# End of Module 3 Study Guide Answer Key

1. Gloria says the two expressions $\frac{1}{4}(12x + 24) - 9x$ and $-6(x + 1)$ are equivalent. Is she correct? Explain how you know.

$\frac{1}{4}(12x+24)-9x$    $-6(x+1)$

$\frac{1}{4}(12x)+\frac{1}{4}(24)-9x$    $(-6)(x)+(-6)(1)$

$3x+6-9x$    $-6x-6$

$3x-9x+6$

$-6x+6$

NO, Gloria is not correct.
The standard form of $\frac{1}{4}(12x+24)-9x$ is $-6x+6$ and the standard form of $-6(x+1)$ is $-6x-6$. $-6x+6$ is not equivalent to $-6x-6$.

2. A grocery store has advertised a sale on ice cream. Each carton of any flavor of ice cream costs $3.79.

   a. If Millie buys one carton of strawberry ice cream and one carton of chocolate ice cream, write an algebraic expression that represents the total cost of buying the ice cream.

   $3.79(s+c)$

   b. Write an equivalent expression for your answer in part (a).

   $3.79s + 3.79c$

   c. Explain how the expressions are equivalent.

   Part b is the same expression as part a with the distributive property applied and in standard form.

3. A new park was designed to contain two circular gardens. Garden A has a diameter of 50 m, and garden B has a diameter of 70 m.

   a. If the gardener wants to outline the gardens in edging, how many meters will be needed to outline the smaller garden? (Write in terms of π.)

$$C = 2\pi r \qquad r = \tfrac{1}{2} \cdot 50 = 25$$
$$C = 2\pi(25)$$
$$C = 50\pi \text{ m}$$

The smaller garden will need 50π m of edging

   b. How much more edging will be needed for the larger garden than the smaller one? (Write in terms of π.)

$$C = 2\pi r \qquad r = \tfrac{1}{2} \cdot 70 = 35$$
$$C = 2\pi(35)$$
$$C = 70\pi$$

Larger garden - smaller garden

70π m - 50π m

20π m

The larger garden needs 20π m more fencing.

   c. The gardener wishes to put down weed block fabric on the two gardens before the plants are planted in the ground. How much fabric will be needed to cover the area of both gardens? (Write in terms of π.)

$$A_{larger} + A_{smaller}$$
$$\pi r^2 + \pi r^2$$
$$\pi(35)^2 + \pi(25)^2$$
$$1225\pi + 625\pi$$

1850π m² of fabric will be needed to cover the area of both gardens.

4. A play court on the school playground is shaped like a square joined by a semicircle. The perimeter around the entire play court is 182.8 ft., and 62.8 ft. of the total perimeter comes from the semicircle.
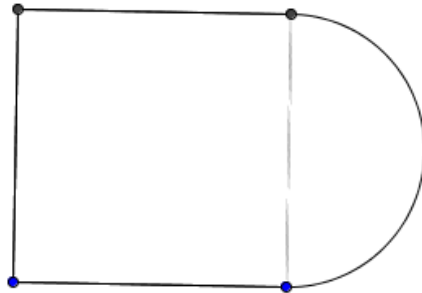


a. What is the radius of the semicircle? Use 3.14 for $\pi$.

$\frac{1}{2}C = 62.8$

$\frac{1}{2}(2\pi r) = 62.8$

$\pi r = 62.8$

$62.8 \div 3.14 = 20$

$3.14 \overline{)62.8G}$
$\quad \underline{62\,8}$
$\quad\quad 00$

$r = 20$

The radius of the semi-circle is 20 ft

b. The school wants to cover the play court with sports court flooring. Using 3.14 for $\pi$, how many square feet of flooring does the school need to purchase to cover the play court?
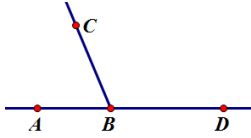
$Area_{square} + Area_{semicircle}$

$S \cdot S + \frac{1}{2}(\pi r^2)$

$40 \cdot 40 + \frac{1}{2}(3.14 (20^2))$

$1600 + \frac{1}{2}(3.14 (400))$

$1600 + 200(3.14)$

$1600 + 628$

$2228$

The school needs to purchase enough flooring to cover 2,228 ft².

5. Marcus drew two adjacent angles.

a. If ∠ABC has a measure one-third of ∠CBD, then what is the degree measurement of ∠CBD?

Let $m$ be the measure of ∠CBD in degrees.

∠ABC + ∠CBD = 180°

$\frac{1}{3}m + m = 180$

$1\frac{1}{3}m = 180$

$(\frac{3}{4})\frac{4}{3}m = 180(\frac{3}{4})$

$m = 135$

6. The dimensions of an above-ground, rectangular pool are 25 feet long, 18 feet wide, and 6 feet deep.

a. How much water is needed to fill the pool?

$V = l \cdot w \cdot h$

$V = 25 ft. \cdot 8ft. \cdot 6ft.$

$V = 2,700 ft^3$

25 × 6 = 150

$\begin{array}{r} 150 \\ \times\ 8 \\ \hline 1200 \\ +1500 \\ \hline 2700 \end{array}$

b.  If there are 7.48 gallons in 1 cubic foot, how many gallons are needed to fill the pool?

$$2,700$$
$$\times\ 7.48$$
$$21\ 600$$
$$108\ 000$$
$$1890\ 000$$
$$20196.00$$

To fill the pool, 20,196 gallons are needed.

c.  Assume there was a hole in the pool, and 3,366 gallons of water leaked from the pool.  How many feet did the water level drop?
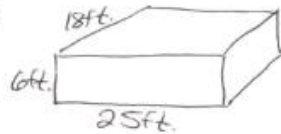
$$3366 \div 7.48$$

$$\begin{array}{r} 450 \\ 7.48\sqrt{3366.00} \\ -2992 \\ \hline 3740 \\ 3740 \end{array}$$

$$V = \ell \cdot w \cdot h$$
$$450 = 25 \cdot 18 \cdot h$$
$$450 = 450 \cdot h$$
$$\frac{450}{450}\ \ \frac{450}{450}$$
$$1 = h$$

The water level dropped one foot.

d.  After the leak was repaired, it was necessary to lay a thin layer of concrete to protect the sides of the pool.  Calculate the area to be covered to complete the job.

base : 25·18
lateral faces: 2(6·18) and 2(6·25)
(25·18) + 2(6·18) + 2(6·25)
450 + 2(108) + 2(150)
450 + 216 + 300
966
The surface area that needs to be covered is 966 ft².

7. Gary is learning about mosaics in art class. His teacher passes out small square tiles and encourages the students to cut up the tiles in various angles. Gary's first cut tile looks like this:
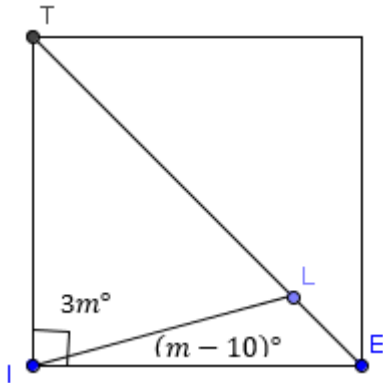


a. Write an equation relating $\angle TIL$ with $\angle LIE$.

$$3m + (m-10) = 90$$

b. Solve for $m$.

$$3m + (m-10) = 90$$
$$3m + m - 10 = 90$$
$$4m - 10 = 90$$
$$4m - 10 + 10 = 90 + 10$$
$$4m = 100$$
$$4m \cdot \tfrac{1}{4} = 100 \cdot \tfrac{1}{4}$$
$$m = 25$$

c. What is the measure of $\angle TIL$?

$$3m$$
$$3(25) = 75$$
The measure of $\angle TIL$ is $75°$

d. What is the measure of $\angle LIE$?

$$m - 10$$
$$25 - 10 = 15$$
The measure of $\angle LIE$ is $15°$