Summer Packet in Preparation for Integrated Math 1 Honors
This outline serves as a guide for the development of a comprehensive summer packet designed to reinforce and build upon already mastered key concepts in order to prepare students for the challenges of Integrated Math I Honors.

Section 1. Numeracy

- Equivalence
- Exponents
- Percents
- Order of Operations

Section 2. Algebraic Expressions

- Simplifying Expressions
- Evaluating Expressions
- Distributive property
- Combining like terms
- Writing Expressions

Section 3. Linear Equations and Inequalities

- Solving single-variable equations
- Solving multi-step equations
- Proportions
- Graphing linear equations
- Read, write, and solve inequalities

Section 4. Functions

- Understanding the concept of a function
- Evaluating functions
- Function notation
- Features of functions

Section 5. Systems of Equations by graphing

Section 6. Geometry Basics

- Analyzing Points on a Graph
- Diagrams
- Pythagorean Theorem
- Basic properties of triangles
- Perimeter and Area of geometric shapes

Section 7. Data Analysis

- Interpreting graphs and charts
- Measures of central tendency (mean, median, mode)

Section 8. Problem Solving Practice and Application

Section 1. Numeracy

This material should be completed without a calculator.

1. Complete the statement with the appropriate symbol (<, >, =): $12.5 \square 12.4$

2. Complete the statement with the appropriate symbol (<,>,=): $\frac{5}{6} \square \frac{3}{4}$.

3. Complete the statement with the appropriate symbol(<,>,=): $-3 \square -3.1$

4. Place the following numbers in order form least to greatest: $\frac{4}{3}, \frac{5}{3}, \frac{3}{2}, \frac{11}{6}, \frac{7}{6}$

5. Place the following numbers in order form least to greatest: $-7, -6.28, -6.3, -6.03, -6$

6. Circle any values that are equivalent: $\frac{4}{5}, \frac{6}{8}, \frac{1}{2}, \frac{9}{27}, \frac{15}{20}, \frac{33}{44}$

7. Simplify the following and leave in exponent form.

a. $4^3 \cdot 4^2$

b. $6r \cdot 5r^2$

c. $-2x^2y \cdot 3x^5y^2$

d. $(3x)^2$

e. $\frac{2^8}{2^3}$

f. $\frac{8x^3}{4x^5}$

g. $\left(\frac{xy^5}{6y^{-3}}\right)^{-1}\left(\frac{x^2}{2y^2}\right)$

h. $\left(\frac{2xy^3}{y^2}\right)\left(\frac{x^3y^3}{2x^4y^2}\right)$

For the following, please round all answers to the nearest tenth when needed.

8. Write the following decimal as a percent: 0.08

$\times 100 = 8\%$

9. Write the following percent as a decimal: 6.25%

$\div 100 = .0625$

10. What is 20% of 50?

$.2(50)$

$\boxed{1}$

11. 46 is what percent of 107?

$46 = x(107)$

$\frac{46}{107} = x$

$x = .4299$

$x \approx 43\%$

12. 62% of what is 89.3?

$.62(89.3)$

$\boxed{55.37}$

13. What percent of 126 is 22?

$x(126) = 22$

$x = \frac{22}{126}$

$x = .1746$

$x \approx 17.5\%$

Evaluate each of the following. This material should be completed without a calculator.

14. $8-[(4-7)+(8-1)]$

$8-[-3+7]$

$8-4$

$\boxed{4}$

15. $\frac{|3-9|-|-5|}{|4-5|}$

$\frac{6-5}{1}$

$\boxed{1}$

16. $4-[8-(2-4)]$

$4-[8+2]$

$4-10$

$\boxed{-6}$

17. $\frac{(-1-2)(-3^2)}{-6-3}$

$\frac{-3(-9)}{-9}$

$\boxed{-3}$

18. $10-\left[(4-5)^2+(12-14)\right]^4$

$10-[1-2]^4$

$10-1$

$\boxed{9}$

19. $3[11-(1-3)]$

$3[11+2]$

$3(13)$

$\boxed{39}$

20. $\frac{1}{2}\cdot\frac{3}{7}\cdot\frac{8}{3}$

$\frac{8}{14}$ $\boxed{\frac{4}{7}}$

21. $\frac{7}{5}-\frac{2}{5}$

$\frac{5}{5}$

$\boxed{1}$

Section 2. Algebraic Expressions

1. Given that $a=-2$, $b=5$, and $c=-1$, determine the value of each expression:

a. $3a-2b$

$3(-2)-2(5)$
$-6-10$
-14

b. $|4a|$

$|4(-2)|$
8

c. $2|a|-|b|$

$2(2)-5$
$4-5$
-1

d. $5b-b^2$

$5(5)-25$
0

e. $-7a-c$

$-7(-2)+1$
$14+1$
15

f. a^2c^5

$4(-1)$
-4

2. Given that x = 3, and y = 5, evaluate: $4x^2-\frac{3}{7}y$

$4(9)-\frac{3}{7}(5)$
$36-\frac{15}{7}$
$\frac{252}{7}-\frac{15}{7}$
$\frac{237}{7}$ or $33\frac{6}{7}$

3. Given that $a=-\frac{13}{22}$, $b=\frac{27}{39}$, *and* $c=1$, evaluate $(a+b)^0-c$.

$1-1$
0
(any thing)^0 = 1

4. Explain why the following expression cannot result in a negative number. $(a-b)^2+|c\cdot d|$

Squaring results in a positive value, AND taking the absolute value results in a positive value.

5. Create an expression for each of the situations or scenarios.

a. Twice the sum of a number and seven.

$2(n+7)$

b. The product of four and a number decreased by two.

$4n-2$

c. Nine less than the quotient of a number and three.

$\frac{n}{3}-9$

d. The square of a number increased by five.

n^2+5

6. The revenue generated is four times the number of tickets sold minus the fixed cost. Let *t* represent the number of tickets sold and *c,* the fixed cost. Write an expression for the revenue.

Revenue
$4t - c$

7. A rectangle's perimeter is three times the sum of its length and width. If *l* represents the length and *w,* the width, write an expression for the perimeter.

Perimeter
$3(l + w)$

8. Write an expression to model the woman's new weekly salary in the following situation: "A woman making $25 an hour gets a 10% raise." Do not simplify the expression.

$25 + .10(25)$

9.The speed of a train is the square of the sum of the engine's power and the number of carriages times five. Let *p* be the power of the engine and *n,* the number of carriages. Write an expression for the speed.

Speed
$5(p+n)^2$

Section 3. Linear Equations and Inequalities

1. Solve the following equations for x:

a. $\frac{3}{10}=\frac{x}{4}$

$10x=12$

$x=\frac{6}{5}$

b. $\frac{x+3}{7}=\frac{2x}{5}$

$14x=5x+15$

$9x=15$

$x=\frac{5}{3}$

2. Which of the following equations is not equivalent to the equation: $5(x-1)+3x=21-5x$

a) $x=2$

b) $13x-5=21$

c) $13x=26$

d) $13x=21$

$5x-5+3x=21-5x$

$13x=26$

3. Create a true proportion using the numbers and the box: $12, 4, 7, \square$. Fill the box with the correct number.

may vary ie. $\frac{4}{7}=\frac{12}{21}$

4. The cost of a 6 ounce can of tomato paste is 29 cents. A 16 ounce can sells for 65 cents. Which is the better deal?

$\frac{29¢}{6\text{ oz}} \approx 4.83 \text{ cents/oz}$

$\frac{65¢}{16\text{ oz}} \approx 4.06 \text{ cents/oz}$ ← better deal.

5. Rob's paycheck for six days of work was $152. At this rate, what will be his paycheck be for 30 days of work?

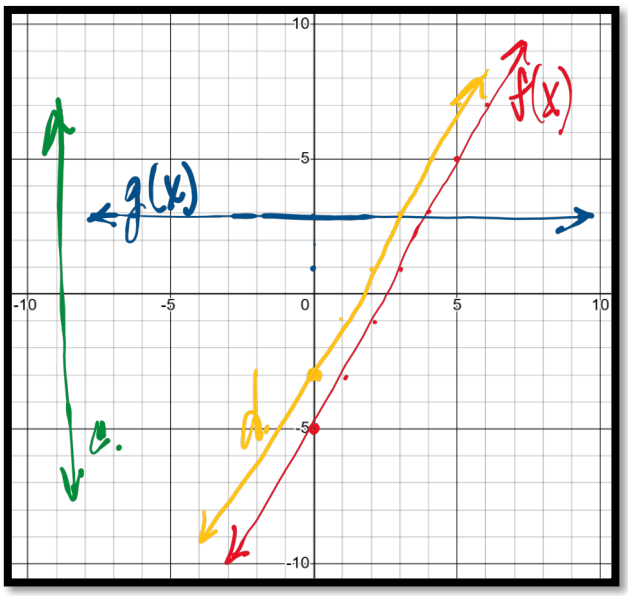
$6x=152$; $x=\$/\text{day}$

$x=\$25.33/\text{day}$

$30x=30(25.33)$

$=\$760$

6. On the graph below, sketch the graphs of



a. $f(x) = 2x - 5$

b. $g(x) = 3$

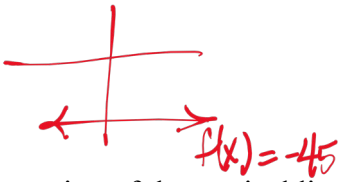
c. a line using only quadrants II and III

d. a line parallel to $f(x)$ with an x-intercept of -3 $m = 2$

7. Find the y – intercept of the function $f(x) = \frac{1}{2}x + \frac{3}{7}$ $f(0) = \frac{1}{2}(0) + \frac{3}{7}$

↳ or $\frac{3}{7}$

8. How many x – intercepts does the graph $f(x) = -45$ have?



none

9. Find the equation of the vertical line that goes through the point $(3, -\frac{3}{4})$.



$x = 3$

10. If you knew the slope of a line is -4, in what directions would you move from the y – intercept to create an accurate graph?

down 4 units, then right 1 unit.

11. Find the equation of the line that goes through the points (3, 4) and (-1, -5).

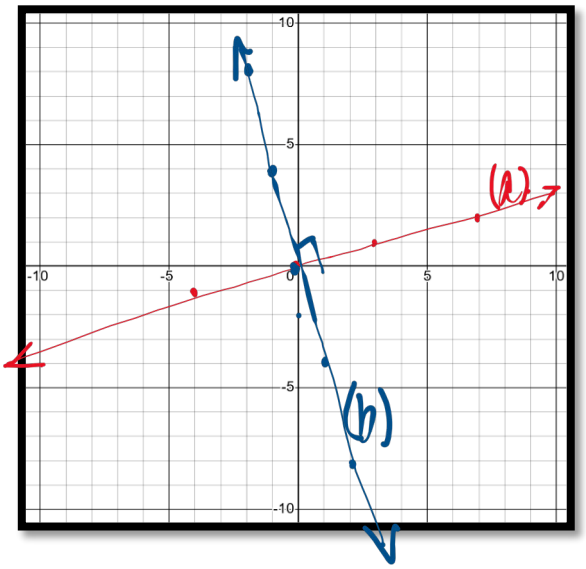
$m = \frac{-5-4}{-1-3} = \frac{-9}{-4} = \frac{9}{4}$

$y - 4 = \frac{9}{4}(x - 3)$

$y = \frac{9}{4}x - \frac{27}{4} + 4$

$y = \frac{9}{4}x - \frac{11}{4}$

12. Using the coordinate grid below.



a. Graph a line with a slope of $\frac{1}{4}$ that passes through the origin.

b. Write the equation of the line that is perpendicular to the graph and has the same y-intercept

$m = -4$

13. Write an inequality for each phrase.

a. *five times a number, n , is less than 6.*

$5n < 6$

b. four less than twice a number is greater than the number

$2n - 4 > n$

c. four times the difference of a number less 5 is greater than three times the sum of the number and two

$4(5 - n) > 3(n + 2)$

15. Solve the following inequalities for *x* and graph the solution on a number line.

a. $-5x + 3 \leq -1$

$-5x \leq -4$

$x \geq 4/5$

b. $\frac{-w}{2} + 3 > 4$

$\frac{-w}{2} > 1$

$w < 14$

Section 4. Functions

1. If $f(x) = 3^x + 5$,

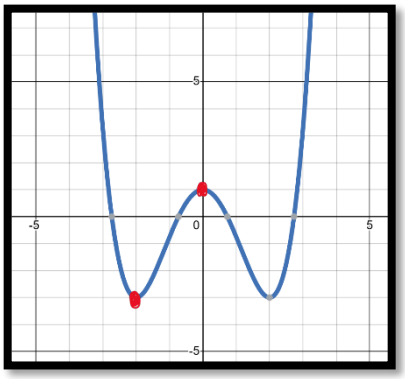
a. find $f(2)$

$f(2) = 3^2 + 5$
$= 9 + 5$
$= 14$

b. find a value for "x" which will result in a function value less than five

does not exist; whatever 'x' is, yields a positive value added to 5.

2. Let the following graph represent a function $f(x)$



a. Find $f(0)$. 1

b. Find $f(-2)$. -3

c. Find $f(0) - f(-2)$. 4

3. Given the equation $y = 5 - \frac{2}{3}x$, fill in the table of values.

$y = 5 - \frac{2}{3}(3)$
$y = 7$

$\frac{17}{3} = 5 - \frac{2}{3}x$
$\frac{2}{3} = -\frac{2}{3}x$
$-1 = x$

$y = 5 - \frac{2}{3}(5)$
$y = 5 - \frac{10}{3}$
$y = \frac{5}{3}$

$1 = 5 - \frac{2}{3}x$
$-4 = -\frac{2}{3}x$
$6 = x$

$y = 5 - \frac{2}{3}(9)$
$y = 5 - 6$
$y = -1$

x	y
-3	7
-1	$\frac{17}{3}$
5	$\frac{5}{3}$
6	1
9	-1

4. Given table shown below, find the Domain and Range.

x	0	2	4	7	9
y	-4	-5	-6	-7	-10

domain: $\{0, 2, 4, 7, 9\}$
range: $\{-4, -5, -6, -7, -10\}$

5. In 1990, the enrollment of Lemont High School was 900 and by 2010, the enrollment had grown to 1450. Find the rate of change $\left(\frac{students}{year}\right)$ from 1990 to 2010.

$\left(\frac{1450-900}{900}\right)(100) = 61.1\%$

the original amount.

6.The yearly cost of tuition (in state) and required fees for attending a public two-year college full time can be estimated by the linear function $f(x) = 53.6x + 1029.34$, where x is the number of years after 2009 and $f(x)$ is the total cost. Find the total cost for you to receive an associate's degree if you start in 2018.

$2018 - 2009 = 9$ years

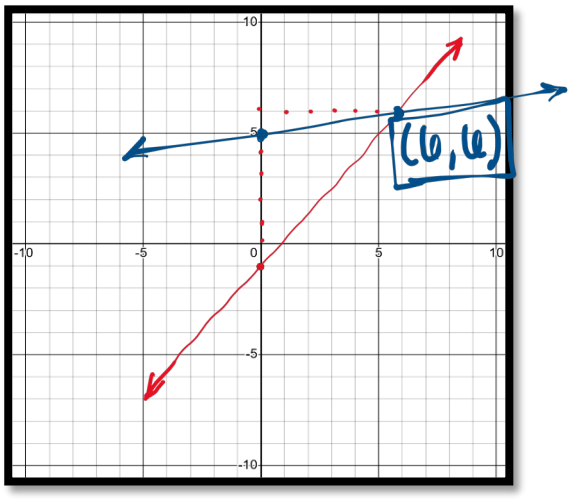
$f(9) = 53.6(9) + 1029.34$
$= \$1511.74$

Section 5. Systems of Equations by Graphing

1. Solve the followings systems by graphing:

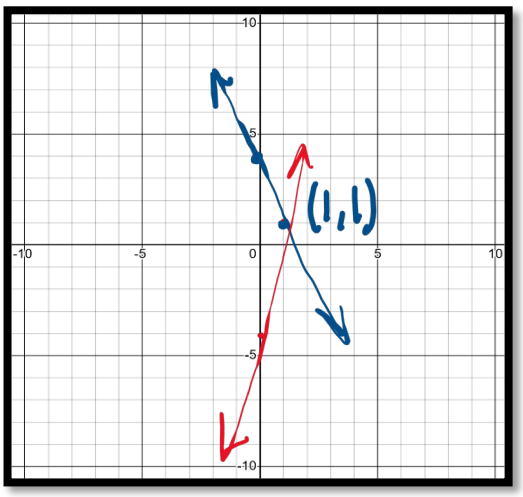
a.

$$y = \frac{7}{6}x - 1$$
$$y = \frac{1}{6}x + 5$$



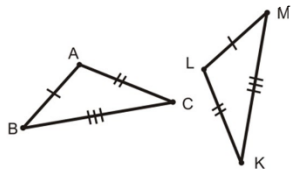
b

$$y = 5x - 4$$
$$y = -3x + 4$$



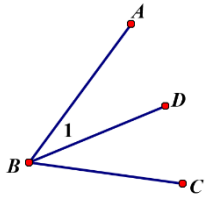
Section 6. Geometry Basics

1. For the triangles below, name all pairs of congruent segments.



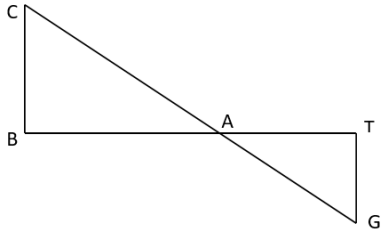
$\overline{BC} \cong \overline{MK}$
$\overline{AB} \cong \overline{ML}$
$\overline{AC} \cong \overline{LK}$

2. Given the following diagram, name $\angle 1$ in two different ways.



$\angle ABD$
$\angle DBA$

3. Name a pair of congruent angles in the following picture:



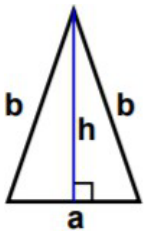
$\angle CAB \cong \angle GAT$

4. The table below lists some different shapes and properties. In each box place an "X" indicating that the shape has the property.

	Square	Rectangle	Kite	Trapezoid	Isosceles Trapezoid	Rhombus	Parallelo-gram
All angles are right angles	X	X					
All sides are congruent	X					X	
Diagonals bisect each other	X	X	X			X	X
Diagonals are perpendicular	X		X			X	

5. Determine the area and perimeter for each figure.

a.



a = 50 ft b = 84 ft

h = 77.5 ft

Area $= \frac{1}{2}bh$

$A = \frac{1}{2}(50)(77.5)$

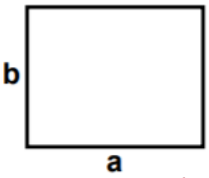
$A = 25(77.5)$

$A = 1937.5 ft^2$

$P = 2(84) + 50$

$P = 218 ft.$

b.



a = 72 yds b = 57 yds

$A = bh$

$A = 72(57)$

$A = 4104 yd^2$

$P = 2a + 2b$

$P = 144 + 114$

$P = 258 yds^2$

6. The perimeter for a rectangle can be found using the formula $P = 2w + 2l$. The Adam's family wants to put in a rectangular fence for their dog. The length of their yard is 22 yards and the width is 360 inches. How much fencing will they need in *feet*?



360 in (10 yds)

22 yds.

$360 in \times \frac{1 ft}{12 in} \times \frac{1 yd}{3 ft.} = 10 yds$

$P = 2(10) + 2(22)$

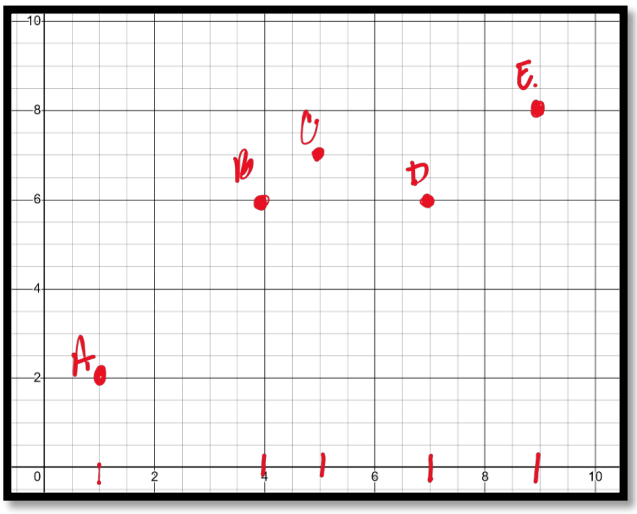
$P = 20 + 44$

$P = 64 yds$

Section 7. Data Analysis

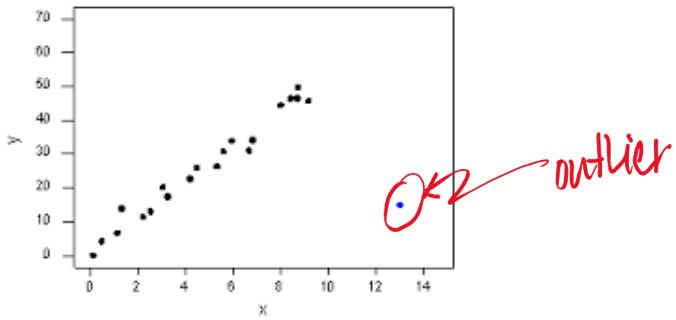
1. Create the scatter plot given the following table.

	x	y
A.	1	2
B.	4	6
C.	5	5
D.	7	6
E.	9	8



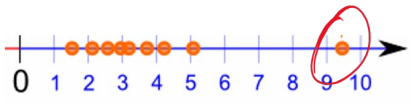
2. Circle the data point in the following data sets that would appear to be an outlier.

a.

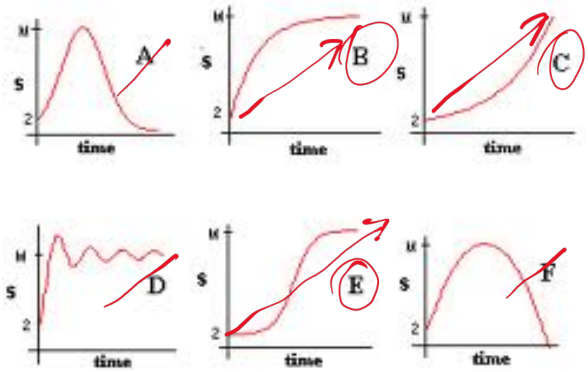


b. 10, 13, 11, 12, 900, 14, 8, 16, 17

c.



3. List all of the functions that are increasing as time increases.



Section 8. Problem Solving Practice and Application

1. Write the next three terms of the sequence: 5, 8, 11, 14, …

if just adding 3.

17, 20, 23

2. Mike and Jake work for an apple picking company. They get paid $9 per bushel picked. After a Saturday of working, Jake was bragging that he made $27 more than Mike made. If the total amount of money made between both men was $153, how many bushels did Mike pick?

let m = no. of Bushels Mike picks
let j = no. of Bushels Jake picks

$9m + 9j = 153$
$9m - 9j = 27$
$18m = 180$
$m = 7$ bushels

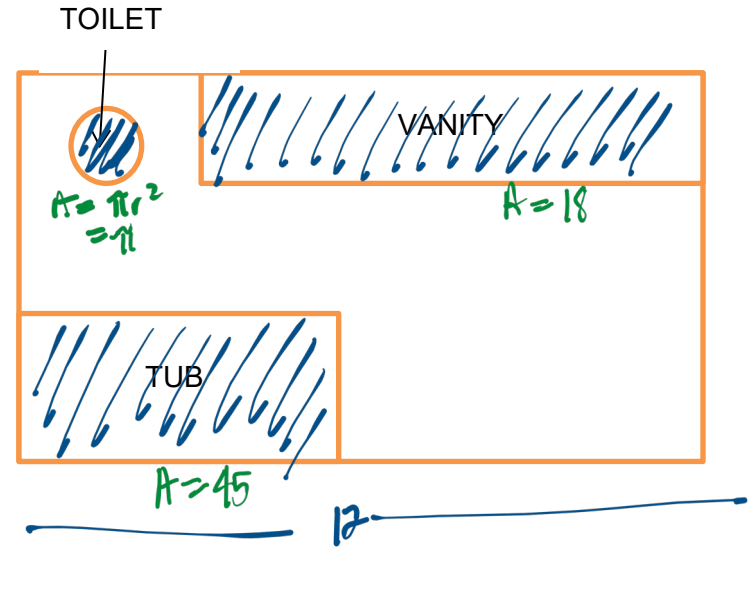
$9(7) + 9j = 153$
$9j = 90$
$j = 10$ bushels.

3. Zac and Jenny are remodeling their bathroom. Given the blue-print below, determine how many boxes of tiles they need to buy, if each box has 12 tiles, each measure one-square-foot (12" x 12"). (Note: Tile will be used in all unoccupied floor sections).

units!

Room: 8ft. x 12 ft.
Toilet: radius = 12 inches
Vanity: 9ft. x 2 ft.
Tub: 5ft. x 3 yd.

1ft.
(9ft)



Room = 96 ft²
− π
− 45
− 18
33 − π or ≈ 29.9 ft²

4. A salesperson earns $600 per week plus a commission of 20% of their sales. Find the minimum amount of sales needed to receive a total income of at least $1500 per week.

let s = sales.

$600 + .20s \geq 1500$

$.20s \geq 900$

$s \geq \$4,500$

5. When the baseball scouts for the Los Angeles Dodgers were looking at bringing a player to the United States from Korea to pitch they were interested in the speed of his pitches. His fastball was clocked at 43 meters per second in Korea, but the United States measures the speed in miles per hour. What is the rate that the United States can understand? (1 mi ≈ 1.6093 km)

$$\frac{43\text{m}}{\text{sec}} \times \frac{1\text{km}}{1000\text{m}} \times \frac{1\text{mi}}{1.6093\text{km}} \times \frac{60\text{sec}}{1\text{min}} \times \frac{60\text{min}}{1\text{hr.}} = 96.19\text{mi/hr.}$$

7. Jimbo has a lot of pets, including two dogs, Rocky and Toby. If you take the product of the number of fish, times the number of dogs, times the number of horses, times Jimbo's age (which is a higher number than the rest), the product is 1218. Knowing that he has more fish than horses, how many fish does he have?

2 dogs.

f - fish

h - horses

a - Jimbo's age

$2fha = 1218$

$\frac{2fha}{2} = \frac{1218}{2}$

$fha = 609$

$afh = 609$

$203 \cdot 3 \cdot 1$

$a > f > h$

all numbers are integers

all number are positive.