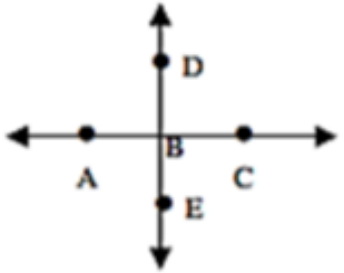
1 In the figure, $AC = 24$, $AB = 6x - 6$, $BC = 5x - 3$ and $BE = 3x + 2$. Which do you know is true?

I. $\overline{AC}$ bisects $\overline{DE}$. ✗

II. $\overline{DE}$ bisects $\overline{AC}$. ✓

III. $DB = 11$ ✗



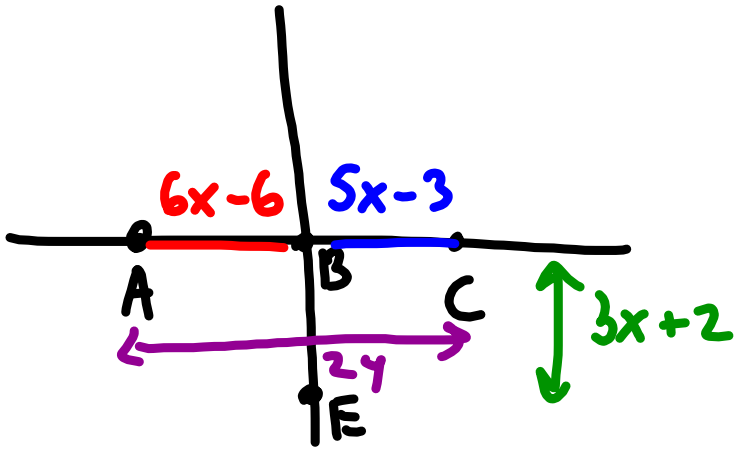
a) I only b) II only c) III only d) I and II only e) II and III only

$6x-6+5x-3=24$

$11x-9=24$

$11x=33$

$x=3$



$AB = 6(3)-6 = 12$

$BC = 5(3)-3 = 12$

$BE = 3(3)+2 = 11$

2

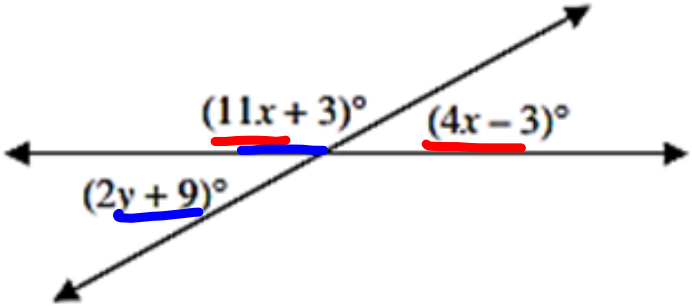
Find the values of x and y.

a) $x = 20, y = 34$

b) $x = 10, y = 52$

c) $x = 12, y = 18$

d) $x = 11, y = 7$



$11x+3+4x-3=180$

$15x=180$

$x=12$

$11x+3+2y+9=180$

$11(12)+3+2y+9=180$

$132+3+2y+9=180$

$2y+144=180$

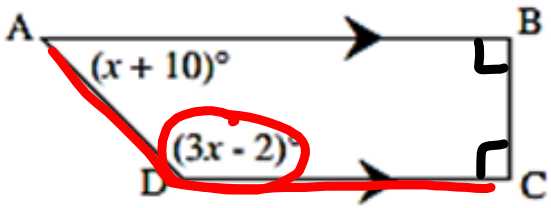
$2y=36$

$y=18$

3

Find $m\angle ADC$.

a) 53 b) 43 c) 137 d) 127



$x+10+3x-2+180=360$

$4x+188=360$

$4x=172$

$x=43$

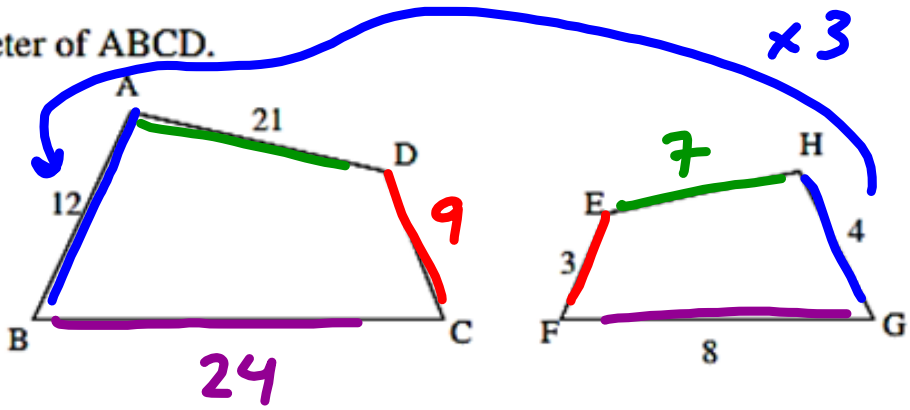
$3(43)-2$

127

4

Quad. ABCD ~ Quad. HGFE. Find the perimeter of ABCD.

a) 88 b) 22 c) 66 d) 31

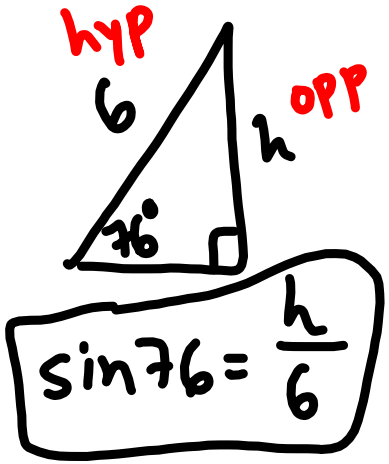


12+21+9+24

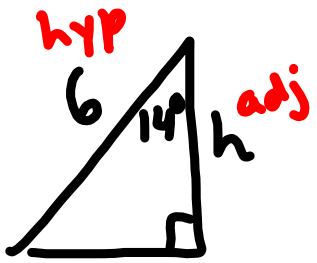
5 A ladder 6 m long just reaches the top of a building and its foot makes a 76° angle with the ground. Which of the following equations could be used to calculate the height, h, of the building?

✓ I. $\sin 76° = \frac{h}{6}$ ✓ II. $6 \cdot \cos 14° = h$ ✗ III. $\cos 76° = \frac{h}{6}$

a) I only b) II only c) III only d) I and II only e) I, II and III

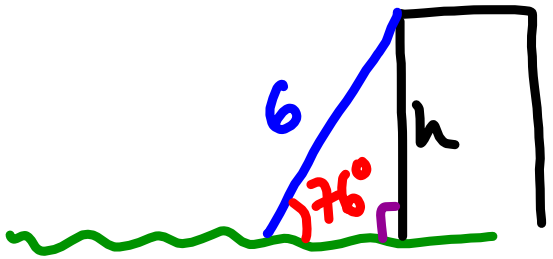


$\sin 76 = \frac{h}{6}$



$\cos 14 = \frac{h}{6}$

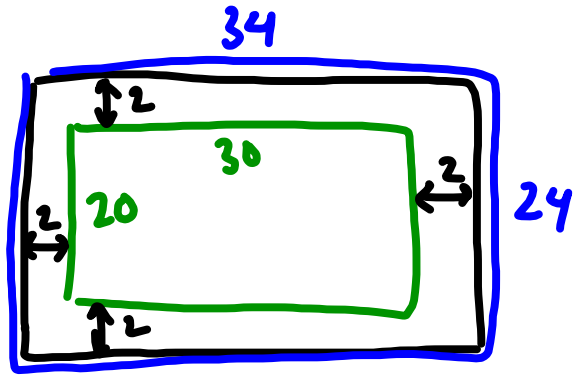
$6\cos 14 = h$



6

A rectangular garden has dimensions 30 feet by 20 feet. What is the area of the 2 foot wide walkway around the garden?

a) 104 ft^2 b) 216 ft^2 c) 680 ft^2 d) 704 ft^2 e) 1416 ft^2



$(34 \cdot 24) - (30 \cdot 20) =$ Walkway

Garden + Walkway

Garden

$816 - 600 =$ Walkway

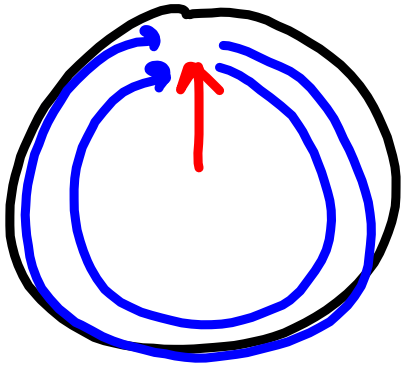
$216 =$ Walkway

ft^2

7

In two hours, the minute hand of a clock rotates through an angle equal to which of the following?

a) 90 b) 180 c) 360 d) 720 e) 1080

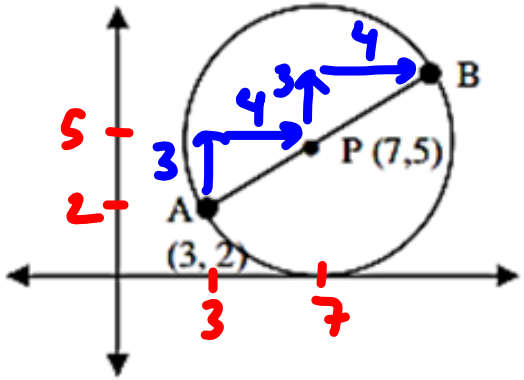


$360° + 360° = 720°$

8

$\overline{AB}$ is the diameter of a circle whose center is at P. What are the coordinates of B?

a) (10, 7) b) (5, 2.5) c) (12, 7) d) (11, 8) e) (11, 7)



9

In ΔABC, $m\angle A = 23$ and $m\angle B = 84$. What is the longest side of ΔABC?

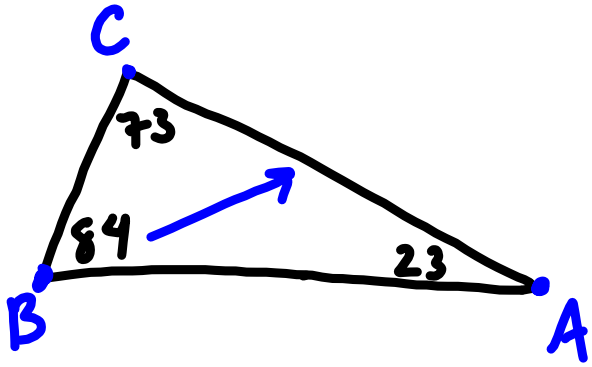
a) $\overline{AC}$ b) $\overline{AB}$ c) $\overline{BC}$ d) $\overline{AC} \cong \overline{AB}$ (there is no longest side)

$m\angle C = 180 - 23 - 84 = 73°$

$m\angle C = 73°$

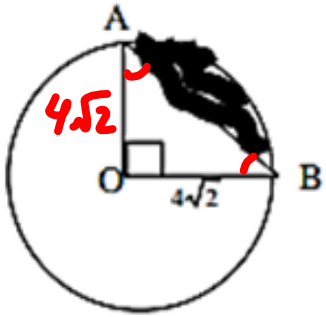
$m\angle A = 23°$

$m\angle B = 84°$



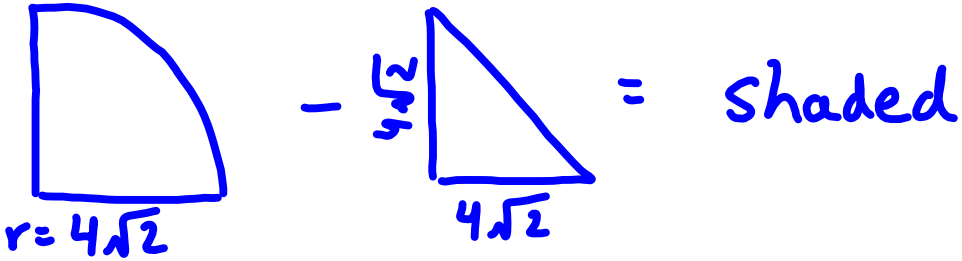
10

Given that $m\angle OAB = 45°$. What is the area of the shaded portion of the circle?



a) $32\pi - 16\sqrt{2}$ b) $4\pi - 8$ c) $32\pi - 8$

d) $8\pi - 16$ e) $8\pi - 8$



$- \quad = \text{shaded}$

$$\frac{\pi(4\sqrt{2})^2}{4} - \frac{1}{2}(4\sqrt{2})(4\sqrt{2})$$

$$\frac{\pi(16\cdot 2)}{4} - \frac{1}{2}(16\sqrt{4})$$

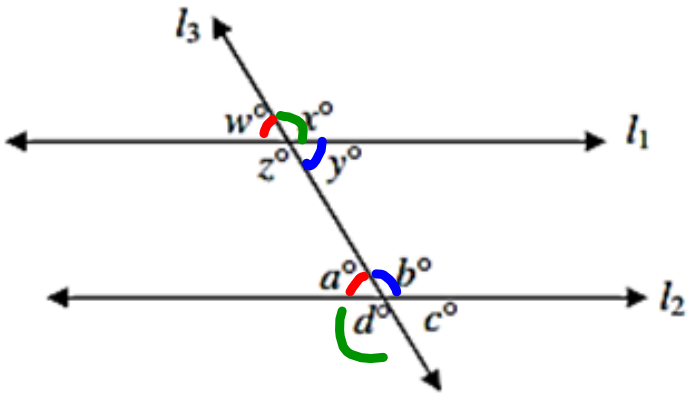
$$8\pi - 16$$

11 In the figure below, l_1 is parallel to l_2. Which of the following must be true?

I. $w = a$ ✓

II. $y + b = 180°$ ✓

III. $x + d = 180°$ ✗



a) I only b) II only c) I and II only

d) II and III only e) I, II and III

12 If the area of a circle is 9π, which of the following is(are) true?

I. The radius is 3. ✓

II. The diameter is 6. ✓

III. The circumference is 6π. ✓

a) I only b) II only c) III only d) I and II only e) I, II and III

$A = \pi r^2$

$\frac{9\pi}{\pi} = \frac{\pi r^2}{\pi}$

$\sqrt{9} = \sqrt{r^2}$

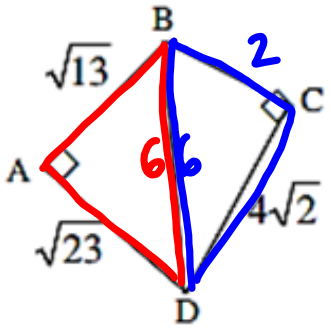
$3 = r$ $d = 6$

$C = 2\pi r = 2\pi(3) = 6\pi$

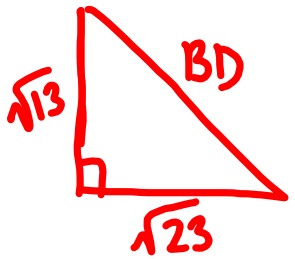
13 Use the figure to find the length of BC.

a) 1 b) 2 c) 3

d) 4 e) 5



1



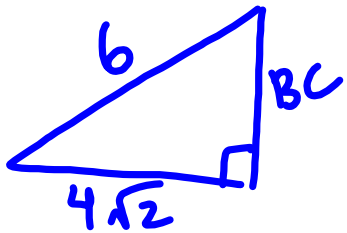
$(\sqrt{23})^2 + (\sqrt{13})^2 = BD^2$

$23 + 13 = BD^2$

$36 = BD^2$

$6 = BD$

2



$(4\sqrt{2})^2 + BC^2 = 6^2$

$(4\sqrt{2})(4\sqrt{2}) + BC^2 = 36$

$16\sqrt{4} + BC^2 = 36$

$32 + BC^2 = 36$

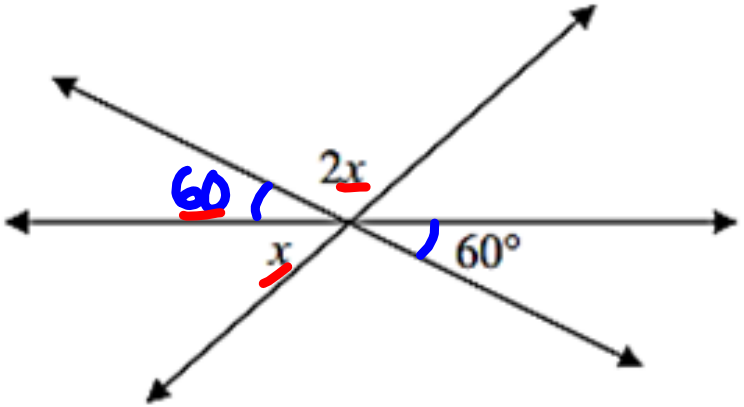
$\sqrt{BC^2} = \sqrt{4}$

$BC = 2$

14 What is $2x - 60$ equal to?

a) 80 b) 40 c) 30

d) 20 e) 10



$x + 60 + 2x = 180$

$3x + 60 = 180$

$3x = 120$

$x = 40$

$2(40) - 60$

$80 - 60$

20

15

If point R has coordinates (x, y) and point S has coordinates $(x + 1, y + 1)$, what is the distance between R and S?

a) $\sqrt{2}$ b) $\sqrt{x^2 + y^2}$ c) 2 d) $\sqrt{x^2 + y^2 + 2}$ e) $x + y + 1$

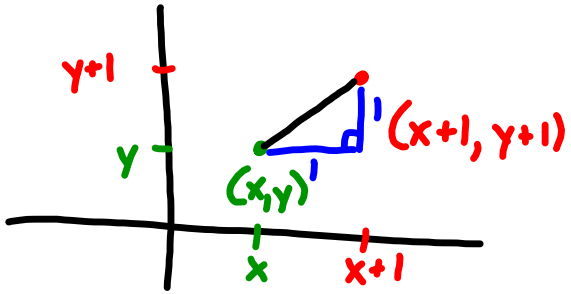
1

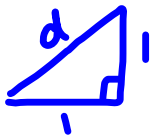
$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$d = \sqrt{(x+1-x)^2 + (y+1-y)^2}$$

$$d = \sqrt{1^2 + 1^2} = \sqrt{2}$$

2





$1^2 + 1^2 = d^2$

$2 = d^2$

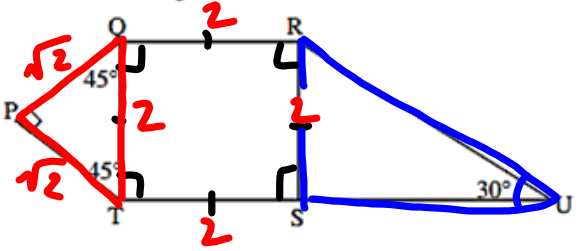
$\sqrt{2} = d$

16

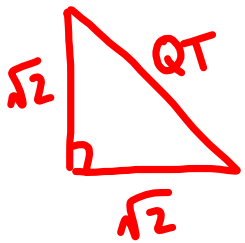
In the figure, if QRST is a square and $PQ = \sqrt{2}$, what is the length of RU?

a) $\sqrt{2}$ b) $\sqrt{6}$ c) $2\sqrt{2}$

d) 4 e) $4\sqrt{3}$



1



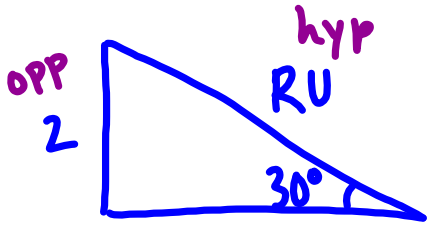
$(\sqrt{2})^2 + (\sqrt{2})^2 = QT^2$

$2 + 2 = QT^2$

$\sqrt{4} = \sqrt{QT^2}$

$2 = QT$

2



SOH-CAH-TOA

$\sin(30) = \frac{2}{RU}$

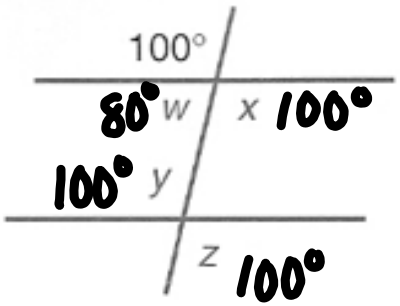
$RU \cdot \sin(30) = 2$

$\frac{RU \cdot \sin(30)}{\sin(30)} = \frac{2}{\sin(30)}$

$RU = \frac{2}{\sin 30} = 4$

Word Problem Portion

1. In the figure below, two parallel lines are intersected by a third line. Find the value of $2x - 2y + w + z$



$2x - 2y + w + z$

$2(100) - 2(100) + 80 + 100$

1. 180

2. Two tanks must have a total capacity of 480 gallons. If one tank needs to be twice the size of the other, how many gallons should the smaller tank hold?

$t_1 + t_2 = 480$

$t_1 = 2t_2$

$2t_2 + t_2 = 480$

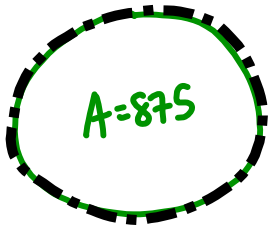
$3t_2 = 480$

$t_2 = 160$

$t_1 = 320$

2. 160 gal

3. A farmer has 875 sq ft of topsoil he will turn into a garden. He wants to minimize the cost of the fencing he will need to put around the garden. He is trying to decide between a circular garden and a square garden. Which should he choose and WHY?



$C = 2\pi r$

$A = \pi r^2$

$\frac{875}{\pi} = \frac{\pi r^2}{\pi}$

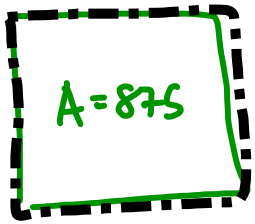
$\sqrt{\frac{875}{\pi}} = \sqrt{r^2}$

$16.69 = r$

$C = 2\pi(16.69)$

$C = 104.87$

≈ 105 ft



$P = 4s$

$A = s^2$

$\sqrt{875} = \sqrt{s^2}$

$29.58 = s$

$P = 4(29.58)$

$P = 118.32$

≈ 119 ft

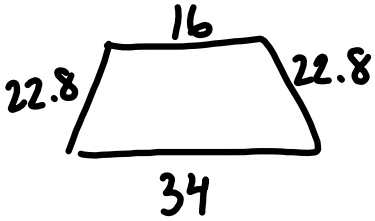
Circle is the cheaper option because it will require less fencing (~105 ft for the circle, compared to ~119 ft for the square).

4. A diamond plate trailer tongue tool box found in a catalog is in the shape of a trapezoidal prism (see photo). The dimensions are shown in the figure. Determine the number of square inches of sheet metal (total surface area) for this box. Ignore the taper of the lid. Round to the nearest square inch.

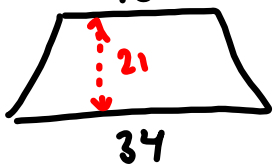
$S = Ph + 2B$

sides bases

$S = Ph + 2(525)$



B



$B = \frac{1}{2}(34+16)(21)$

$B = 525$

$P = 16+34+22.8+22.8$

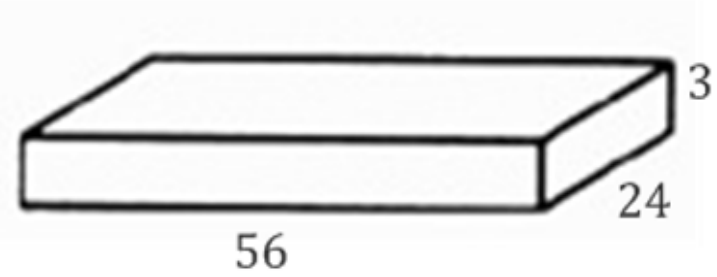
$P = 95.6$

$S = (95.6)(18) + 2(525)$

$S = 2770.8 \text{ in}^2$

$S = 2771 \text{ in}^2$

5. A concrete foundation is to be poured for a home. A hole 3 feet deep, 24 feet wide, and 56 feet long is excavated for the foundation (a rectangular prism). Determine the number of **cubic yards** (how many cubic feet per cubic yard? It's **not** 3!) of concrete that must be ordered for the pour.



$V = 3(24)(56) = 4032\ ft^3$

$$4032\ ft^3 \times \frac{1\ yd}{3\ ft} \times \frac{1\ yd}{3\ ft} \times \frac{1\ yd}{3\ ft}$$

$$149.33\ yd^3$$

$V = (18.67)(8)(1) = 149.36\ yd^3$