Name: Key (w/ corrections) Date: _____

End of Module 3 STUDY GUIDE

Directions: Show all work for full credit.

1. Mark says the two expressions, $\frac{1}{3}(9a - 27) - 4$ and $-3(-a - 3) + 4$ are equivalent. Is he correct? Explain how you know.

$3a - 9 - 4$ $\qquad$ $3a + 9 + 4$

$3a - 13 \neq 3a + 13$

No; The standard form of the first expression has a -13 and the standard form of the second expression has a + 13.

2. A grocery store has advertised a sale on juice. Each container of any flavor of juice costs $2.99.

   a. If Margaret buys one container of apple juice and one container of grape juice, write an algebraic expression that represents the total cost of buying the juice.

$2.99(a + g)$

Let a = # of containers of apple juice
Let g = # of containers of grape juice

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

$2.99a + 2.99g$

   c. Explain how the expressions are equivalent.

Part b is the same expression as part a. with the distributive property applied.

3. A new arboretum was designed to contain two circular gardens. Garden A has a diameter of 25 ft and Garden B has a diameter of 45 ft.

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

$C_{smaller} = \pi d = \pi(25) = \boxed{25\pi \text{ ft}}$

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

$C_{larger} = \pi d = \pi(45) = 45\pi$ ft

$45\pi - 25\pi =$ **20π ft more edging**

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

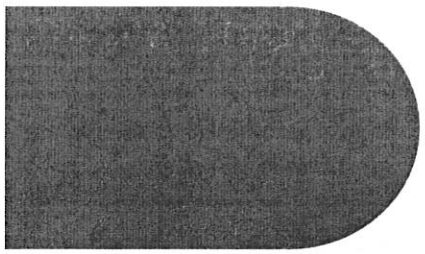
$A_T = A_{larger} + A_{smaller}$

$= \pi r^2 + \pi r^2$

$= \pi(22.5^2) + \pi(12.5^2)$

$= 506.25\pi + 156.25\pi =$ **662.5 π ft²**

Corrected (4.) A play court on the school playground is shaped like a square joined by a semicircle. The perimeter around the play court is 245.3 m and 78.75 m of the total perimeter comes from the semicircle.



$C_{semi} = \frac{1}{2}\pi d$

$78.75 = \frac{1}{2}(3.14)d$

$50.16 = d$

a. What is the radius of the semicircle? Use 3.14 for π

$r = \frac{1}{2}d = \frac{1}{2}(50.16) =$ **25.1m**

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b. The school wants to cover the play court with paint. Using 3.14 for π, how many gallons of paint does the school need to purchase to cover the play court? (Assume only one coat of paint will be used)

$A_T = A_{square} + A_{semi}$

$= s^2 + \frac{1}{2}\pi r^2$

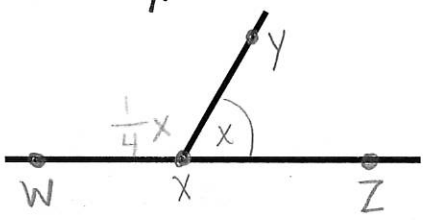
$= (50.2^2) + \frac{1}{2}(3.14)(25.1^2)$

$= 2520 + 989.1 = \boxed{3509.1\ m^2}$

Corrected (5.) Mindy drew two adjacent angles.

a. If angle WXY has a measure of one-fourth of angle YXZ, then what is the degree measurement of YXZ?

Let $m\angle YXZ = x$



$\frac{1}{4}x + x = 180$

$\frac{5}{4}x = 180$

$\boxed{x = 144°}$

b. If the measure of YXZ is 4(3x + 7) degrees, then what is the value of x?

$4(3x+7) = 144$

$12x + 28 = 144$

$12x = 116$

$\boxed{x = 9.7}$

6. The dimensions of an above-ground, rectangular pool are 20 feet long, 28 feet wide and 8 feet deep.

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

$V = lwh = (20)(28)(8) = \boxed{4{,}480\ ft^3}$

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b. If there are 7.48 gallons in 1 cubic foot, how many gallons are needed to fill the pool? *(Hint: Use dimensional analysis or proportions to solve)*

$4{,}480\ \cancel{ft^3} \times \frac{7.48\ gal}{1\ \cancel{ft^3}} = \boxed{33{,}510.4\ gal}$

c. Assume there was a hole in the pool and 5,432 gallons of water leaked from the pool. How many feet did the water level drop? *(Hint: Use dimensional analysis, proportions or volume formula to solve)*

$5{,}432\ \cancel{gal} \times \frac{1\ ft^3}{7.48\ \cancel{gal}} = 726.2\ ft^3$

$V = lwh$

$726.2 = (20)(28)h$

$1.3 = h$

The water level dropped 1.3 ft

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

Base only → no cement on top of pool!

SA of base and sides = $(20)(28) + 2(20)(8) + 2(28)(8)$

$= 560 + 320 + 448$

$= \boxed{1{,}328\ ft^2}$

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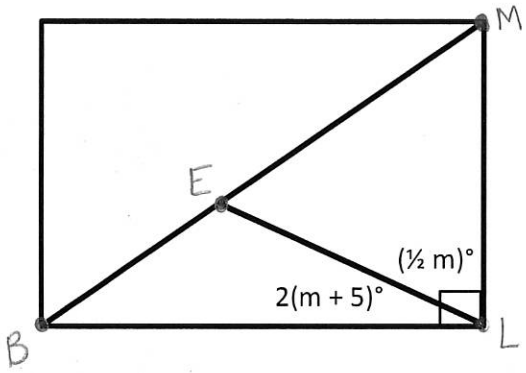
7. George is learning about mosaics in art class. His teacher passes out small square tiles and encourages the students to cut up the tiles in various angles. George's first cut looks like this:



a. Write an equation relating angle MLE with angle ELB

$\frac{1}{2}m + 2(m+5) = 90$

b. Solve for m.

$\frac{1}{2}m + 2m + 10 = 90$

$2.5m + 10 = 90$

$2.5m = 80$

$\boxed{m = 32°}$

c. What is the measure of angle MLE?

$\frac{1}{2}m = \frac{1}{2}(32) = \boxed{16°}$

d. What is the measure of angle ELB?

$2(m+5) = 2(32+5) = \boxed{74°}$