

Dear Incoming 7th Grade Student,

This math packet is primarily meant to refresh your mind of the material that was covered in 6th Grade math. There are directions at the top of each section to help remind you of and guide you through the various skills since you don't have your math journals.

It is also intended to give you a hint of things to come. You should have the skills to complete these new problems (especially using the examples). **If a problem seems new, you should still try those problems but not get frustrated or worried about getting them wrong.**

Please remember to **SHOW YOUR WORK**. If you need to complete work on alternate paper, **PLEASE** be sure to number your problems. I will collect your packets and work on the 1st day.

See you in the Fall!

Pre-Algebra – Summer Math Packet

Unit: Knowledge of Algebra, Patterns, and Functions

Objective: Write equations and inequalities - B

An **inequality** is a mathematical sentence that contains the symbols $<$, $>$, \leq , or \geq .

| Words | Symbols |
|------------------------------------|------------|
| m is greater than 7. | $m > 7$ |
| r is less than -4 . | $r < -4$ |
| t is greater than or equal to 6. | $t \geq 6$ |
| y is less than or equal to 1. | $y \leq 1$ |

Examples:

- 1) Two times a number is greater than 10 $2x > 10$
- 2) Three less than a number is less than or equal to 7. $x - 3 = 7$
- 3) The sum of a number and 1 is at least 5. $x + 1 \geq 5$
- 4) Cody has \$50 to spend. How many shirts can he buy at \$16.50 each? $16.50x \leq 50$

Write an inequality for each of the following:

| | |
|---|--|
| 1.) Five times a number is greater than 25. | 2.) The sum of a number and 6 is at least 15. |
| 3.) 24 divided by some number is less than 7. | 4.) Five dollars less than two times Chris' pay is at most \$124. |
| 5.) In Ohio, you can get your license when you turn 16. Write an inequality to show the age of all drivers in Ohio. | 6.) Suppose a DVD costs \$19 and a CD costs \$14. Write an inequality to find how many CDs you can buy along with one DVD if you have \$65 to spend. |

On a scale of 1 – 5 (1: Weak, 5: Strong) rate yourself on this section of math: 1 2 3 4 5

Pre-Algebra – Summer Math Packet

Unit: Knowledge of Algebra, Patterns, and Functions

Objective: Determine the unknown in a linear equation with 1 or 2 operations

Remember, equations must always remain balanced.

- If you add or subtract the same number from each side of an equation, the two sides remain equal.
- If you multiply or divide the same number from each side of an equation, the two sides remain equal.

Example 1: Solve $x + 5 = 11$

$$\begin{array}{r} x + 5 = 11 \quad \text{Write the equation} \\ - 5 = - 5 \quad \text{Subtract 5 from both sides} \\ \hline x = 6 \quad \text{Simplify} \end{array}$$



$$\begin{array}{r} x + 5 = 11 \quad \text{Write the equation} \\ 6 + 5 = 11 \quad \text{Replace } x \text{ with } 6 \\ 11 = 11 \checkmark \quad \text{The sentence is true} \end{array}$$

Example 2: Solve $-21 = -3y$

$$\begin{array}{r} -21 = -3y \quad \text{Write the equation} \\ - 3 = - 3 \quad \text{Divide each side by } - 3 \\ \hline 7 = y \quad \text{Simplify} \end{array}$$



$$\begin{array}{r} -21 = -3y \quad \text{Write the equation} \\ -21 = -3(7) \quad \text{Replace the } y \text{ with } 7 \\ -21 = -21 \checkmark \quad \text{Multiply - is the sentence true?} \end{array}$$

Example 3: Solve $3x + 2 = 23$

$$\begin{array}{r} 3x + 2 = 23 \quad \text{Write the equation} \\ - 2 = - 2 \quad \text{Subtract 2 from each side} \\ \hline 3x = 21 \quad \text{Simplify} \\ \frac{3x}{3} = \frac{21}{3} \quad \text{Divide each side by } 3 \\ x = 7 \quad \text{Simplify} \end{array}$$



$$\begin{array}{r} 3x + 2 = 23 \quad \text{Write the equation} \\ 3(7) + 2 = 23 \quad \text{Replace } x \text{ with } 7 \\ 21 + 2 = 23 \quad \text{Multiply} \\ 23 = 23 \quad \text{Add - is the sentence true?} \end{array}$$

1.) Solve $x - 9 = -12$

2.) Solve $48 = -6r$

3.) Solve $2t + 7 = -1$

4.) Solve $4t + 3.5 = 12.5$

5.) It costs \$12 to attend a golf clinic with a local pro. Buckets of balls for practice during the clinic cost \$3 each. How many buckets can you buy at the clinic if you have \$30 to spend?

6.) An online retailer charges \$6.99 plus \$0.55 per pound to ship electronics purchases. How many pounds is a DVD player for which the shipping charge is \$11.94?

On a scale of 1 – 5 (1: Weak, 5: Strong) rate yourself on this section of math: 1 2 3 4 5

Pre-Algebra – Summer Math Packet

Unit: Knowledge of Algebra, Patterns, and Functions

Objective: Solve for the unknown in an inequality with one variable.

An **inequality** is a mathematical sentence that contains the symbols $<$, $>$, \leq , or \geq .

| Words | Symbols |
|------------------------------------|------------|
| m is greater than 7. | $m > 7$ |
| r is less than -4 . | $r < -4$ |
| t is greater than or equal to 6. | $t \geq 6$ |
| y is less than or equal to 1. | $y \leq 1$ |

Example 2: Solve $2x + 8 < 24$

$$\begin{array}{r}
 2x + 8 < 24 \quad \text{Write the inequality} \\
 -8 \quad -8 \quad \text{Subtract 8 from each side} \\
 \hline
 2x < 16 \quad \text{Simplify} \\
 \frac{2x}{2} < \frac{16}{2} \quad \text{Divide each side by 2} \\
 x < 8 \quad \text{Simplify}
 \end{array}$$

Example 1: Solve $v + 3 < 5$

$$\begin{array}{r}
 v + 3 < 5 \quad \text{Write the inequality} \\
 -3 \quad -3 \quad \text{Subtract 3 from each side} \\
 \hline
 v < 2 \quad \text{Simplify}
 \end{array}$$

Check: Try 1, a number less than 2

$$\begin{array}{r}
 v + 3 < 5 \quad \text{Write the inequality} \\
 1 + 3 < 5 \quad \text{Replace } v \text{ with 1} \\
 4 < 5? \quad \text{Is this sentence true? yes}
 \end{array}$$

Check: Try 7, a number less than 8

$$\begin{array}{r}
 2x + 8 < 24 \quad \text{Write the inequality} \\
 2(7) + 8 < 24 \quad \text{Replace } x \text{ with 7} \\
 14 + 8 < 24 \quad \text{Multiply 7 by 2} \\
 22 < 24? \quad \text{Is the sentence true? yes}
 \end{array}$$

1.) Solve $y + 5 \leq 14$

2.) Solve $6u \geq 36$

3.) Solve $5y + 1 < 36$

4.) Solve $4x - 6 > -10$

5.) The speed limit on highways in Florida is 70 miles per hour. Write and solve an inequality to find how long it will take you to travel the 105 miles from Orlando to St. Augustine if you travel at or below the speed limit.

6.) You have \$80. Jeans cost \$29 and shirts cost \$12. Mom told you to buy one pair of jeans and use the rest of the money to buy shirts. Use this information to write and solve an inequality. How many shirts you can buy?

On a scale of 1 – 5 (1: Weak, 5: Strong) rate yourself on this section of math: 1 2 3 4 5

Pre-Algebra – Summer Math Packet

Unit: Knowledge of Algebra, Patterns, and Functions

Objective: Identify or graph solutions of inequalities on a number line.

Examples: Graph each inequality on a number line.

$$x < 2$$



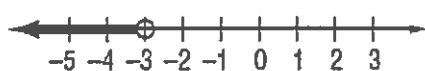
The open circle means that the number is **not** included in the solution.

$$y \geq 8$$



The closed circle means that the number **is** included in the solution.

$$m < -3$$

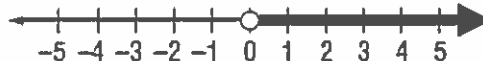


The solution is all numbers less than negative three.
-3 is **not** included in the solution.

1.) Write an inequality for the graph.

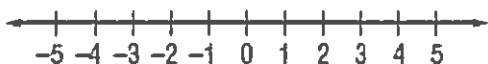


2.) Write an inequality for the graph.



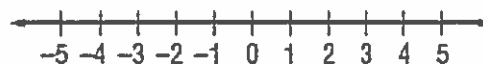
3.) Graph the inequality.

$$b \geq -1$$



4.) Graph the inequality.

$$z < 3$$



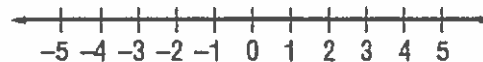
5.) Solve the inequality, then graph it on the number line.

$$y + 9 \leq 13$$



6.) Solve the inequality, then graph it on the number line.

$$4x - 6 > -10$$



On a scale of 1 – 5 (1: Weak, 5: Strong) rate yourself on this section of math: 1 2 3 4 5

Pre-Algebra – Summer Math Packet

Unit: Knowledge of Algebra, Patterns, and Functions

Objective: Apply given formulas to a problem-solving situation using formulas having no more than three variables.

Example 1:

The perimeter of a rectangle is twice the length (L) plus twice the width (W). $P = 2L + 2W$

Use the given formula to find the perimeter of the rectangle.



8 cm

10 cm

$$P = 2L + 2W$$

$$P = 2(10) + 2(8)$$

$$P = 20 + 16$$

$$P = 36 \text{ cm}$$

Write the equation

Replace L and W with the length and width

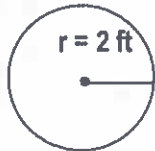
Multiply

Simplify and add the correct label

Example 2:

The area A of a circle equals the product of pi (π) and the square of its radius (r). $A = \pi r^2$ ($\pi \approx 3.14$)

Use the given formula to find the area of the circle.



r = 2 ft

$$A = \pi r^2$$

$$A = 3.14 \cdot (2)^2$$

$$A = 3.14 \cdot 4$$

$$A = 12.56 \text{ ft}^2$$

Write the equation

Replace π with 3.14 and r with 2

Square the 2

Simplify and add the correct label

- 1.) The formula for finding the area of a rectangle is $A = L \cdot W$. Use this formula to find the area of the rectangle.

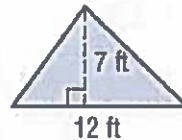


4 cm

9 cm

- 2.) The formula for finding the area of a triangle is

$$A = \frac{1}{2}bh. \text{ Find the area of the triangle below.}$$

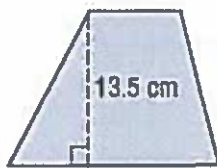


12 ft

7 ft

- 3.) A trapezoid has two bases (b_1 and b_2). The formula for finding the area of a trapezoid is: $A = \frac{1}{2}h(b_1 + b_2)$

$b_1 = 8 \text{ cm}$

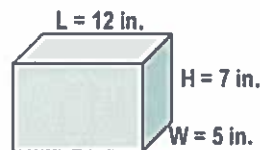


$b_2 = 18 \text{ cm}$

13.5 cm

Find the area of the trapezoid.

- 4.) The formula for finding the volume of a rectangular prism is $V = L \cdot W \cdot H$. Find the volume of the box.



L = 12 in.

H = 7 in.

W = 5 in.

- 5.) Margot planted a rectangular garden that was 18 feet long and 10 feet wide. How many feet of fencing will she need to go all the way around the garden? $P = 2L + 2W$

- 6.) Juan ran all the way around a circular track one time. The diameter (d) of the track is 60 meters. The formula for circumference of a circle is $C = \pi d$. Use this formula to find out how far Juan ran.

On a scale of 1 – 5 (1: Weak, 5: Strong) rate yourself on this section of math: 1 2 3 4 5

Pre-Algebra – Summer Math Packet

Unit: Knowledge of Algebra, Patterns, and Functions

Objective: Graph ordered pairs in a coordinate plane.

The **coordinate plane** is used to locate points. The horizontal number line is the **x-axis**. The vertical number line is the **y-axis**. Their intersection is the **origin**.

Points are located using **ordered pairs**. The first number in an ordered pair is the **x-coordinate**; the second number is the **y-coordinate**.

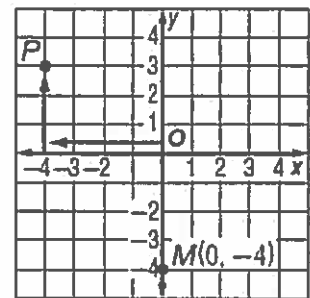
The coordinate plane is separated into four sections called **quadrants**.

Example 1: Name the ordered pair for point P. Then identify the quadrant in which P lies. Quadrant 2 Quadrant 1

- Start at the origin.
- Move 4 units left along the x-axis.
- Move 3 units up on the y-axis.

The ordered pair for point P is $(-4, 3)$.

P is in the upper left quadrant or quadrant II.



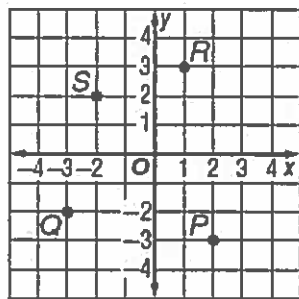
Quadrant 3 Quadrant 4

Example 2: Graph and label the point M $(0, -4)$.

- Start at the origin.
- Move 0 units along the x-axis.
- Move 4 units down on the y-axis.
- Draw a dot and label it M $(0, -4)$.

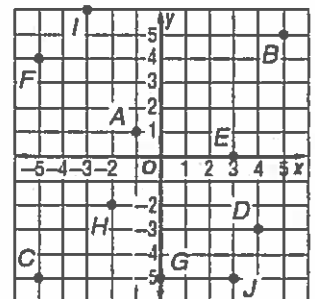
1.) Name the ordered pair for each point graphed at the right. Then identify the quadrant in which each point lies.

| Coordinates | Quadrant |
|-----------------|----------|
| P (,) | _____ |
| Q (,) | _____ |
| R (,) | _____ |
| S (,) | _____ |



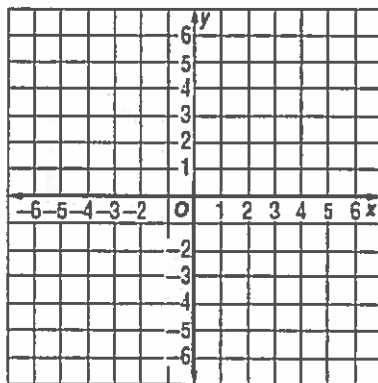
2.) Find each of the points below on the coordinate plane. Then identify the quadrant in which each point lies.

| Coordinates | Quadrant |
|-----------------|----------|
| A (,) | _____ |
| J (,) | _____ |
| B (,) | _____ |
| H (,) | _____ |



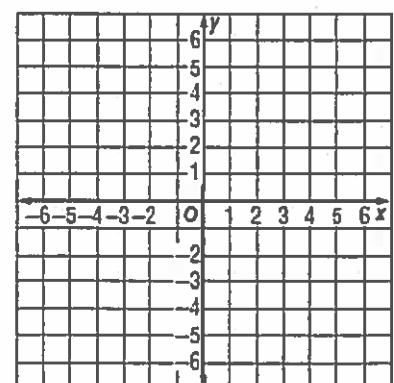
3.) Graph and label each point on the coordinate plane.

- N $(3, -1)$
- P $(-2, 4)$
- Q $(-3, -4)$
- R $(0, 0)$
- S $(-5, 0)$



4.) Graph and label each point on the coordinate plane.

- D $(0, 4)$
- E $(5, 5)$
- G $(-3, 0)$
- H $(-6, -2)$
- J $(0, -2)$



On a scale of 1 – 5 (1: Weak, 5: Strong) rate yourself on this section of math: 1 2 3 4 5

Pre-Algebra – Summer Math Packet

Unit: Knowledge of Geometry

Objective: Identify and describe angles formed by intersecting lines, rays, or line segments - B

Examples:



When two lines intersect, they form two pairs of opposite angles called **vertical angles**, which are always congruent.

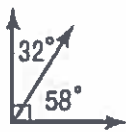
Congruent angles have the same measure.

$\angle 1 \cong \angle 2$ means that angle 1 is congruent to angle 2.



Two angles are **supplementary** if the sum of their measures is 180° .

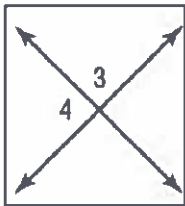
$$126^\circ + 54^\circ = 180^\circ$$



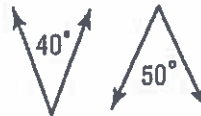
Two angles are **complementary** if the sum of their measures is 90° .

$$32^\circ + 58^\circ = 90^\circ$$

- 1.) Classify the angles as **complementary**, **supplementary**, or **neither**.



- 2.) Classify the angles as **complementary**, **supplementary**, or **neither**.



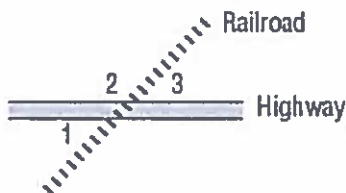
- 3.) Classify the angles as **complementary**, **supplementary**, or **neither**.



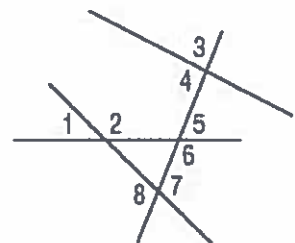
- 4.) Classify the angles as **complementary**, **supplementary**, or **neither**.



- 5.) A map shows a railroad crossing a highway, as shown below. Which of the numbered angles are vertical angles?



- 6.) In a game of pick-up-sticks, the last 4 sticks are shown below. Which of the numbered angles are vertical angles?



On a scale of 1 – 5 (1: Weak, 5: Strong) rate yourself on this section of math: 1 2 3 4 5

Pre-Algebra – Summer Math Packet

Unit: Knowledge of Geometry

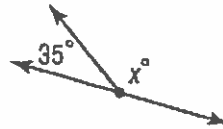
Objective: Determine the measure of angles formed by intersecting lines, line segments, and rays.

Example 1: Find the value of x in the figure.

The two angles are supplementary, so the sum of their measures is 180° .

$$\begin{array}{r} x + 35 = 180 \\ - 35 \quad - 35 \\ \hline x = 145 \end{array}$$

Write the equation
Subtract 35 from both sides
Simplify
The angle is 145°

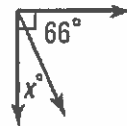


Example 2: Find the value of x in the figure.

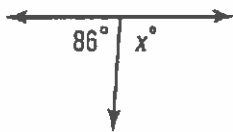
The two angles are complementary, so the sum of their measures is 90° .

$$\begin{array}{r} x + 66 = 90 \\ - 66 \quad - 66 \\ \hline x = 24 \end{array}$$

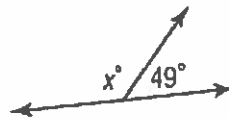
Write the equation
Subtract 66 from both sides
Simplify
The angle is 24°



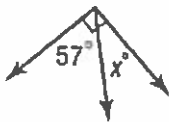
1.) Find the value of x .



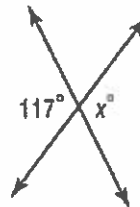
2.) Find the value of x .



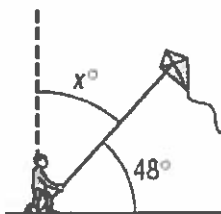
3.) Find the value of x .



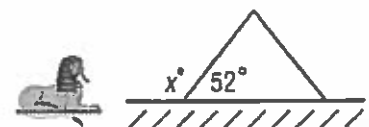
4.) Find the value of x .



5.) A kite string makes an angle of 48° with respect to the ground as shown below. The dashed line is vertical and the ground is horizontal. How are the 48° angle and the unknown angle related? What is the value of x ?



6.) A side view of the Great Pyramid at Giza is shown below. The sides of the pyramid make an angle of 52° with respect to the ground. What is the value of x ?



On a scale of 1 – 5 (1: Weak, 5: Strong) rate yourself on this section of math: 1 2 3 4 5

Pre-Algebra – Summer Math Packet

Unit: Knowledge of Measurement

Objective: Estimate and determine the area of quadrilaterals using parallelograms or trapezoids – A.

The area A of a parallelogram equals the product of its base b and its height h . Because rectangles, rhombuses, and squares are all parallelograms, the formula for finding the area of a parallelogram is also used to find the areas of each of these figures.

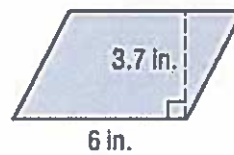


Example: Find the area of a parallelogram if the base is 6 inches and the height is 3.7 inches.




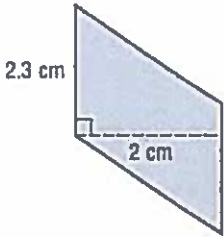
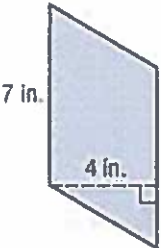
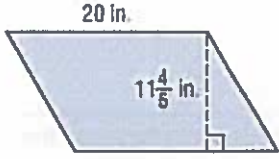
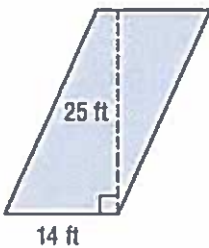

Estimate: $A = 6 \cdot 4$ or 24 in^2

Calculate: $A = bh$ Area of a parallelogram
 $A = 6 \cdot 3.7$ Replace b with 6 and h with 3.7
 $A = 22.2$ Multiply



Check: The area of the parallelogram is 22.2 square inches. This is close to the estimate.

Find the area of each parallelogram. Round to the nearest tenth if necessary.

| | |
|---|---|
| <p>1.)</p>  | <p>2.)</p>  |
| <p>3.)</p>  | <p>4.)</p>  |
| <p>5.) Joyce wants to construct a sail with the dimensions shown. How much material will be used?</p>  | <p>6.) Two parallel streets are cut across by two other parallel streets as shown in the figure. What is the area of the grassy area in the middle?</p>  |

On a scale of 1 – 5 (1: Weak, 5: Strong) rate yourself on this section of math: 1 2 3 4 5

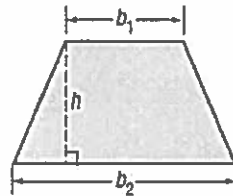
Pre-Algebra – Summer Math Packet

Unit: Knowledge of Measurement

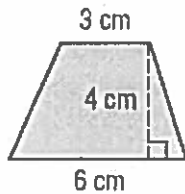
Objective: Estimate and determine the area of quadrilaterals using parallelograms or trapezoids – B.

A trapezoid has two bases, b_1 and b_2 . The height of a trapezoid is the distance between the two bases. The area A of a trapezoid equals half the product of the height h and the sum of the bases b_1 and b_2 .

$$A = \frac{1}{2} h(b_1 + b_2)$$



Example: Find the area of the trapezoid.



$$A = \frac{1}{2} h (b_1 + b_2)$$

$$A = \frac{1}{2} (4) (3 + 6)$$

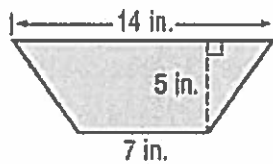
$$A = 18$$

Area of a trapezoid
Replace h with 4, b_1 with 3, and b_2 with 6.

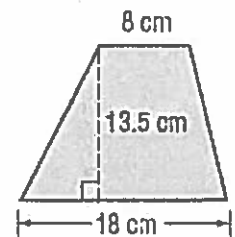
The area of the trapezoid is 18 square centimeters.

Find the area of each trapezoid. Round to the nearest tenth if necessary.

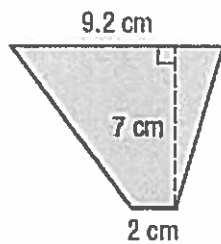
1.)



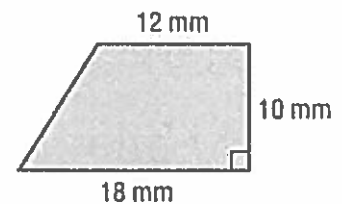
2.)



3.)



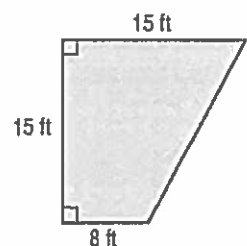
4.)



5.) Arkansas has a shape that is similar to a trapezoid with bases of about 182 miles and 267 miles and a height of about 254 miles. Estimate the area of the state.



6.) Greta is making a patio with the dimensions given in the figure. What is the area of the patio?



On a scale of 1 – 5 (1: Weak, 5: Strong) rate yourself on this section of math: 1 2 3 4 5

Pre-Algebra – Summer Math Packet

Unit: Knowledge of Statistics

Objective: Determine the best choice of a data display for a given data set.

Examples:

- Different types of graphs are better suited for certain types of data.

Bar Graph – Use when comparing data (Ex. Football teams and # of wins)

Line Graph – Use when data is over time (Ex. Rainfall each month for 1 year)

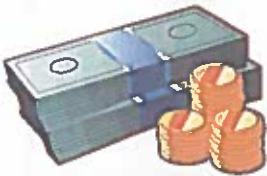
Circle Graph (Pie Graph) – Use when data is dealing with \$ or % (Ex. Allowance – how you spend it)

Stem & Leaf Plot – Use to show individual data (Ex. Class test scores)

Back-to-Back Stem & Leaf Plot – Use when comparing 2 large sets of data & showing individual data scores

Directions: Look at the following situations and tell what type of graph would be the best choice to display the data. Choose BAR, LINE, CIRCLE, or STEM & LEAF.

1.) How the Federal Government spends each part of your tax dollar



2.) You are keeping track of your little sister's/brother's height from age 3 months to 5 years old

3.) Lengths of the 5 largest rivers in the world



4.) Number of points scored in each game during the 99-00 Season

Redskins: 35 50 27 38 24 20 21 26 21
48 17 28 23 20 17 28

Ravens: 10 20 17 19 11 8 10 41 3
34 23 41 31 31 22 3

5.)

| Students who ride a bus | |
|-------------------------|----------|
| YEAR | STUDENTS |
| 2000 | 333 |
| 2001 | 297 |
| 2002 | 360 |
| 2003 | 365 |

6.)

| # of Species at the Zoo | |
|-------------------------|---------|
| ZOO | SPECIES |
| Los Angeles | 350 |
| Lincoln Park | 290 |
| Cincinnati | 700 |
| Bronx | 530 |
| Oklahoma City | 600 |

On a scale of 1 – 5 (1: Weak, 5: Strong) rate yourself on this section of math: 1 2 3 4 5

Pre-Algebra – Summer Math Packet

Unit: Knowledge of Statistics

Objective: Compare the measures of central tendency (mean, median, mode) to determine which is most appropriate.

Examples:

| | MEAN | MEDIAN | MODE |
|--------------------------|--|--|---|
| What is it? | Average | Middle # | # shown the MOST often |
| How to find it? | Sum of Data (+) # of Data Points (+) | Order data from least to greatest, then find the middle # 2 middle #s - Average | Look at data & Find the # that appears the most. 2 modes – Bimodal |
| Most Useful when: | -- Data has no outliers Outliers are REALLY low & high #s | -- Data has outliers -- There are no large gaps in the middle of the data | -- Data has many identical (same) #s |



Use the table at the right.

Find the mean, median, & mode of the data.

Mean: 488.3

Median: 150

Mode: None

| Caribbean Islands | | | |
|-------------------|--------------|--------------------|--------------|
| Island | Area (Sq Mi) | Island | Area (Sq Mi) |
| Antigua | 108 | Martinique | 425 |
| Aruba | 75 | Puerto Rico | 3,339 |
| Barbados | 166 | Tobago | 116 |
| Curacao | 171 | Virgin Islands, UL | 59 |
| Dominica | 290 | Virgin Islands, US | 134 |

Which measure of central tendency would be misleading in describing the size of the islands? Explain.

The mean could be misleading since the areas of all but one of the islands are less than that value.

Which measure would most accurately describe the data? Median

Use the table that shows the miles of shoreline for five states to answer questions 1 – 3.

| Miles of Shoreline | |
|--------------------|--------------------------|
| State | Length of Shoreline (mi) |
| Virginia | 3,315 |
| Maryland | 3,190 |
| Washington | 3,026 |
| North Carolina | 3,375 |
| Pennsylvania | 89 |

1.) Determine the mean, median, and mode of the data.

2.) Which measure of central tendency is misleading in describing the miles of shoreline for the states? Explain.

3.) Which measure of central tendency most accurately describes the data? Explain.

Book Sales: Use the table below that shows the number of books sold each day for 20 days to answer questions 4 – 5.



| Book Sales Per Day | | | |
|--------------------|----|----|----|
| 23 | 18 | 23 | 15 |
| 24 | 16 | 0 | 11 |
| 19 | 10 | 13 | 17 |
| 12 | 23 | 11 | 16 |
| 36 | 24 | 12 | 27 |

4.) Determine the mean, median, & mode of the data.

5.) Which measure of central tendency would be misleading in describing the book sales & which measure most accurately describes the data? Explain.

6.) Michael & Melissa both claim to be earning a C average, 70% to 79%, in their Latin Class. Use the table below to explain their reasoning and determine which student is earning a C average.

| GRADES (%) | | | | | | | |
|------------|--------|--------|--------|--------|--------|--------|--------|
| | Test 1 | Test 2 | Test 3 | Test 4 | Test 5 | Test 6 | Test 7 |
| Michael | 80 | 76 | 73 | 70 | 40 | 25 | 10 |
| Melissa | 88 | 83 | 75 | 70 | 60 | 65 | 62 |

On a scale of 1 – 5 (1: Weak, 5: Strong) rate yourself on this section of math: 1 2 3 4 5

Pre-Algebra – Summer Math Packet

Unit: Knowledge of Probability

Objective: Make predictions and express probability of the results of a survey or simulation as a fraction, decimal, or percent. - A

Examples: Experimental probability can also be based on past performances and can be used to make predictions on future events.

In a survey, 100 people were asked to name their favorite Independence Day side dishes. What is the experimental probability of macaroni salad being someone's favorite dish?

There were 100 people surveyed and 12 chose macaroni salad, SO the experimental probability is $\frac{12}{100} = \frac{3}{25}$.

| SIDE DISH | # of People |
|---------------------------|-------------|
| Potato Salad | 55 |
| Green Salad Or vegetables | 25 |
| Macaroni salad | 12 |
| Coleslaw | 8 |

Suppose 250 people attend the city's Independence Day barbecue. How many can be expected to choose macaroni salad as their favorite side dish?

Write a proportion. $\frac{3}{25} = \frac{x}{250}$ (Use the experimental probability in the proportion.)

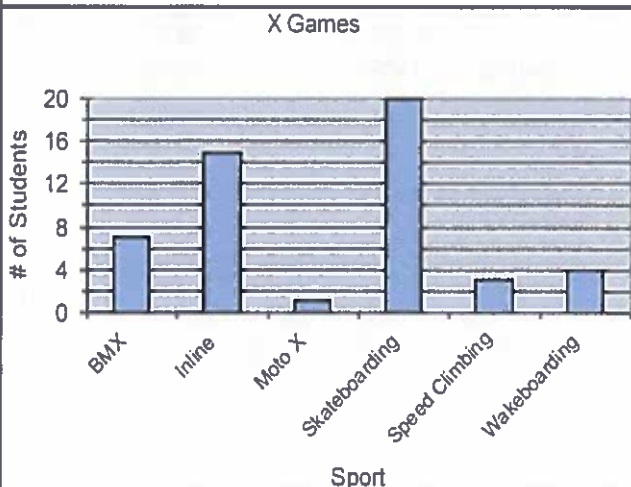
Solve by using cross products. $25x = 3(250)$
About 30 will choose macaroni salad. $x = 30$

1.) Using the table in the example, what is the experimental probability of potato salad being someone's favorite dish?

2.) Using the information in the example and question 1, about how many people can be expected to choose potato salad as their favorite dish if 400 attend the barbecue?

3.) In a survey, 50 people were asked to pick which movie they would see this weekend. Twenty chose *Horror Story*, 15 chose *The Ink Well*, 10 chose *The Monkey House*, and 5 chose *Little Rabbit*. What is the experimental probability of someone wanting to see *The Monkey House*?

4.) Using the information from question # 3, suppose 300 people are expected to attend a movie theater this weekend to see one of the four movies listed. How many can be expected to see *The Monkey House*?



For questions 5 & 6, use the graph shown at the left. The graph shows the results of a survey in which 50 students were asked to name their favorite X Game sport.

5.) Suppose 500 people attend the X Games. How many can be expected to choose Inline as their favorite sport?

6.) Suppose 500 people attend the X Games. How many can be expected to choose speed climbing as their favor sport?

On a scale of 1 – 5 (1: Weak, 5: Strong) rate yourself on this section of math: 1 2 3 4 5

Pre-Algebra – Summer Math Packet

Unit: Knowledge of Probability

Objective: Make predictions and express probability of the results of a survey or simulation as a fraction, decimal, or percent. - B

Examples:

Probability is a way to measure the chance that an event will occur. You can use this formula to determine the probability, P, of an event.

$$P = \frac{\text{number of favorable outcomes}}{\text{number of possible outcomes}}$$

Probability can be expressed as a FRACTION, DECIMAL, or PERCENT.

A jar contains 10 purple, 3 orange, and 12 blue marbles. A marble is drawn at random. Determine the probability that you will pick a purple marble. Express your answer in a fraction, decimal, and %.

Step 1 – Determine the total # of marbles. $10 + 3 + 12 = 25$

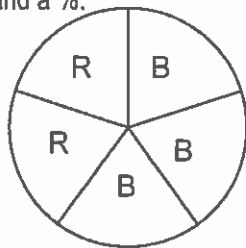
Step 2 – Determine the probability of picking a purple marble. $P(\text{purple}) = \frac{\text{number of purple}}{\text{Total marbles}} = \frac{10}{25} \div 5 = \frac{2}{5}$

Step 3 – Simplify the fraction.

Step 4 – Convert Fraction to a Decimal – Divide. $2 \div 5 = 0.4$

Step 5 – Convert Decimal to a % - Move decimal 2 places to the right. $0.4 = 40\%$

1.) A six-sided number cube is rolled, and the spinner below is spun. Determine the probability of rolling a 3 and spinning blue. (B=blue, R=red) Express your answer as a fraction, a decimal, and a %.



2.) When Monica rolled her number cube 100 times, she had these results:

| Number on cube | Frequency |
|----------------|-----------|
| 1 | 12 |
| 2 | 18 |
| 3 | 21 |
| 4 | 16 |
| 5 | 17 |
| 6 | 16 |

What is the experimental probability of rolling a number less than 3? Express your answer as a fraction, a decimal, and a percent.

3.) A jar contains 15 orange, 14 white, 10 pink, 2 green, and 9 blue marbles. A marble is drawn at random. Determine the probability for the following situation. Express your answer in Fraction, Decimal, and % forms.

P (not blue) =



4.) A jar contains 15 orange, 14 white, 10 pink, 2 green, and 9 blue marbles. A marble is drawn at random. Determine the probability for the following situation. Express your answer in Fraction, Decimal, and % forms.

P (pink or orange) =

5.) A six-sided die is rolled 20 times and the results are recorded as follows: 3 ones, 4 twos, 5 threes, 2 fours, 4 fives, 2 sixes. What is the experimental probability of rolling a number greater than four? Express your answer in Fraction, Decimal, and % forms.

6.) A six-sided die is rolled 25 times and the results are recorded as follows: 4 ones, 5 twos, 5 threes, 3 fours, 4 fives, 4 sixes. What is the experimental probability of rolling a number greater than four? Express your answer in fraction, decimal, and % forms.

On a scale of 1 – 5 (1: Weak, 5: Strong) rate yourself on this section of math: 1 2 3 4 5

Pre-Algebra – Summer Math Packet

Unit: Knowledge of Number Relationships & Computation

Objective: Determine equivalent forms of rational numbers expressed as fractions, decimals, percents, and ratios. - B

Examples:

A **RATIO** is a comparison of two numbers by division. When a ratio compares a number to 100, it can be written as a **PERCENT**. To write a ratio or fraction as a percent, find an equivalent fraction with a denominator of 100. You can also use the meaning of percent to change percents to fractions.

Write $\frac{19}{20}$ as a percent.

$$\frac{19}{20} \cdot \frac{5}{5} = \frac{95}{100} = 95\% \quad \text{Since } 100 \div 20 = 5, \text{ multiply the numerator and denominator by 5.}$$

Write 92% as a fraction in simplest form.

$$\frac{92}{100} = \frac{\div 4}{\div 4} = \frac{23}{25}$$

Write 92% as a decimal. Move decimal two places to the left. Add zeros if needed. 92.0% = 0.92

Write 0.4 as a percent. Move decimal two places to the right. Add zeros if needed. 0.4 = 40%

1.) Write $\frac{7}{25}$ as a percent and decimal.

2.) Write 19% as a decimal and fraction in simplest form.

3.) Write $\frac{9}{50}$ as a percent and decimal.

4.) Write 75% as a decimal and fraction in simplest form.

5.) Ms. Crest surveyed her class and found that 15 out of 30 students brushed their teeth more than twice a day. Write this ratio as a fraction in simplest form, then write it as a % and a decimal.

6.) A local retail store was having a sale and offered all their merchandise as a 25% discount. Write this percent as a fraction in simplest form, then write it as a decimal.

On a scale of 1 – 5 (1: Weak, 5: Strong) rate yourself on this section of math: 1 2 3 4 5

Pre-Algebra – Summer Math Packet

Unit: Knowledge of Number Relationships & Computation

Objective: Compare, order, and describe rational numbers.

Examples:


- **RATIONAL** numbers include fractions, decimal, and percents. To **COMPARE** or **ORDER** rational numbers, they must be in the same form (all fraction or all decimals, or all %s)

Example: Order 0.6, 48%, and $\frac{1}{2}$ from least to greatest.

Step 1 – Change all to decimals. 0.6 48% = 0.48 $\frac{1}{2} = 0.5$

Step 2 – Compare decimals & Order. 0.48, 0.5, 0.6

Step 3 – Write using original form. 48%, $\frac{1}{2}$, 0.6

| | |
|---|---|
| <p>1.) Order from least to greatest.</p> <p style="text-align: center;">22%, 0.3, $\frac{1}{5}$</p> | <p>2.) Order from least to greatest.</p> <p style="text-align: center;">0.74, $\frac{3}{4}$, 70%</p> |
| <p>3.) Replace \bigcirc with $<$, $>$, or $=$.</p> <p style="text-align: center;">$\frac{7}{12}$ \bigcirc 58%</p> | <p>4.) Which is the largest?</p> <p style="text-align: center;">$1\frac{3}{8}$ $1\frac{3}{10}$ $1\frac{4}{9}$</p> |
| <p>5.) According to the Pet Food Manufacturer's Association, 11 out of 25 people own large dogs and 13 out of 50 medium dogs. Do more fraction of people own large or medium dogs?</p> <div style="text-align: center; margin-top: 10px;">  </div> | <p>6.) Your PE teacher asked you to run for specific time period. You ran 0.6 of the time. Two of your friends ran $\frac{7}{10}$ and 72% of the time. Order the amount of time you and your friends ran from least to greatest.</p> |

Pre-Algebra – Summer Math Packet

On a scale of 1 – 5 (1: Weak, 5: Strong) rate yourself on this section of math: 1 2 3 4 5

Unit: Knowledge of Number Relationships & Computation

Objective: Add, subtract, multiply and divide integers. - A

Examples:

ADDITION INTEGER RULES:

For integers with the same sign:

- The sum of two positive integers is POSITIVE.
- The sum of two negative integers is NEGATIVE.

For integers with different signs, subtract their absolute value. The sum is:

- Positive IF the positive integer has the greater absolute value.
- Negative IF the negative integers has the greater absolute value.

Examples:

$-6 + (-3) =$ add keep the sign = -9

$-34 + (-21) =$ add keep the sign = -55

$8 + (-7) =$ subtract keep the sign of the higher = 1

$-5 + 4 =$ subtract keep the sign of the higher = -1

SUBTRACTION INTEGER RULES:

- Keep the first number the same
- Switch the subtraction sign to ADDITION
- Change the second number to it's opposite. Opposite: -6 to 6
- Follow Addition rules above.

Examples:

$6 - 9 = 6 + (-9) = -3$

$-10 - (-12) = -10 + 12 = 2$

$-3 - 7 = -3 + (-7) = -10$

$1 - (-2) = 1 + 2 = 3$

| | |
|---|---|
| 1.) Add: $2 + (-7)$ | 2.) Subtract: $-13 - 8$ |
| 3.) Evaluate $a - b$ if $a = -2$ and $b = -7$ | 4.) Evaluate $x + y + z$ if $x = 3$, $y = -5$, and $z = -2$ |
| 5.) In Mongolia the temperature can dip down to -45°C in January. The temperature in July may reach 40°C . What is the temperature range in Mongolia? | 6.) Write an addition expression to describe skateboarding situation. Then determine the sum. Hank starts at the bottom of a half pipe 6 feet below street level. He rises 14 feet at the top of his kickturn. |

Pre-Algebra – Summer Math Packet

On a scale of 1 – 5 (1: Weak, 5: Strong) rate yourself on this section of math: 1 2 3 4 5

Unit: Knowledge of Number Relationships & Computation

Objective: Add, subtract, multiply and divide integers. - B

Examples:

MULTIPLYING & DIVIDING INTEGER RULES:

- Two integers with DIFFERENT signs the answer is NEGATIVE.
- Two integers with SAME signs the answer is POSITIVE.

Examples:

$5(-2) = 5$ times -2 , the signs are different so the answer will be negative = -10

$(-6) \cdot (-9) =$ the signs are the same so the answer will be positive = 54

$30 \div (-5) =$ the signs are different so the answer will be negative = -6

$-100 \div (-5) =$ the signs are the same so the answer will be positive = 20

1.) Multiply: $-14(-7)$

2.) Divide: $350 \div (-25)$

3.) Evaluate if $a = -3$ and $c = 5$

$$-3ac$$

4.) Evaluate if $d = -24$, $e = -4$, and $f = 8$

$$\frac{de}{f}$$

5.) A computer stock decreased 2 points each hour for 6 hours. Determine the total change in the stock value over the 6 hours.

6.) A submarine descends at a rate of 60 feet each minute. How long will it take it to descend to a depth of 660 feet below the surface?

Pre-Algebra – Summer Math Packet

On a scale of 1 – 5 (1: Weak, 5: Strong) rate yourself on this section of math: 1 2 3 4 5

Unit: Knowledge of Number Relationships & Computation

Objective: Add, subtract, and multiply positive fractions and mixed numbers. - A

Examples:

- To add unlike fractions (fractions with different denominators), rename the fractions so there is a common denominator.

| | | |
|--|--|---|
| Add: $\frac{1}{6} + \frac{2}{5} =$ | $\frac{1}{6} = \frac{1 \cdot 5}{6 \cdot 5} = \frac{5}{30}$ | $\frac{2}{5} = \frac{2 \cdot 6}{5 \cdot 6} = \frac{12}{30}$ |
| $\frac{5}{30} + \frac{12}{30} = \frac{17}{30}$ | | |

| | | |
|---------------------------------------|---|--|
| Add: $12\frac{1}{2} + 8\frac{2}{3} =$ | $12\frac{1}{2} = 12\frac{1 \cdot 3}{2 \cdot 3} = 12\frac{3}{6}$ | $8\frac{2}{3} = 8\frac{2 \cdot 2}{3 \cdot 2} = 8\frac{4}{6}$ |
|---------------------------------------|---|--|

$12\frac{3}{6} + 8\frac{4}{6} = 20\frac{7}{6}$

$\frac{7}{6}$ is improper so we must change it to proper. 7 divided by 6 = $1\frac{1}{6}$

$20 + 1\frac{1}{6} = 21\frac{1}{6}$

1.) Add: $\frac{1}{3} + \frac{1}{9}$

2.) Add: $7\frac{4}{9} + 10\frac{2}{9}$

3.) Add: $1\frac{5}{9} + 4\frac{1}{6}$

4.) Add: $2\frac{1}{2} + 2\frac{2}{3}$

5.) A quiche recipe calls for $2\frac{3}{4}$ cups of grated cheese. A recipe for quesadillas requires $1\frac{1}{3}$ cups of grated cheese. What is the total amount of grated cheese needed for both recipes?

6.) You want to make a scarf and matching hat. The pattern calls for $1\frac{7}{8}$ yards of fabric for the scarf and $2\frac{1}{2}$ yards of fabric for the hat. How much fabric do you need in all?

Pre-Algebra – Summer Math Packet

On a scale of 1 – 5 (1: Weak, 5: Strong) rate yourself on this section of math: 1 2 3 4 5

Unit: Knowledge of Number Relationships & Computation

Objective: Add, subtract, and multiply positive fractions and mixed numbers. - B

Examples:

- To subtract unlike fractions (fractions with different denominators), rename the fractions so there is a common denominator.

$$\text{Subtract: } \frac{7}{8} - \frac{1}{2} = \frac{7}{8} = \frac{7 \cdot 1}{8 \cdot 1} = \frac{7}{8} \quad \frac{1}{2} = \frac{1 \cdot 4}{2 \cdot 4} = \frac{4}{8} \quad \frac{7}{8} - \frac{4}{8} = \frac{3}{8}$$

$$\text{Subtract: } 5\frac{3}{4} - 2\frac{1}{3} = 5\frac{3}{4} = 5\frac{3 \cdot 3}{4 \cdot 3} = 5\frac{9}{12} \quad 2\frac{1}{3} = 2\frac{1 \cdot 4}{3 \cdot 4} = 2\frac{4}{12}$$

$$5\frac{9}{12} - 2\frac{4}{12} = 3\frac{5}{12}$$

****Note:** If you have to borrow from the whole number change to improper fractions, find a common denominator, subtract, and then change back to proper fractions.

1.) Subtract: $\frac{9}{10} - \frac{1}{10}$

2.) Subtract: $\frac{2}{3} - \frac{1}{6}$

3.) Subtract: $9\frac{7}{10} - 4\frac{3}{5}$

4.) Subtract: $5\frac{3}{8} - 4\frac{11}{12}$

*Hint: Change to improper fractions first!

5.) Melanie had $4\frac{2}{3}$ pounds of chopped walnuts. She used $1\frac{1}{4}$ pounds in a recipe. How many pounds of chopped walnuts did she have left?

6.) Lois has $3\frac{1}{3}$ pounds of butter. She uses $\frac{3}{4}$ pound in a recipe. How much does she have left? *Hint: Change to improper fractions first.

Pre-Algebra – Summer Math Packet

On a scale of 1 – 5 (1: Weak, 5: Strong) rate yourself on this section of math: 1 2 3 4 5

Unit: Knowledge of Number Relationships & Computation

Objective: Add, subtract, and multiply positive fractions and mixed numbers. - C

Examples:

- To multiply fractions – Multiply the numerators & denominators.
- Be sure to change mixed numbers to improper fractions before multiplying.

$$\frac{1}{3} \cdot \frac{5}{8} = \frac{5}{24}$$

$$1\frac{1}{3} \cdot 3\frac{2}{5} = \frac{4}{3} \cdot \frac{17}{5} = \frac{68}{15} = 4\frac{8}{15}$$

**Remember: Changing mixed numbers to improper fractions. $2\frac{3}{4} = 4 \cdot 2 + 3 = \frac{11}{4}$

$$1\frac{1}{3} \cdot 21 = \frac{4}{3} \cdot \frac{21}{1} = \frac{4 \cdot 21}{3 \cdot 1} = \frac{84}{3} = 28$$

| | |
|---|--|
| <p>1.) $\frac{2}{3} \cdot \frac{4}{5} =$</p> | <p>2.) $\frac{7}{3} \cdot 4\frac{1}{2} =$</p> |
| <p>3.) $2\frac{1}{2} \cdot 2\frac{1}{3} =$</p> | <p>4.) $3 \cdot 5\frac{2}{9} =$</p> |
| <p>5.) Anna wants to make 4 sets of curtains. Each set requires $5\frac{1}{8}$ yards of fabric. How much fabric does she need?</p> | <p>6.) One sixth of the students at a local college are seniors. The number of freshmen students is $2\frac{1}{2}$ times that amount. What fraction of the students are freshmen?</p> |