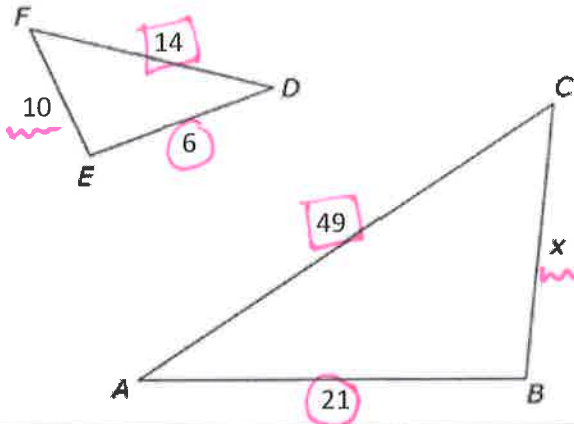


**STUDY YOUR STUDY GUIDE!!**

1. The figure shows  $\triangle ABC \sim \triangle DEF$  with side lengths as indicated.



Find the value of  $x$ .

$$\frac{14}{49} = \frac{10}{x}$$

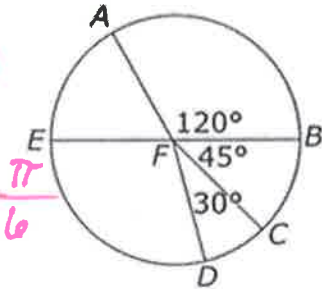
$$14x = 10 \cdot 49$$

$$x = 35$$

2. The circle with center  $F$  is divided into sectors. In circle  $F$ ,  $\overline{EB}$  is a diameter. The radius of circle  $F$  is 3 units.

Convert:

$$\frac{30 \cdot \pi}{1} \cdot \frac{\pi}{180} = \frac{\pi}{6}$$



What is the arc length of  $\widehat{CD}$ ?

$$\frac{\pi}{6} \times \frac{x}{3}$$

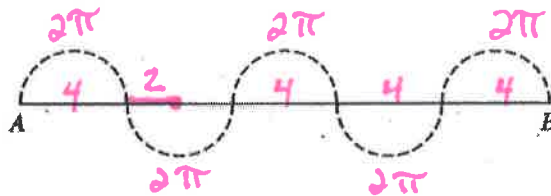
$$3\pi = 6x$$

\*  $\text{radian} = \frac{\text{arc length}}{\text{radius}}$

$$\frac{3\pi}{6} = x$$

$$= \frac{\pi}{2} = 1.57 \text{ units}$$

- 3.



In the figure above, the diameters of the 5 dotted semicircles are equal and lie on the line segment  $AB$ . If the length of the line segment  $AB$  is 20, what is the length of the dotted curve from  $A$  to  $B$ ?

Circumference =  $2\pi r$

$$C = 2\pi \cdot 2$$

$$= 4\pi$$

half circle =  $4\pi \div 2$

$$= 2\pi$$

Answer:

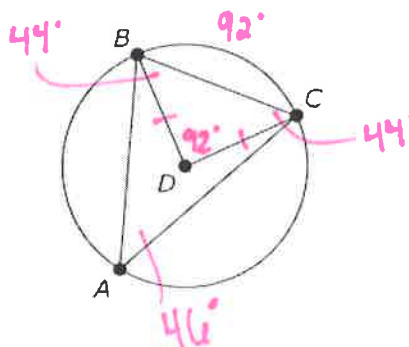
$$2\pi \cdot 5$$

$$= 10\pi$$

$$= 31.4$$

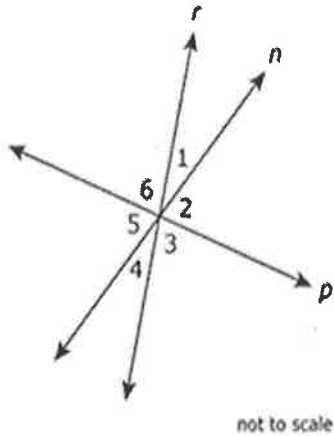
4. The figure shows  $\triangle ABC$  inscribed in circle  $D$ .

If  $m\angle CBD = 44^\circ$ , find  $m\angle BAC$ .



$$\frac{1}{2} (92) = 46^\circ$$

5. The figure shows lines  $r$ ,  $n$ , and  $p$  intersecting to form angles numbered 1, 2, 3, 4, 5, and 6. All three lines lie in the same plane.



Based on the figure, which of the individual statements would provide enough information to conclude that line  $r$  is perpendicular to line  $p$ ?

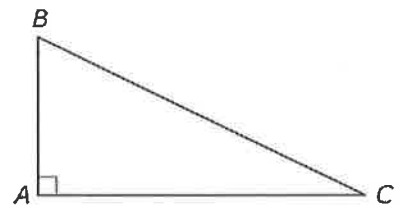
Select all that apply.

- A.  $m\angle 2 = 90^\circ$
- B.  $m\angle 6 = 90^\circ$
- C.  $m\angle 3 = m\angle 6$
- D.  $m\angle 1 + m\angle 2 = 90^\circ$

6. In right triangle  $ABC$ ,  $m\angle B \neq m\angle C$ . Let  $\sin B = r$  and  $\cos B = s$ . What is  $\sin C - \cos C$ ?

- A.  $r + s$
- B.  $r - s$
- C.  $s - r$
- D.  $\frac{r}{s}$

$\cos(C) = r$     $\sin(C) = s$   
 $\sin(C) - \cos(C) =$   
 $s - r$



7. The table shows the approximate measurements of the Great Pyramid of Giza in Egypt and the Pyramid of Kukulcan in Mexico.

Pyramid	Height (meters)	Area of Base (square meters)
Great Pyramid of Giza	147	52,900
Pyramid of Kukulcan	30	3,025

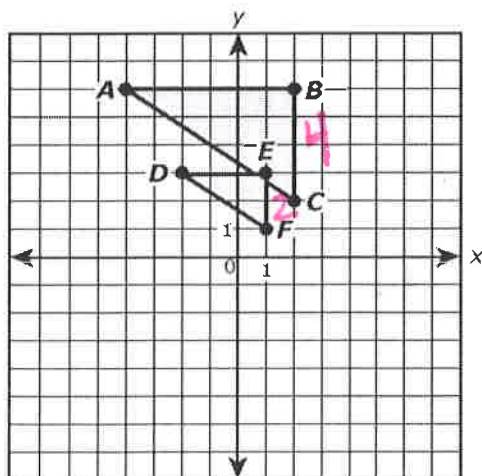
Approximately what is the difference between the volume of the Great Pyramid of Giza and the volume of the Pyramid of Kukulcan?

$V = \frac{1}{3} \cdot 147 \cdot 52,900 = 2,592,100 \text{ m}^3$   
 $V = \frac{1}{3} \cdot 30 \cdot 3,025 = 30,250 \text{ m}^3$

$V = \frac{1}{3} \cdot h \cdot \text{area of base}$

Difference:  $2,592,100 - 30,250 =$   
 $2,561,850 \text{ m}^3$

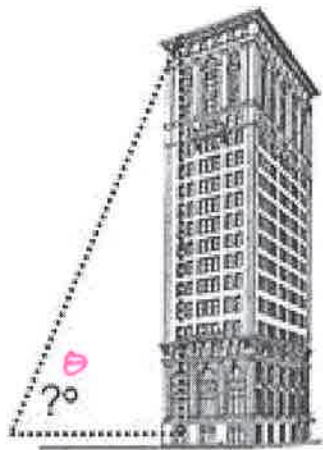
8. In the coordinate plane shown,  $\triangle ABC$  has vertices  $A(-4, 6)$ ,  $B(2, 6)$ , and  $C(2, 2)$ .



What is the scale factor that will carry  $\triangle ABC$  onto  $\triangle DEF$ ?

$\frac{\text{image}}{\text{pre-image}} = \frac{4}{2} = 2$

9. Phoebe stands on level ground, 50m away from the foot of a building known to be 174.6m high. What will the angle of elevation be to the top of the building?



174.6m

50m

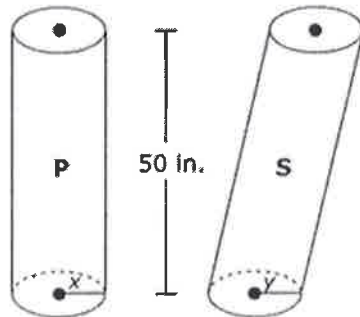
$$\tan(\theta) = \frac{174.6\text{m}}{50\text{m}}$$

$$\theta = \tan^{-1}\left(\frac{174.6}{50}\right)$$

$$\theta = 74^\circ$$

10. Two cylinders each with a height of 50 inches are shown.

$$V = \pi r^2 h$$

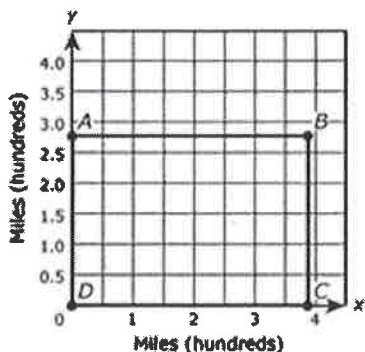


Which statements about cylinders P and S are true?

Select all that apply.

- A. If  $x = y$ , the volume of cylinder P is greater than the volume of cylinder S, because cylinder P is a right cylinder.
- B. If  $x = y$ , the volume of cylinder P is equal to the volume of cylinder S, because the cylinders are the same height.
- C. If  $x = y$ , the volume of cylinder P is less than the volume of cylinder S, because cylinder S is slanted.

11. The figure shows rectangle  $ABCD$  in the coordinate plane with point  $A$  at  $(0, 2.76)$ ,  $B$  at  $(3.87, 2.76)$ ,  $C$  at  $(3.87, 0)$ , and  $D$  at the origin. Rectangle  $ABCD$  can be used to approximate the size of the state of Colorado with the  $x$  and  $y$  scales representing hundreds of miles.



Based on the information given, how many miles is the perimeter of Colorado?

$$d = \sqrt{(x-x)^2 + (y-y)^2}$$

$$AB = \sqrt{(0-3.87)^2 + (2.76-2.76)^2} = 3.87$$

$$BC = \sqrt{(3.87-3.87)^2 + (2.76-0)^2} = 2.76$$

$$CD = \sqrt{(3.87-0)^2 + (0-0)^2} = 3.87$$

$$DA = \sqrt{(0-0)^2 + (0-2.76)^2} = 2.76$$

} Add

Perimeter = **13.26 hundred miles**

12. The equation  $x^2 + y^2 + 12x - 26y = c$  describes a circle.

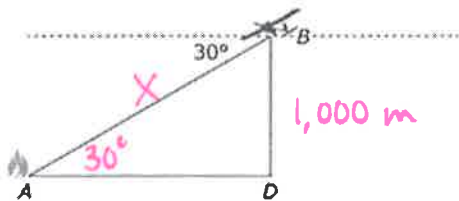
Determine the center of the circle.

$$x^2 + 12x + y^2 - 26y = c$$

$$(x+6)^2 + (y-13)^2 = c$$

center:  $(-6, 13)$

13. An unmanned aerial vehicle (UAV) is equipped with cameras used to monitor forest fires. The figure represents a moment in time at which a UAV, at point  $B$ , flying at an altitude of 1,000 meters (m) is directly above point  $D$  on the forest floor. Point  $A$  represents the location of a small fire on the forest floor.



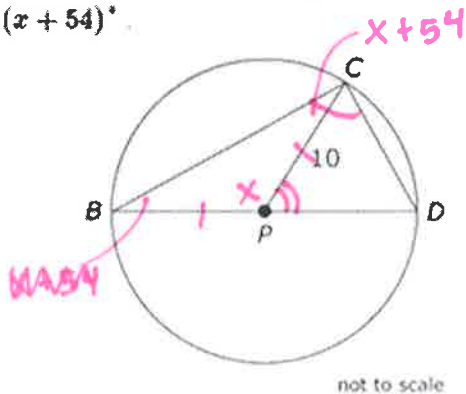
At the moment in time represented by the figure, the angle of depression from the UAV to the fire has a measure of  $30^\circ$ .

At the moment in time represented by the figure, what is the distance from the UAV to the fire? (the hypotenuse)

$$\sin(30) = \frac{1000}{x}$$

**$x = 2000 \text{ m}$**

14. The figure shows a circle with center  $P$ , a diameter  $BD$ , and inscribed  $\triangle BCD$ .  $PC = 10$ . Let  $m\angle CBD = (x)^\circ$  and  $m\angle BCD = (x + 54)^\circ$ .



Find the value of  $x$ .



$$x + 54 = 90^\circ$$

**$x = 36^\circ$**

15. The equation  $x^2 - 16x + y^2 = 17$  defines a circle in the  $xy$ -coordinate plane.

$(x-8)^2 + y^2 = 17 + 64 \rightarrow (x-8)^2 + y^2 = 81$

Circle the correct answer for both boxes:

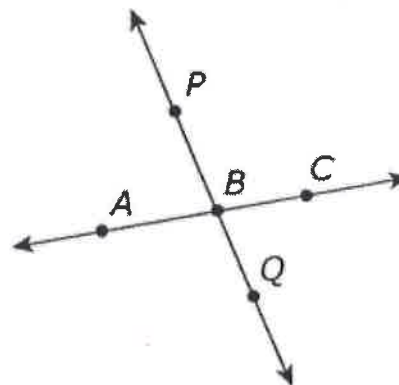
To find the center of the circle and the length of the radius, the equation can be re-written as

Choose...  
 $x - 16$   
 $x - 32$   
 $x - 8$   
 $x + 8$

)<sup>2</sup> +  $y^2 =$

Choose...  
 17  
 25  
 33  
 81

16. The figure shows  $\overleftrightarrow{AC}$  and  $\overleftrightarrow{PQ}$  intersecting at point  $B$ .  $\overleftrightarrow{A'C'}$  and  $\overleftrightarrow{P'Q'}$  will be the images of lines  $AC$  and  $PQ$ , respectively, under a dilation with center  $P$  and scale factor 2.



Circle the answers in the boxes to complete the sentence:

Line  $A'C'$  will be

Choose...  
 parallel to  
 perpendicular to  
 the same line as

$\overleftrightarrow{AC}$  and line  $P'Q'$  will be

Choose...  
 parallel to  
 perpendicular to  
 the same line as

$\overleftrightarrow{PQ}$ .

17. In the coordinate plane,

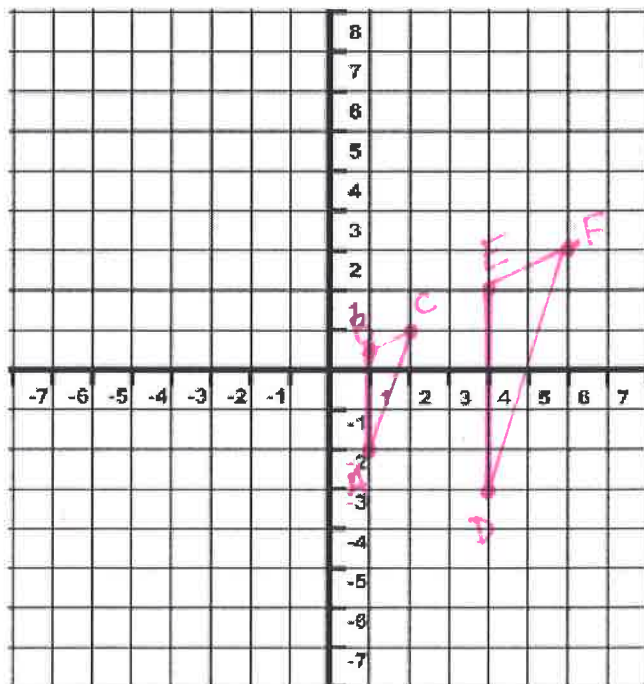
$\triangle ABC$  has vertices at  $A(1, -2)$ ,  $B(1, 0.5)$ ,  $C(2, 1)$ ; and

$\triangle DEF$  has vertices at  $D(4, -3)$ ,  $E(4, 2)$ ,  $F(6, 3)$ .

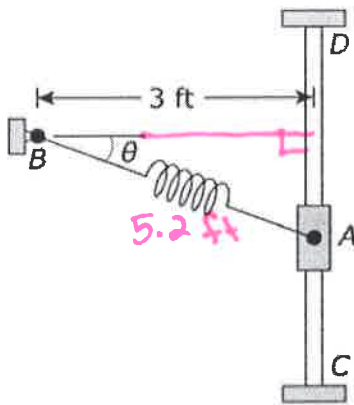
pre-image  
 $\downarrow$

$\triangle ABC \sim \triangle DEF$ . What is the scale factor for this similarity?

$\frac{\text{image}}{\text{pre-image}} = \frac{5}{2.5} = 2$



18. A spring is attached at one end to support  $B$  and at the other end to collar  $A$ , as represented in the figure. Collar  $A$  slides along the vertical bar between points  $C$  and  $D$ . In the figure, the angle  $\theta$  is the angle created as the collar moves between points  $C$  and  $D$ .



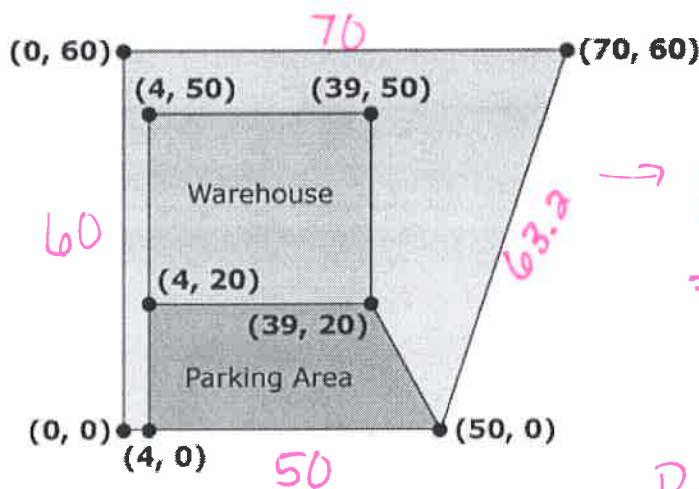
When the spring is stretched and the distance from point  $A$  to point  $B$  is 5.2 feet, what is the value of  $\theta$  to the nearest tenth of a degree?

$$\cos(\theta) = \frac{3}{5.2}$$

$$\theta = \cos^{-1}\left(\frac{3}{5.2}\right)$$

$$\theta = 54.8^\circ$$

19. Luke purchased a warehouse on a plot of land for his business. The figure represents a plan of the land showing the location of the warehouse and parking area. The coordinates represent points on a rectangular grid with units in feet.



What is the perimeter of the plot of land?

$$\begin{aligned} &\rightarrow \sqrt{(70-50)^2 + (60-0)^2} \\ &= \sqrt{20^2 + 60^2} = \sqrt{4000} = 63.2 \end{aligned}$$

$$\text{Perimeter} = 70 + 60 + 50 + 63.2$$

~~$$= 243.2 \text{ feet}$$~~

$$= 243.2 \text{ feet}$$

20. Find the midpoint of the segment containing the end points  $X(-15, 8)$  and  $Y(9, 20)$ .

$$M\left(\frac{x+x}{2}, \frac{y+y}{2}\right)$$

$$M\left(\frac{-15+9}{2}, \frac{20+8}{2}\right) = M(-3, 14)$$