

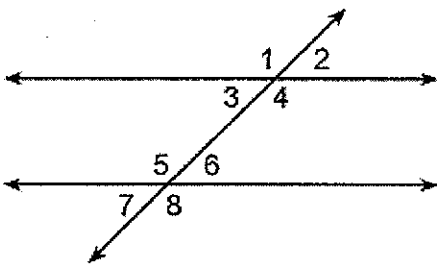
Directions: Show all work.

1. Solve the equation given:

$$\begin{aligned}
 & \overbrace{-2(3x - 1)} = 4x - 8 \\
 & -6x + 2 = 4x - 8 \\
 & \begin{array}{r} +6x \qquad +6x \\ \hline 2 = 10x - 8 \\ +8 \qquad +8 \\ \hline 10 = 10x \\ \frac{10}{10} \quad \frac{10}{10} \\ \boxed{x = 1} \end{array}
 \end{aligned}$$

2. Two angles are supplementary. Angle 1 is represented by $(4x - 15)$ and angle 2 is represented by $(x + 35)$. Determine the measure of the larger angle.

$$\begin{aligned}
 (4x - 15) + (x + 35) &= 180 \\
 5x + 20 &= 180 \\
 -20 \quad -20 & \\
 \hline
 5x &= 160 \\
 \frac{5x}{5} \quad \frac{160}{5} & \\
 x &= 32 \\
 4(32) - 15 & \\
 128 - 15 & \\
 \boxed{113^\circ} &
 \end{aligned}$$



3. Identify a pair of angles that satisfy each of the following special relationships.

Corresponding \angle 1 and \angle 5

Vertical \angle 1 and \angle 4

Alternate Interior \angle 3 and \angle 6

Alternate Exterior \angle 1 and \angle 8

Supplementary \angle 1 and \angle 2

4. In 1995, the population of a certain town is 4,500 people. From 1995 to 2000, the population increased by 15%. From 2000 to 2005, the population decreased by 4%. What was the town's population in 2005? Show your work.

$$\begin{aligned}
 4,500 \cdot 0.15 &= 675 \\
 4,500 + 675 &= 5,175 \\
 5,175 \cdot 0.04 &= 207 \\
 5,175 - 207 &= \boxed{4,968}
 \end{aligned}$$

5. Dylan took his friend out to eat. The total bill came to \$67.75. Sales tax was 8.625%, and then they left a 20% tip. Determine the total amount they will pay.

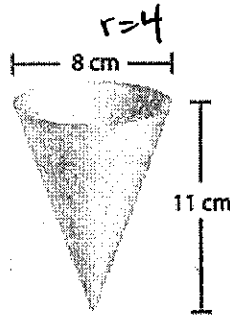
$$67.75 \cdot 0.08625 = 5.84$$

$$67.75 + 5.84 = 73.59$$

$$73.59 \cdot 0.20 = 14.72$$

$$73.59 + 14.72 = \boxed{88.31}$$

6. Abby is selling lemonade in paper cups with the dimensions shown below. Determine the volume of each cup to the nearest tenth. ($V = \frac{1}{3}\pi r^2 h$)

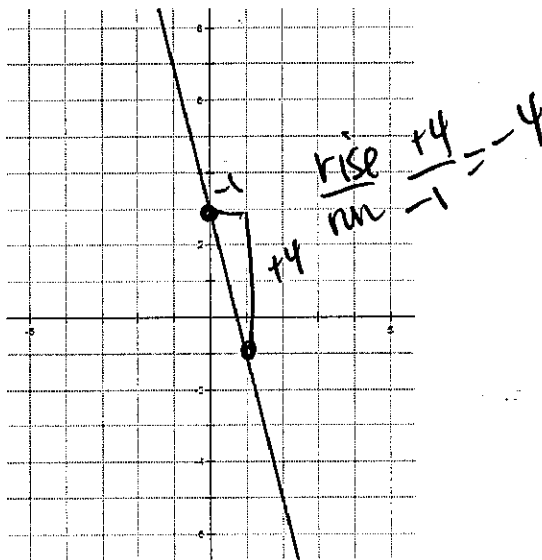


$$V = \frac{1}{3} \cdot \pi \cdot 4^2 \cdot 11$$

$$V = \frac{176\pi}{3}$$

$$V = \boxed{184.3 \text{ cm}^3}$$

7.



Determine the slope (m) of the line. -4

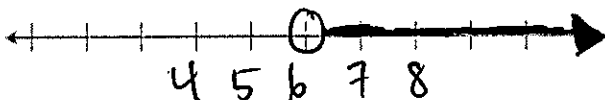
Determine the y-intercept (b). +3

Write the linear equation. $y = -4x + 3$

8. Solve and Graph the inequality shown.

$$7x - 11 > 4x + 7$$

$$\begin{array}{r} -4x \quad -4x \\ \hline 3x - 11 > 7 \\ +11 \quad +11 \\ \hline 3x > 18 \\ \frac{3x}{3} > \frac{18}{3} \\ x > 6 \end{array}$$



9. What is $(3x - 7)$ subtracted from $(-8x - 9)$?

$$(-8x - 9) - (3x - 7)$$

$$-8x - 9 - 3x + 7$$

$$\boxed{-11x - 2}$$

Directions: Select the choice that best answers each question.

1. Determine the solution set for the inequality.

$$3x + 20 \geq 2(5x - 4)$$

$$3x + 20 \geq 10x - 8$$

$$\begin{array}{r} -3x \quad -3x \\ \hline 20 \geq 7x - 8 \\ +8 \quad +8 \\ \hline 28 \geq 7x \\ \frac{28}{7} \geq \frac{7x}{7} \end{array}$$

$x \leq 4$

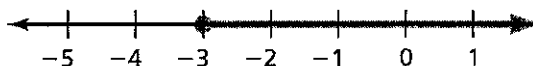
A $x \geq 4$

B $x \leq 3\frac{3}{7}$

C $x \leq 4$

D $x \geq 2$

2. Which of the following inequalities represents the graph shown below?



A $x \geq -3$

B $x > -3$

C $x \leq -3$

D $x < -3$

3. Solve for x.

$$6 \left[\frac{1}{3}x + 2 = \frac{5}{2}x \right]$$

$$2x + 12 = 15x$$

$$\begin{array}{r} -2x \quad -2x \\ \hline 12 = 13x \\ \frac{12}{13} = \frac{13x}{13} \end{array}$$

A $\frac{12}{13}$

B $\frac{2}{13}$

C 1

D No Solution

4. What is the solution to $8x + 4 = 4(2x + 1)$?

$$8x + 4 = 8x + 4$$

A 1

B -1

C No Solution

D All Real Numbers

5. Which equation has no solution?

A $3x - 4 = 5x - 6$

C $2(x + 2) = 2x + 2$

$$\begin{array}{r} 2x + 4 = 2x + 2 \\ -2x \quad -2x \\ \hline 4 = 2 \end{array}$$

B $x + 5 + 2x = 2x + 10$

D $6x - 5 = -5x + 6$

6. Determine the solution set. Show your work.

$$4(2x - 3) \leq 4$$

$$\begin{array}{r} 8x - 12 \leq 4 \\ +12 \quad +12 \\ \hline 8x \leq 16 \\ \frac{8}{8} \quad \frac{8}{8} \\ x \leq 2 \end{array}$$

Graph the solution set.



7. Solve for e. Show your work.

$$-3e + 4 + 8e = 39$$

$$\begin{array}{r} 5e + 4 = 39 \\ -4 \quad -4 \\ \hline 5e = 35 \\ \frac{5}{5} \quad \frac{5}{5} \\ e = 7 \end{array}$$

Answer 7

8. John and Corey are drinking Gatorade after practice. John drinks two less than three times the number of ounces Corey had. Together they drink 18 ounces. How much Gatorade did they each drink? Be sure to write an equation and "let" statements. Show your work.

$$\text{John} = 3c - 2 = 13$$

$$\text{Corey} = c = 5$$

$$c + 3c - 2 = 18$$

$$\begin{array}{r} 4c - 2 = 18 \\ +2 \quad +2 \\ \hline 4c = 20 \end{array}$$

$$\frac{4c}{4} = \frac{20}{4}$$

$$c = 5$$

Corey had 5 ounces.

John had 13 ounces.

9. Cameron and Paige began eating candy on Halloween. Cameron ate one piece of candy on Halloween, and then ate seven pieces per day after that. Paige ate 16 pieces of candy on Halloween, and then ate four pieces per day after that.

Part A Write an equation to determine the number of days will it be before they have eaten the same number of candy.

Equation $1 + 7x = 16 + 4x$

Part B Solve your equation from Part A.

$$\begin{array}{r} 1 + 7x = 16 + 4x \\ -4x \quad -4x \\ \hline 1 + 3x = 16 \end{array}$$

$$\begin{array}{r} 1 + 3x = 16 \\ -1 \quad -1 \\ \hline 3x = 15 \end{array}$$

$$\frac{3x}{3} = \frac{15}{3}$$

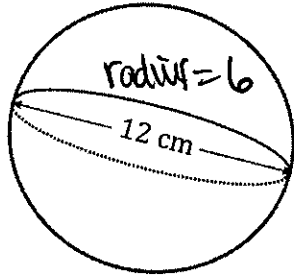
$$x = 5$$

Answer 5

Directions: Select the choice that best answers each question.

1. A Christmas snow globe uses the dimensions of the sphere shown below. Determine the volume of the sphere in terms of π .

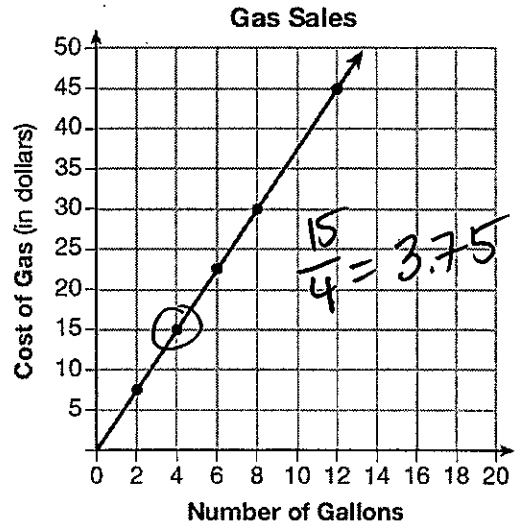
$$Volume = \frac{4}{3}\pi r^3$$



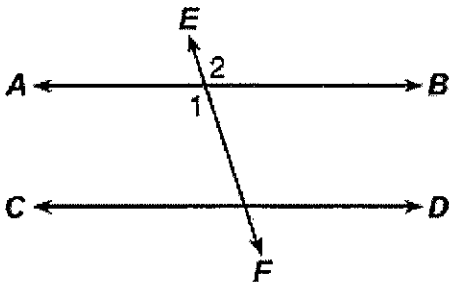
- A $288\pi \text{ cm}^3$
- B $216\pi \text{ cm}^3$
- C $48\pi \text{ cm}^3$
- D $2,304\pi \text{ cm}^3$

$$\frac{4}{3} \cdot \pi \cdot 6^3$$

2. The graph below was created by an employee at a gas station.



3. In the diagram below, lines AB and CD are parallel, and line EF is a transversal



Which angle relationship best describes $\angle 1$ & $\angle 2$?

- A Supplementary Angles
- B Vertical Angles
- C Corresponding Angles
- D Alternate Interior Angles

Which statement can be justified by using the graph?

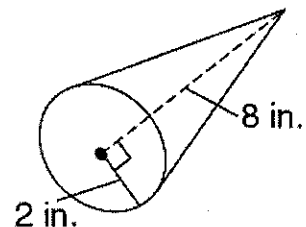
- A If 10 gallons of gas was purchased, \$35 was paid.
- B For every gallon of gas purchased, \$3.75 was paid.
- C For every 2 gallons of gas purchased, \$5.00 was paid.
- D If zero gallons of gas were purchased, zero miles were driven.

4. The size of the new super cone at Friendly's is shown below. Determine the volume of the cone to the nearest tenth.

$$Volume = \frac{1}{3}\pi r^2 h$$

- A 64.0 in^3
- B 100.5 in^3
- C 50.3 in^3
- D 33.5 in^3

$$\frac{1}{3} \cdot \pi \cdot 2^2 \cdot 8$$



5. Gabby graphs a linear equation that passes through the points (6, 20) and (8, 14). Determine the equation of her line. *Show your work.*

$$\frac{y_2 - y_1}{x_2 - x_1} = \frac{14 - 20}{8 - 6} = \frac{-6}{2} = -3 = m$$

$$y = -3x + b$$

$$20 = -3(6) + b$$

$$20 = -18 + b$$

$$\begin{array}{r} +18 \\ +18 \\ \hline 38 = b \end{array}$$

Equation $y = -3x + 38$

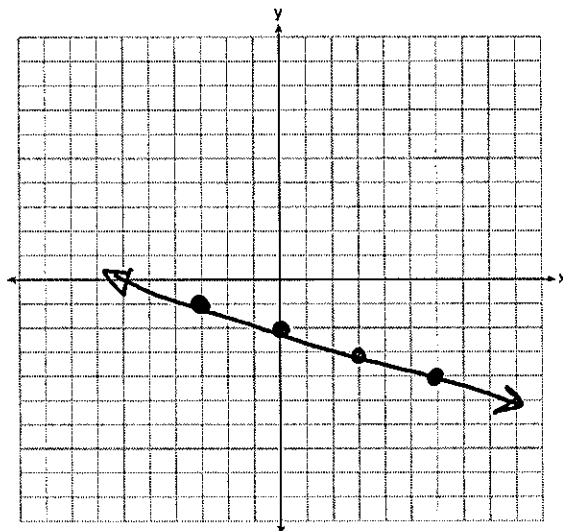
6. Solve for y, and then graph the equation.

$$2x - 3y = 3x + 6$$

$$\begin{array}{r} -2x \\ -2x \end{array}$$

$$\frac{-3y}{-3} = \frac{1x + 6}{-3}$$

$$y = -\frac{1}{3}x - 2$$



7. A statistics class surveyed some students during one lunch period to obtain opinions about television programming preferences. The results of the survey are summarized in the table below.

Programming Preferences

	Comedy	Drama
Male	70	35
Female	48	42

Based on the sample, predict how many of the school's 351 males would prefer comedy.

Show your work.

$$\frac{70}{105} = \frac{x}{351}$$

$$x = 234$$

$$\frac{105x}{105} = \frac{24,570}{105}$$

8. A landscaper is creating a rectangular flower bed such that the width is three less than twice the length. The perimeter of the flower bed is 36 feet. Write and solve an equation to determine the width of the flower bed. *Show your work.*

$$\begin{array}{l} \text{length} = x = 7 \\ \text{width} = 2x - 3 = 11 \end{array}$$

$$2(x) + 2(2x - 3) = 36$$

$$2x + 4x - 6 = 36$$

$$6x - 6 = 36$$

$$\begin{array}{r} +6 \\ +6 \end{array}$$

$$\frac{6x}{6} = \frac{42}{6}$$

$$x = 7$$

Final Exam - Monday, June 18th (8:00 am)

Directions: Show your work. You may use a calculator.

1. Olivia and Hope go to Applebee's for lunch. Their bill came to \$43.75. They want to leave an 18% tip. What will be the total amount they pay?

$$43.75 \times 0.18 = 7.88$$

$$43.75 + 7.88$$

- A \$51.62
- B \$7.88
- C \$51.63
- D \$35.88

2. Taylor wants to buy a ticket to the Mets game. The regular price of each ticket is \$81. If she receives a discount of 5%, and is then charged 8.125% sales tax, how much will she pay for the ticket? Show your work.

$$81 \times 0.05 = 4.05$$

$$81 - 4.05 = 76.95$$

$$76.95 \times 0.08125 = 6.25$$

$$76.95 + 6.25 = \boxed{83.20}$$

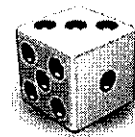
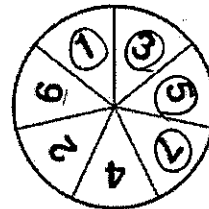
3. The BMS boy's lacrosse team scored 58 goals last season. This season the team scored 71 goals. Determine the percent change in the number of goals scored to the nearest tenth. Show your work.

$$\frac{\text{change}}{\text{original}} = \frac{71 - 58}{58} = \frac{13}{58}$$

$$0.22413...$$

$$\boxed{22.4\% \text{ increase}}$$

4. What is the probability of spinning an odd number on the spinner, and then an even number on the number cube?



- A $\frac{1}{42}$
- B $\frac{2}{21}$
- C $\frac{1}{21}$
- D $\frac{2}{7}$

$$\frac{4}{7} \cdot \frac{1}{2} = \frac{4}{14}$$

$$= \frac{2}{7}$$

5. Mr. Burmeister's gumball machine has 8 red, 5 yellow, 3 green, 5 purple, and 4 blue gumballs. What is the probability of randomly selecting a yellow gumball and then a red gumball without replacement?

- A $\frac{1}{15}$
- B $\frac{8}{125}$
- C $\frac{1}{6}$
- D $\frac{1}{8}$

$$\begin{array}{l} 8R \\ 5Y \\ 3G \\ 5P \\ 4B \\ \hline 25 \text{ total} \end{array}$$

$$P(\text{yellow, red}) = \frac{5}{25} \cdot \frac{8}{24} = \frac{1}{5} \cdot \frac{1}{3} = \frac{1}{15}$$

6. Simplify the following expression.

$$\frac{4e^8 \cdot 5e}{10e^2} = \frac{20e^9}{10e^2} = 2e^7$$

- A $2e^7$
- B $10e^6$
- C $10e^7$
- D $2e$

7. Simplify the following expression.

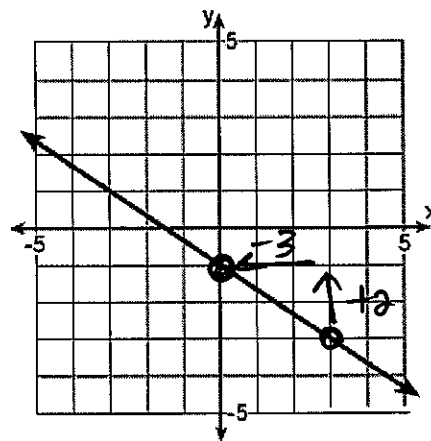
$$7w^3x^5 \cdot 3w^2x$$

$$21w^5x^6$$

Gabe graphed the linear equation shown to the right. Use this graph to answer questions #8 & #9.

8. What is the slope type of Gabe's line?

- A Positive
- C Negative
- B Zero
- D Undefined



9. Write the equation of Gabe's line.

$$y = -\frac{2}{3}x - 1$$

10. Jocelyn graphs a linear equation that passes through the points $(-10, 6)$ and $(2, 12)$. Determine the equation of her line. Show your work.

$$\frac{y_2 - y_1}{x_2 - x_1} = \frac{12 - 6}{2 - (-10)} = \frac{6}{12} = \frac{1}{2}$$

$$y = \frac{1}{2}x + b$$

$$12 = \frac{1}{2}(2) + b$$

$$12 = 1 + b$$

$$\frac{-1}{-1} = \frac{-1}{-1}$$

$$11 = b$$

Equation

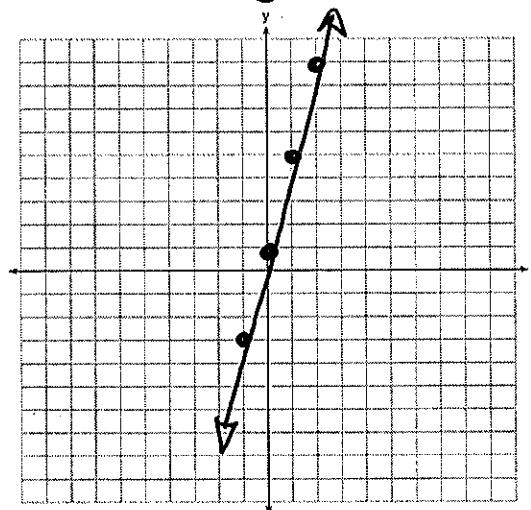
$$y = \frac{1}{2}x + 11$$

11. Solve for y, and then graph the equation.

$$5y - 8x = 12x + 5$$

$$\frac{5y}{5} = \frac{20x + 5}{5}$$

$$y = 4x + 1$$



12. Mitch tosses a pair of six-sided number cubes. The top faces of the number cubes are shown. Find the probability of getting these results with the number cubes.



$$\frac{1}{6} \cdot \frac{1}{6} = \frac{1}{36}$$

A $\frac{2}{7}$

(C) $\frac{1}{36}$

B $\frac{1}{6}$

D $\frac{1}{9}$

13. Nora has 4 quarters, 3 dimes, and 3 pennies in her pocket. She randomly chooses a coin from her pocket and does not replace it. She then chooses a second coin. What is the probability that she selects a quarter and then a dime?

$$\begin{array}{l} 4Q \\ 3D \\ + 3P \\ \hline 10 \end{array}$$

A $\frac{1}{5}$

(C) $\frac{2}{15}$

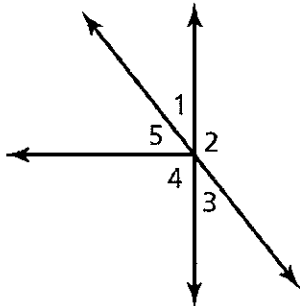
B $\frac{3}{25}$

D $\frac{7}{19}$

$$\frac{4}{10} \cdot \frac{3}{9}$$

$$\frac{2}{5} \cdot \frac{1}{3} = \frac{2}{15}$$

14. Use the diagram below to answer the following questions.



Which pair of angles are considered supplementary? \sphericalangle 1 and \sphericalangle 2

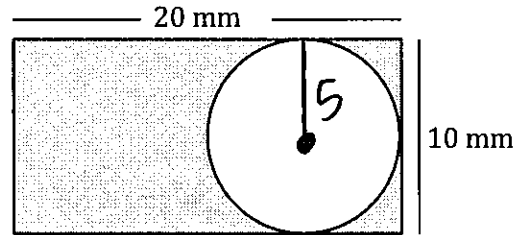
Which pair of angles are considered complementary? \sphericalangle 1 and \sphericalangle 5

Which pair of angles are congruent? \sphericalangle 1 and \sphericalangle 3

Explain how you determined your answer.

vertical angles

15. Gavin drew a circle to match the width of a rectangle. Determine the area of the shaded region. ($A = \pi r^2$)



Part A Write your answer in terms of π . Show your work.

$$\begin{array}{l} \square - \bigcirc \\ 20 \cdot 10 - \pi \cdot 5^2 \\ 200 - 25\pi \end{array}$$

Answer $200 - 25\pi$ mm^2

Part B Determine the area to the nearest tenth.

Answer 121.5 mm^2

16. A pair of complementary angles have measures of $(8r + 9)$ and $(7r + 6)$. Determine the measure of the larger angle. *Show your work.*

$$8r + 9 + 7r + 6 = 90$$

$$\begin{array}{r} 15r + 15 = 90 \\ -15 \quad -15 \\ \hline \end{array}$$

$$\begin{array}{r} 15r = 75 \\ \hline 15 \quad 15 \end{array}$$

$$8(5) + 9 \quad r = 5$$

$$40 + 9$$

$$\boxed{49^\circ}$$

17. Justin is conducting a probability experiment that involves flipping a quarter, flipping a penny, and rolling a number cube. What is the probability that both coins land on heads, and he also rolls an odd number?



A $\frac{1}{12}$

B $\frac{3}{8}$

C $\frac{1}{6}$

D $\frac{1}{8}$

$$\frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2} = \frac{1}{8}$$

18. The diagram below shows the intersection of two lines.

Part A Determine the value of m .

Show your work.

$$\begin{array}{r} 2m + 10 = 5m - 80 \\ -2m \quad -2m \\ \hline \end{array}$$

$$\begin{array}{r} 10 = 3m - 80 \\ +80 \quad +80 \\ \hline \end{array}$$

$$\begin{array}{r} 90 = 3m \\ \hline 3 \quad 3 \end{array}$$

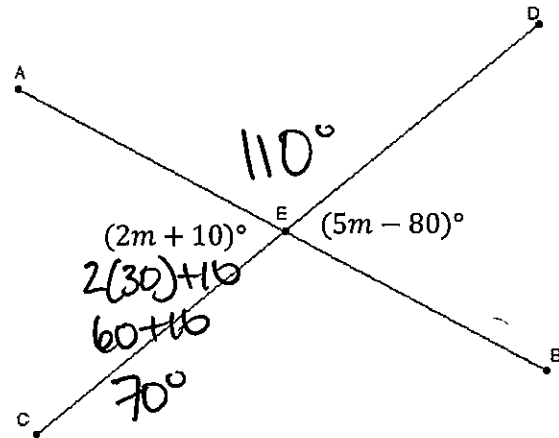
Answer $\boxed{30}$

Part B Find the measure of angle AED.

Show your work.

$$180 - 70^\circ$$

Answer $\underline{110^\circ}$ degrees



Final Exam – Monday, June 18th (8:00 am)

Directions: Show your work. You may use a calculator.

1. Jake and Connor are training for a marathon. Jake runs 10 miles the first week, and then 2 miles each week after. Connor runs 4 miles the first week, and then 5 miles each week after. Determine the number of weeks it will take for Jake and Connor to run the same number of miles.

Part A Write an equation to determine the number of weeks will it be before they have run the same number of miles.

Equation $10 + 2x = 4 + 5x$

Part B Solve your equation from Part A.

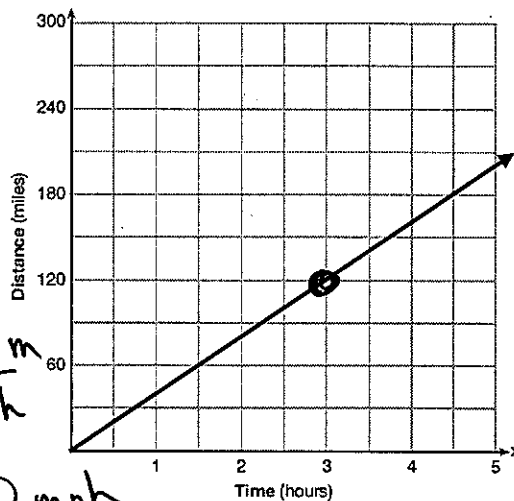
$$\begin{array}{r} 10 + 2x = 4 + 5x \\ -2x \quad -2x \\ \hline 10 = 4 + 3x \\ -4 \quad -4 \\ \hline 6 = 3x \\ \frac{6}{3} = \frac{3x}{3} \end{array}$$

$$\begin{array}{r} 10 = 4 + 3x \\ -4 \quad -4 \\ \hline 6 = 3x \\ \frac{6}{3} = \frac{3x}{3} \end{array}$$

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

Answer 2

2. Rachel and her family are driving to Florida during their summer vacation. The distance they travel is represented by the graph below.



Based on the graph, which of the following statements is true?

- A They are traveling at a constant speed of 75 miles per hour.
- B Their speed is increasing as the time increases.
- C They are traveling at a constant speed of 40 miles per hour.
- D They are traveling at a constant speed of 45 miles per hour.

3. Simplify the expression below.

$$\begin{array}{l} \sqrt{80} + 7\sqrt{5} \\ \wedge \\ 4\sqrt{5} + 7\sqrt{5} \\ \boxed{11\sqrt{5}} \end{array}$$

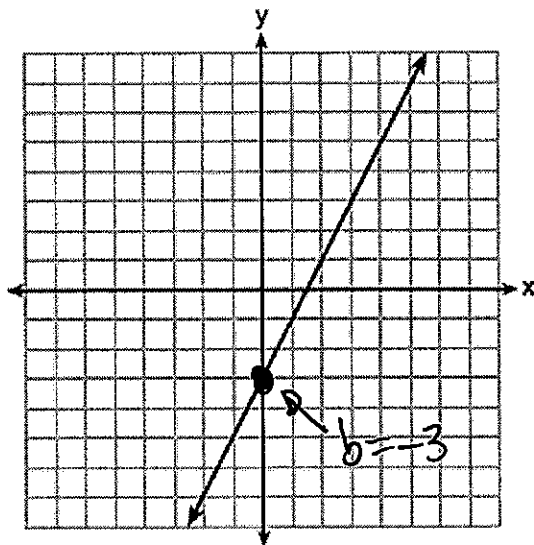
4. Write the equation of the line that passes through the points (3, 11) and (-2, 1).

$$\begin{array}{l} x_1, y_1 \quad x_2, y_2 \\ \frac{1-11}{-2-3} = \frac{-10}{-5} = 2 = m \end{array}$$

$$\begin{array}{l} y = 2x + b \\ 11 = 2(3) + b \\ 11 = 6 + b \\ 5 = b \end{array}$$

$$\boxed{y = 2x + 5}$$

5. Emily graphed the linear equation shown.



Which of the equations below has the same y-intercept as Emily's?

A $6y + x = 18$

C $27 + 3y = 6x$

B $y + 3 = 6x$
 $\begin{array}{r} -3 \\ -3 \\ \hline y = 6x - 3 \end{array}$

D $y = -3x + 6$

6. Peter compared his quiz grades for the first and second semester of his math class.

Semester 1: $\overset{80.5}{78}$, $\overset{92.5}{83}$, $\overset{88}{88}$, $\overset{91}{91}$, $\overset{94}{94}$

IQR = 12.5

Semester 2: $\overset{77}{77}$, $\overset{80}{80}$, $\overset{85}{85}$, $\overset{88}{88}$, $\overset{91}{91}$, $\overset{92}{92}$, $\overset{97}{97}$

IQR = 12

NOT

Which statement about Peter's quiz grades is true?

A The interquartile range for semester 1 is greater than the interquartile range for semester 2. **TRUE**

B The median score for semester 1 is greater than the median score for semester 2. **false**

C The lower quartile for semester 1 is greater than the lower quartile for semester 2. **TRUE**

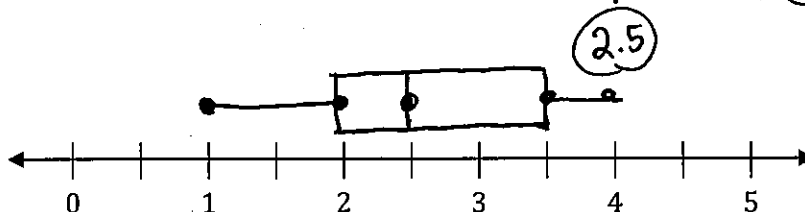
D The upper quartile for semester 2 is greater than the upper quartile for semester 1. **TRUE**

7. Bella collected data on the number of hours she practiced tumbling on Sunday through Thursday nights for a period of 2 weeks. The data are shown in the table below.

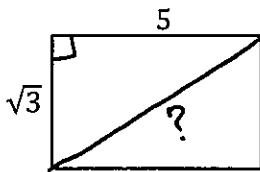
	Sun	Mon	Tues	Wed	Thurs
Week 1	4	2	3.5	1	2
Week 2	4	2.5	2.5	3	1.5

Construct a box-plot for these values.

① 1.5 ② 2 2.5 | 2.5 3 ③ 3.5 4 ④ 4



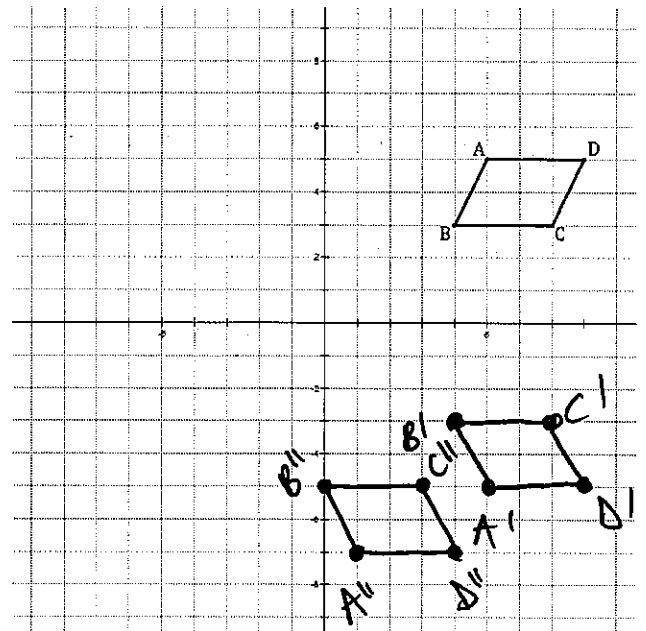
8. Josselyn drew the rectangle shown below. Determine the diagonal length of the rectangle in simplest radical form. Show your work.



$$\begin{aligned}
 a^2 + b^2 &= c^2 \\
 \sqrt{3}^2 + 5^2 &= c^2 \\
 3 + 25 &= c^2 \\
 \sqrt{28} &= \sqrt{c^2} \\
 \sqrt{4 \cdot 7} & \\
 2\sqrt{7} &= c
 \end{aligned}$$

Answer 2√7

9. Parallelogram ABCD is shown below.



Part A

Show the image of parallelogram ABCD after a reflection over the x -axis.

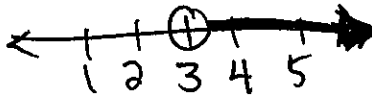
Part B

Show the image of parallelogram A'B'C'D' after the translation $(x, y) \rightarrow (x - 4, y - 2)$.

10. What is the smallest integer in the solution set?

$$\begin{aligned}
 2x + 5 &> 11 \\
 -5 \quad -5 \\
 \hline
 2x &> 6 \\
 \frac{2x}{2} &> \frac{6}{2} \\
 x &> 3
 \end{aligned}$$

- A 2
- B 3
- C 4
- D 5



12. Simplify the expression below.

$$5y(4y^2 + 8y - 2)$$

$$20y^3 + 40y^2 - 10y$$

11. Solve for x .

- A -11
- B -1
- C 1
- D 11

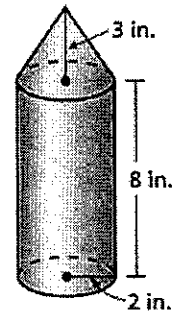
$$\begin{aligned}
 \frac{(2x + 5)}{4} &= \frac{(3x - 1)}{8} \\
 8(2x + 5) &= 4(3x - 1) \\
 16x + 40 &= 12x - 4 \\
 -12x \quad -12x \\
 \hline
 4x + 40 &= -4 \\
 -40 \quad -40 \\
 \hline
 4x &= -44 \\
 \frac{4x}{4} &= \frac{-44}{4} \\
 x &= -11
 \end{aligned}$$

13. The mold for a giant Crayola crayon is shown below.
Determine the amount of wax needed to fill the mold *in terms of* π .

$$\begin{aligned} \text{Cone} \\ V &= \frac{1}{3} \cdot \pi \cdot 2^2 \cdot 3 \\ &= 4\pi \end{aligned}$$

$$\begin{aligned} \text{Cylinder} \\ V &= \pi \cdot 2^2 \cdot 8 \\ &= 32\pi \end{aligned}$$

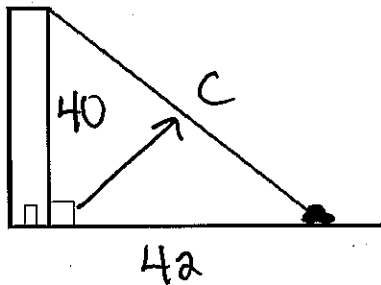
$$4\pi + 32\pi = \boxed{36\pi}$$



$$\begin{aligned} \text{Cone} \\ V &= \frac{1}{3} \pi r^2 h \end{aligned}$$

$$\begin{aligned} \text{Cylinder} \\ V &= \pi r^2 h \end{aligned}$$

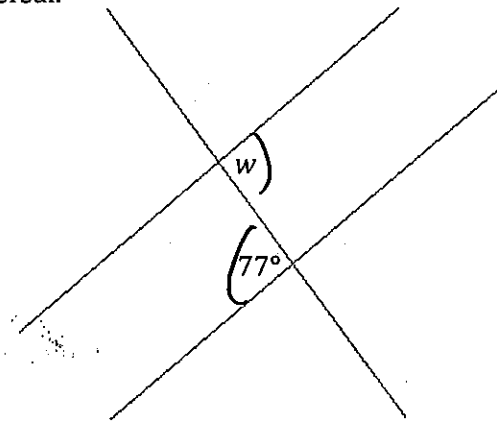
14. A car is parked 42 feet away from an apartment building. The height of the building is 40 feet. What is the distance from the top of the apartment building to the parked car?



$$\begin{aligned} 40^2 + 42^2 &= c^2 \\ 1600 + 1764 &= c^2 \\ \sqrt{3364} &= c \\ 58 &= c \end{aligned}$$

Answer 58 feet

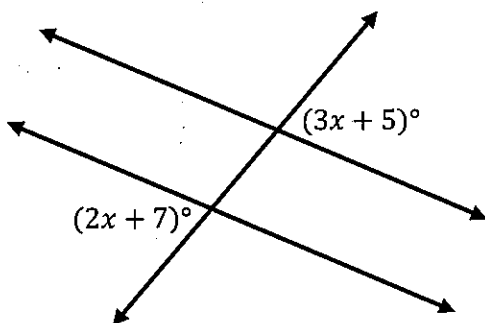
15. In the diagram below, parallel lines are cut by a transversal.



Which of the following statements correctly explains the value of w ?

- A 103° , because the angles shown are supplementary.
- B 77° , because the angles shown are vertical.
- C 77° , because the angles shown are corresponding.
- D 77° , because the angles shown are alternate interior.

16. Given two parallel lines cut by a transversal.



Which equation could be used to determine the value of x ?

- A $(3x + 5) + (2x + 7) = 90$
- B $(3x + 5) + (2x + 7) = 180$
- C $(3x + 5) = (2x + 7)$
- D $(3x + 5) \cdot (2x + 7) = 180$

Final Exam - Monday, June 18th (8:00 am)

Directions: Show your work. You may use a calculator.

1. In the morning, a farm worker packed 3 pints of strawberries every 4 minutes. In the afternoon, she packed 2 pints of strawberries every 3 minutes. What was the difference between her morning and afternoon packing rates, in pints per hour?

- A 5
- B 10
- C 40
- D 45

$$\frac{3 \text{ pints}}{4 \text{ min}} = \frac{x}{60 \text{ min}}$$

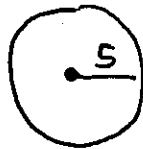
$$x = 45 \text{ pints/hour}$$

$$\frac{2 \text{ pints}}{3 \text{ min}} = \frac{x}{60 \text{ min}}$$

$$x = 40 \text{ pints/hour}$$

2. Kyle used a wire fencing to form a border around a circular region in his backyard. If the radius of the circular region was 5 yards, what was the total length of the border, rounded to the nearest tenth of a yard?

- A 15.7
- B 31.4
- C 78.5
- D 157.1



$$C = 2\pi r$$

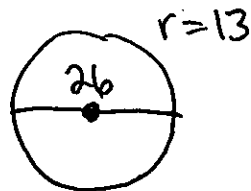
$$C = 2 \cdot \pi \cdot 5$$

$$C = 10\pi$$

$$C = \underline{31.4159\dots}$$

3. A circle has a diameter of 26 units. What is the area of the circle to the nearest hundredth of a square unit?

- A 81.68
- B 530.93
- C 2,123.72
- D 8,494.87



$$A = \pi \cdot r^2$$

$$A = \pi \cdot 13^2$$

$$A = 169\pi$$

$$A = \underline{530.9291\dots}$$

4. A hardware store created flyers to advertise their pricing on a certain type of carpet. A portion of the flyer is shown below.

HALLUM HARDWARE CARPET SALE	
Area (square feet)	Cost (dollars)
500	750
1,000	1,500
1,500	2,250
2,000	3,000

If Cailin buys carpet from Hallum Hardware using a 15% discount card, what will be the amount she pays for 700 square feet of carpet, before tax. *Show your work.*

$$\frac{\$^2}{\$} \frac{500}{\$750} = \frac{700}{X}$$

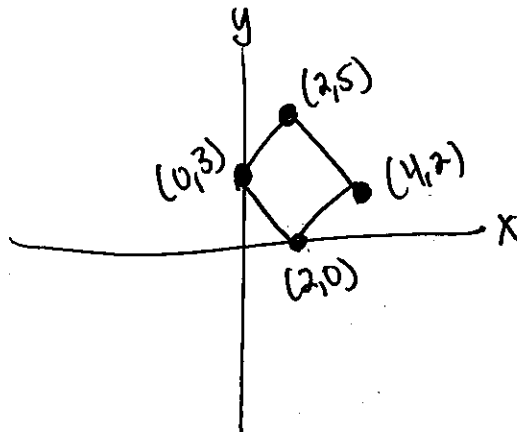
$$X = \$1,050$$

$$\$1,050 \times 0.15 = 157.50$$

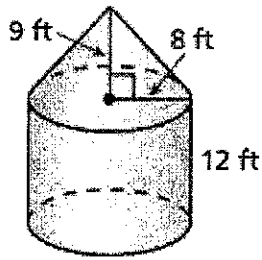
$$1,050 - 157.50 = \$892.50$$

5. A parallelogram with vertices at (0, 3), (2, 0), (4, 2), and (2, 5) is reflected over the y-axis. Which vertex of the parallelogram will have the same coordinates before and after the reflection?

- A (0, 3)
- B (2, 0)
- C (4, 2)
- D (2, 5)



6. Determine the volume of the figure shown. Write your answer in terms of π . Show your work.



Cone

$$V = \frac{1}{3} \cdot \pi \cdot 8^2 \cdot 9$$

$$V = 192\pi$$

Cylinder

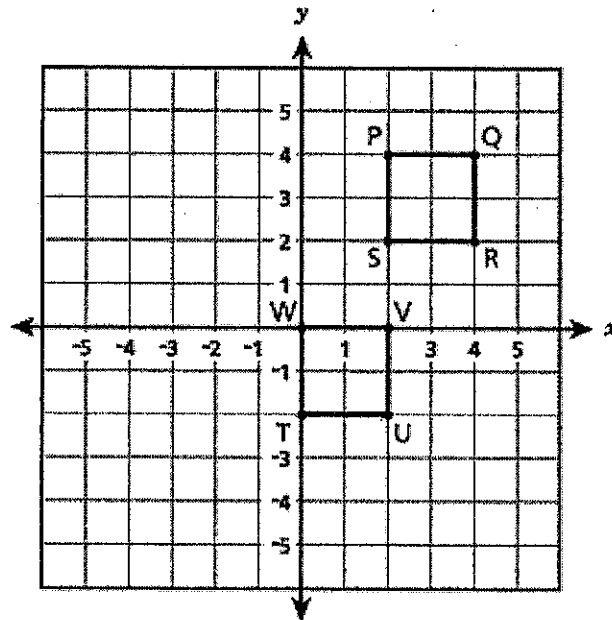
$$V = \pi r^2 h$$

$$V = \pi \cdot 8^2 \cdot 12$$

$$V = 768\pi$$

$$192\pi + 768\pi = \boxed{960\pi}$$

7. Squares PQRS and TUVW are shown below.



Which sequence of transformations of square PQRS shows that square PQRS is congruent to square TUVW?

- A A translation 2 units right and 2 units to the up, then a reflection over the x -axis
- B A translation 2 units right and 2 units to the up, then a reflection over the y -axis
- C A translation 2 units left and 2 units to the down, then a reflection over the x -axis
- D A translation 2 units left and 2 units to the down, then a reflection over the y -axis

8. What value for the constant, h , in the equation shown below will result in an infinite number of solutions?

$$6x + 18 = h(3x + 9)$$

A -2

B -3

C 2

D 3

$$6x + 18 = 2(3x + 9)$$

$$6x + 18 = 6x + 18$$

9. A recycling plant processes an average of $\frac{1}{3}$ ton of glass each minute. At approximately what rate does the recycling plant process glass, in tons per day? (1 day = 24 hours)

A 20

B 180

C 480

D 4,320

$$\frac{\frac{1}{3} \text{ ton}}{1 \text{ min}} = \frac{x}{60 \text{ min}}$$

$$x = 20$$

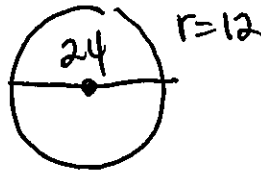
$$\frac{20 \text{ ton}}{1 \text{ hr}} = \frac{x}{24 \text{ hr}}$$

$$x = 480$$

10. A contractor is building the base of a circular fountain. On the blueprint, the base of the fountain has a diameter of 18 centimeters. The blueprint has a scale factor of three centimeters to four feet. What will be the actual area of the fountain base, in square feet, after it is built? Round your answer to the nearest hundredth of a square foot. *Show your work.*

$$\frac{3 \text{ cm}}{4 \text{ ft}} = \frac{18 \text{ cm}}{x}$$

$$x = 24 \text{ ft}$$



$$A = \pi r^2$$

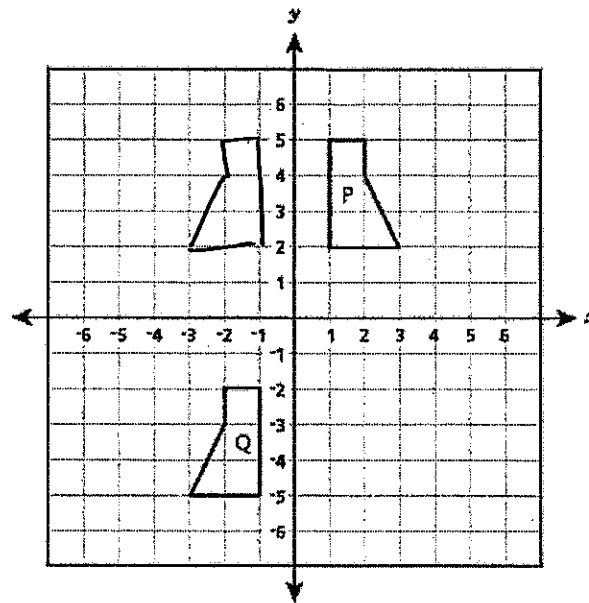
$$A = \pi \cdot 12^2$$

$$A = 144\pi$$

$$452.3893\dots$$

$$\boxed{452.39}$$

11. Figures P and Q, shown below, are congruent.



Describe a sequence of transformations that could be used to transform figure P to figure Q.

reflection over the y-axis, then translation $(x, y-7)$

12. A cylinder has a radius of 3 inches and a height of $4\frac{3}{4}$ inches. A sphere has a radius of 3 inches. What is the difference between the volumes of the cylinder and the sphere, to the nearest tenth of a cubic inch?

- A 21.2
- B 51.8
- C 68.3
- D 96.6

Cylinder
 $V = \pi \cdot 3^2 \cdot 4\frac{3}{4}$
 42.75π

Sphere
 $V = \frac{4}{3} \cdot \pi \cdot 3^3$
 36π

$$42.75\pi - 36\pi = 6.75\pi$$

$$= 21.2057\dots$$

13. A school wants to add a coed soccer program. To determine student interest in the program, a survey will be taken. In order to get an unbiased sample, which group should the school survey?

- A Every third student entering the building
- B Every member of the varsity football team
- C Every member in Ms. Frenna's orchestra
- D Every student having a second-period French class

14. A triangle with vertices at $A(-1, -1)$, $B(-2, 1)$ and $C(-1, 4)$ is translated. The image of vertex A' has coordinates at $(3, -1)$. Determine the coordinates of B' and C' .

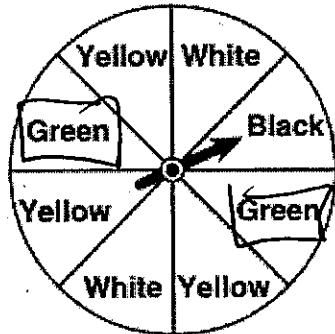
$$\begin{array}{l}
 A(-1, -1) \longrightarrow A'(3, -1) \\
 B(-2, 1) \longrightarrow B'(2, 1) \\
 C(-1, 4) \longrightarrow C'(3, 4)
 \end{array}
 \quad \begin{array}{l}
 \text{translation} \\
 (x+4, y)
 \end{array}$$

15. The mean radius of Earth is 6,371.0 kilometers and the mean radius of Earth's Moon is 1,737.5 kilometers. What is the approximate difference in the mean circumferences of Earth and Earth's Moon? Round your answer to the nearest tenth of a kilometer.

	<u>Earth</u>	<u>Moon</u>
A 40,030.2	$C = 2 \cdot \pi \cdot 6,371.0$	$C = 2 \cdot \pi \cdot 1,737.5$
B 29,113.1	$C = 12,742\pi$	$C = 3,475\pi$
C 14,556.6		
D 10,917.0		

$$12,742\pi - 3,475\pi = 9,267\pi \\
 = 29,113.139\dots$$

16. A spinner is divided into eight equal regions as shown in the diagram below. Maya spins the spinner three times.



$$\frac{2}{8} = \frac{1}{4}$$

What is the probability all three spins will land on green?
Show your work.

$$\frac{1}{4} \cdot \frac{1}{4} \cdot \frac{1}{4} = \frac{1}{64}$$

17. Katherine has some blue and black pens in her bag. The number of blue pens she has is three more than twice the number of black pens. She has 42 pens in all. How many blue pens does Katherine have?

- A 13
- B 15
- C 29
- D 33

$$\begin{aligned} \text{blue} &= 2x + 3 \\ \text{black} &= x \end{aligned}$$

$$\begin{aligned} \text{blue} &= 2(13) + 3 \\ &= 26 + 3 \\ &= 29 \end{aligned}$$

$$x + 2x + 3 = 42$$

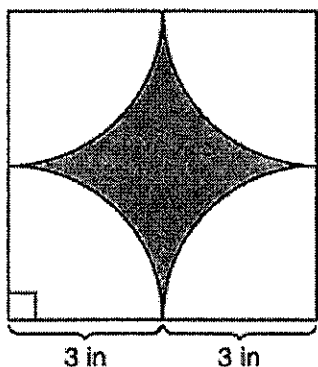
$$3x + 3 = 42$$

$$\begin{array}{r} -3 \quad -3 \\ \hline \end{array}$$

$$\frac{3x}{3} = \frac{39}{3}$$

$$x = 13$$

18. A designer created the logo shown below. The logo consists of a square and four quarter-circles of equal size.



$$\begin{aligned} & \square - \bigoplus \\ & 6 \cdot 6 - \pi \cdot 3^2 \\ & 36 - 9\pi \end{aligned}$$

Determine the area of the shaded region in terms of π . Show your work.

$$\boxed{36 - 9\pi}$$

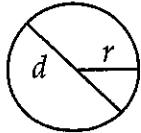
19. What is the product of $-3x^2y$ and $(5xy^2 + xy)$?

- A $-15x^3y^3 - 3x^3y^2$
- B $-15x^3y^3 - 3x^3y$
- C $-15x^2y^2 - 3x^2y$
- D $-15x^3y^3 + xy$

$$-15x^3y^3 - 3x^3y^2$$

Grade 7 Mathematics Reference Sheet

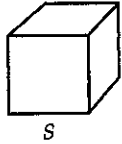
FORMULAS



Circle

$$\text{Area} = \pi r^2$$

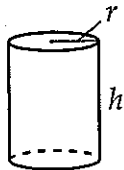
$$\text{Circumference} = 2\pi r$$



Cube

$$\text{Total Surface Area} = 6s^2$$

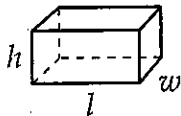
$$\text{Volume} = s^3$$



Right Circular Cylinder

$$\text{Total Surface Area} = 2\pi rh + 2\pi r^2$$

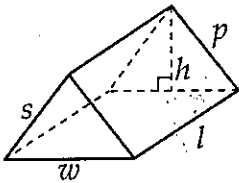
$$\text{Volume} = \pi r^2 h$$



Right Rectangular Prism

$$\text{Total Surface Area} = 2wl + 2lh + 2wh$$

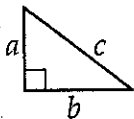
$$\text{Volume} = lwh$$



Right Triangular Prism

$$\text{Total Surface Area} = wh + lw + lp + ls$$

$$\text{Volume} = \frac{1}{2}wh \times l$$



Pythagorean Theorem

$$c^2 = a^2 + b^2$$

CONVERSIONS

$$1 \text{ centimeter} = 10 \text{ millimeters}$$

$$1 \text{ meter} = 100 \text{ centimeters} = 1,000 \text{ millimeters}$$

$$1 \text{ kilometer} = 1,000 \text{ meters}$$

$$1 \text{ gram} = 1,000 \text{ milligrams}$$

$$1 \text{ kilogram} = 1,000 \text{ grams}$$

$$1 \text{ pound} = 16 \text{ ounces}$$

$$1 \text{ ton} = 2,000 \text{ pounds}$$

$$1 \text{ cup} = 8 \text{ fluid ounces}$$

$$1 \text{ pint} = 2 \text{ cups}$$

$$1 \text{ quart} = 2 \text{ pints}$$

$$1 \text{ gallon} = 4 \text{ quarts}$$

$$1 \text{ liter} = 1,000 \text{ milliliters}$$

$$1 \text{ kiloliter} = 1,000 \text{ liters}$$