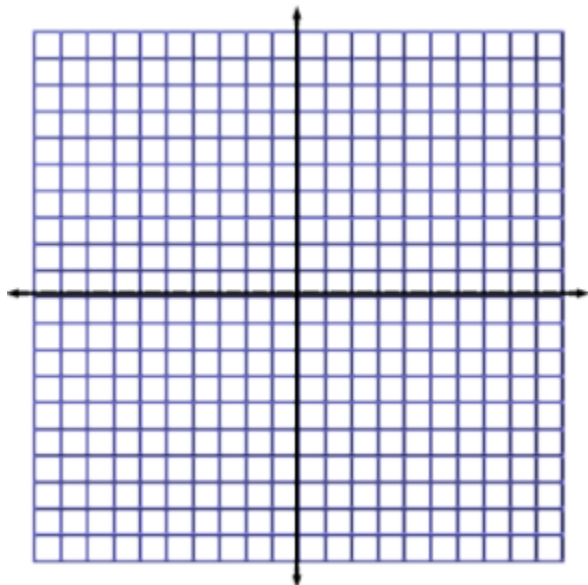Start at the point (4,3).
Clue 1: move to the image after the translation $(x,y) \rightarrow (x - 8, y + 4)$
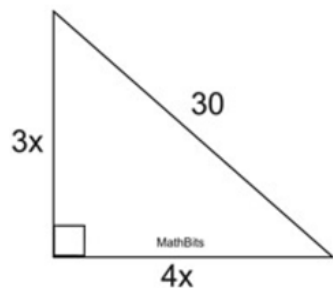Clue 2: now, reflect your position over the x-axis.
Clue 3: now, rotate your position 90° counterclockwise.
What are the coordinates of your final positon?

(use of the graph is optional)

**29.** Given the diagram shown at the right, find the value of $3x$.

30

3x

MathBits

4x

30. Does the circle with a center at (2,3) and passing through the point (8,9),
also pass through the point (-4,-1)? Explain your answer.

31. Jonathan incorrectly states that the sum of the measures of the exterior angles of a triangle is 180°. Draw an example and explain to Jonathan how to correctly find the sum of the measures of the exterior angles of a triangle.

32. In the diagram at the right, C lies on $\overline{AB}$. If the ratio of AC to CB is 3 : 2, what is the y-coordinate of C?
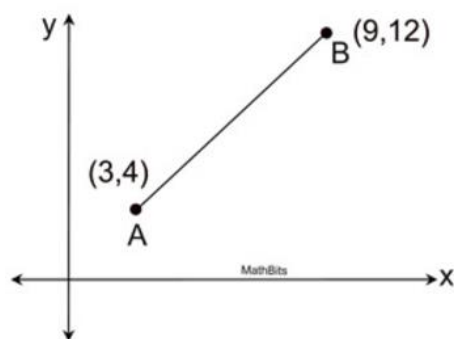

33. A squirrel is sitting atop a roof looking at a nearby tree. The horizontal distance from the squirrel to the tree (A) is 35 feet. The angle of elevation of the top (B) of the tree is 28° and the angle of depression of the foot (C) of the tree is 37°. What is the height of the tree, to the *nearest tenth of a foot* ?
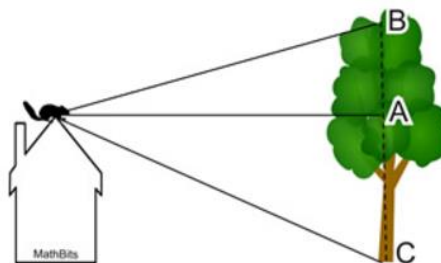
34. Given parallelogram $ABCD$, $m\angle BAD = 56°$, $m\angle ABC = (8a - b)°$ and $m\angle BCD = (2a + 6b)°$. Find the values of a and b.

35. The coordinates of quadrilateral $ABCD$ are located at $A(-2,3)$, $B(4,5)$, $C(6,-1)$ and $D(0,-3)$.

a) Using coordinate geometry methods, show that the diagonals bisect each other.

b) Using coordinate geometry methods, show that the diagonals are perpendicualr.

c) Using coordiante geometry methods, show that all four sides are congruent.

d) Based only upon the information shown in parts a, b and c, what name can be given to this quadrilateral?
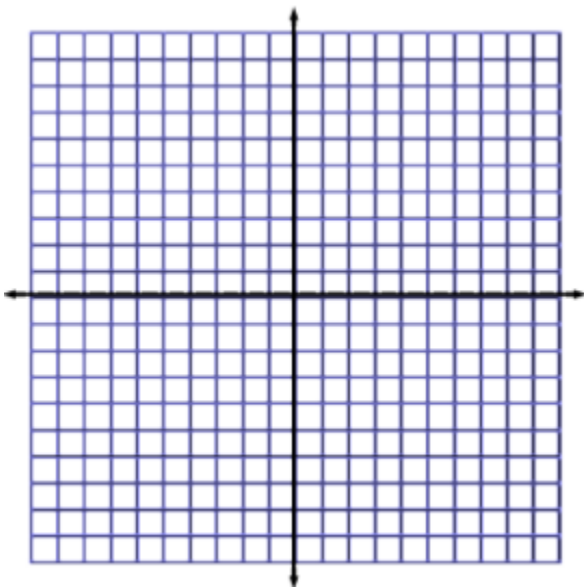
(use of the graph is optional)

36. Sam's Pizza Shop uses open-topped cardboard boxes to serve full circular pizzas to the seated customers. These serving boxes come in three sizes.

a) The open topped serving boxes are cut from a square sheet of cardboard by cutting out squares with 2 inch sides from each corner and then folding up the sides. If the volume of a "large pizza" serving box is 648 cubic inches, state the dimensions (length, width, height) of the serving box, in inches.

b) When placed in its serving box, a large pizza can be described as being "inscribed" in the box. State the surface area of a large pizza, to the *nearest square inch*.

c) Sam's Pizza Shop offers a special "bacon ribbed" pizza where strips of bacon are placed along the circumference of the pizza. When served, pizzas are cut into 8 slices. How many inches (to the *nearest inch*) of bacon are needed for each slice of a large bacon ribbed pizza?