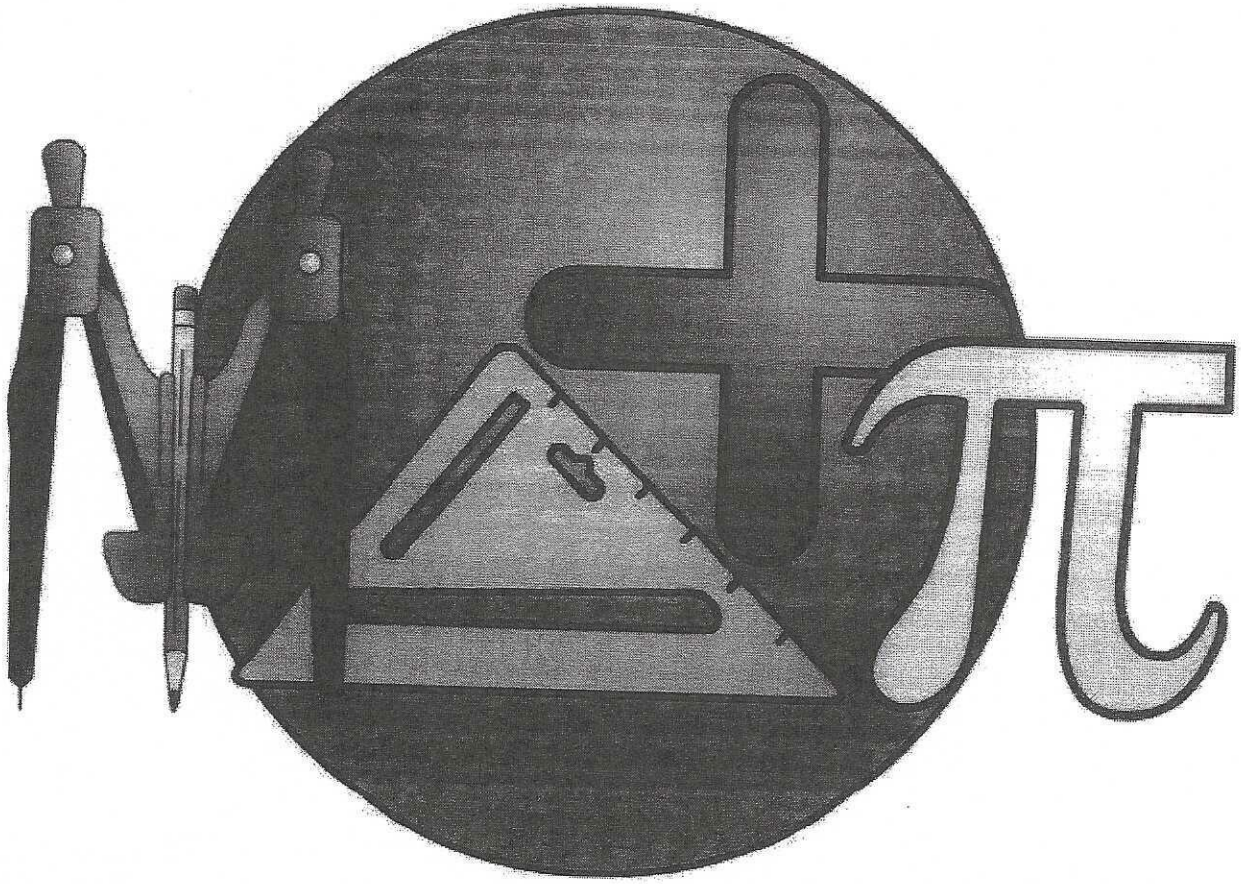
Math Entering

8th grade

Students must show work.

Calculators are NOT permitted for this assignment



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 $\langle$, $\rangle$, $\leq$, 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 **$2x \rangle 10$**
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.

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 $x + 5 = 11$

$x + 5 = 11$	Write the equation
$-5 = -5$	Subtract 5 from both sides
$x = 6$	Simplify

Check

$x + 5 = 11$	Write the equation
$6 + 5 = 11$	Replace x with 6
$11 = 11$✓	The sentence is true

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

$\frac{-21}{-3} = \frac{-3y}{-3}$	Write the equation
$7 = y$	Divide each side by – 3 Simplify

Check

$-21 = -3y$	Write the equation
$-21 = -3(7)$	Replace the y with 7
$-21 = -21$?	Multiply – is the sentence true?

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

$3x + 2 = 23$	Write the equation
$-2 = -2$	Subtract 2 from each side
$\frac{3x}{3} = \frac{21}{3}$	Simplify Divide each side by 3
$x = 7$	Simplify

Check

$3x + 2 = 23$	Write the equation
$3(7) + 2 = 23$?	Replace x with 7
$21 + 2 = 23$?	Multiply
$23 = 23$?	Add – is the sentence true?

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

2.) Solve $48 = -6r$

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

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

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 1: Solve $v + 3 < 5$

$v + 3 < 5$ Write the inequality
$-3 \quad -3$ Subtract 3 from each side
$v < 2$ Simplify

Check: Try 1, a number less than 2
$v + 3 < 5$ Write the inequality
$1 + 3 < 5$ Replace v with 1
$4 < 5$? Is this sentence true? **yes**

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

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

Check: Try 7, a number less than 8
$2x + 8 < 24$ Write the inequality
$2(7) + 8 < 24$ Replace x with 7
$14 + 8 < 24$ Multiply 7 by 2
$22 < 24$? Is the sentence true? **yes**

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

2.) Solve $6u \geq 36$

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

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

Pre-Algebra – Summer Math Packet

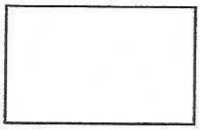
Unit: Knowledge of Algebra, Patterns, and Functions

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.

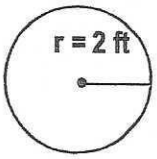


$P = 2L + 2W$	Write the equation
$P = 2(10) + 2(8)$	Replace L and W with the length and width
$P = 20 + 16$	Multiply
$P = 36$ cm	Simplify and add the correct label

Example 2:

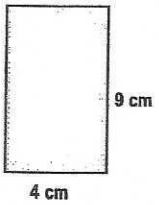
The area *A* of a circle equals the product of pi (π) and the square of its radius (r). $A = \pi r^2$ $(\pi \approx 3.14)$

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

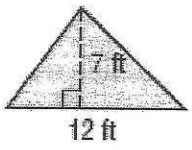


$A = \pi r^2$	Write the equation
$A = 3.14 \cdot (2)^2$	Replace π with 3.14 and r with 2
$A = 3.14 \cdot 4$	Square the 2
$A = 12.56$ ft^2	Simplify and add the correct label

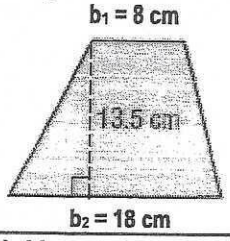
1.) The formula for finding the area of a rectangle is $A = L \cdot W$. Use this formula to find the area of the rectangle.



2.) The formula for finding the area of a triangle is $A = \frac{1}{2}bh$. Find the area of the triangle below.

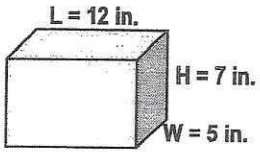


3.) A trapezoid has two bases (b_1 and b_2). The formula for finding the area of a trapezoid is: $A = \frac{1}{2}h(b_1 + b_2)$



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.



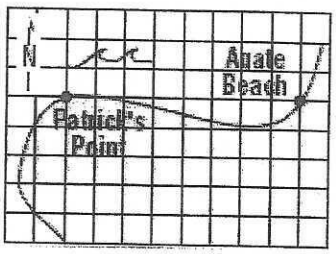
Pre-Algebra – Summer Math Packet

Unit: Knowledge of Measurement

Objective: Determine the distance between 2 points using a drawing and a scale.

A **scale drawing** represents something that is too large or too small to be drawn at actual size. Similarly, a **scale model** can be used to represent something that is too large or too small for an actual-size model. The **scale** gives the relationship between the drawing/model measure and the actual measure.

Example: On this map, each grid unit represents 50 yards. Find the distance from Patrick's Point to Agate Beach.



Scale **Patrick's Point to Agate Beach**

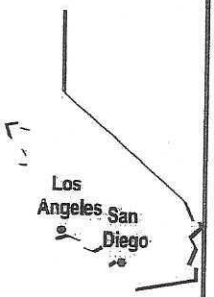
$$\frac{\text{map} \rightarrow 1 \text{ unit}}{\text{actual} \rightarrow 50 \text{ yards}} = \frac{8 \text{ units} \leftarrow \text{map}}{x \text{ yards} \leftarrow \text{actual}}$$

$1 \cdot x = 50 \cdot 8$ **cross multiply**

$x = 400$ **simplify**

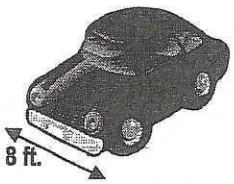
It is 400 yards from Patrick's Point to Agate Beach.

1.) On a map, the distance from Los Angeles to San Diego is 6.35 cm. The scale is 1 cm = 20 miles. What is the actual distance?



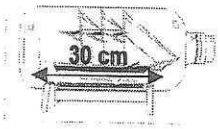
2.) Lexie is making a model of the Empire State Building. The scale of the model is 1 inch = 9 feet. The needle at the top is 31.5 feet tall. How big should the needle be on the model?

3.) A scale drawing of an automobile has a scale of 1 inch = ½ foot. The actual width of the car is 8 feet. What is the width on the scale drawing?



Actual car

4.) A model ship is built to a scale of 1 cm : 5 meters. The length of the model is 30 centimeters. What is the length of the actual ship?



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.**

$$\frac{19}{20}\ \frac{\bullet 5}{\bullet 5} = \frac{95}{100} = 95\%$$ **Since 100 ÷ 20 = 5, 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.

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

1.) Order from least to greatest.

22%, 0.3, $\frac{1}{5}$

2.) Order from least to greatest.

0.74, $\frac{3}{4}$, 70%

3.) Replace ◯ with <, >, or =.

$\frac{7}{12}$ ◯ 58%

4.) Which is the largest?

$1\frac{3}{8}$ $1\frac{3}{10}$ $1\frac{4}{9}$

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

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) • (- 9) = the signs are the same so the answer will be positive = 54

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

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

1.) Mulitply: - 14 (- 7)

2.) Divide: 350 ÷ (- 25)

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

$-3ac$

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

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

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: $\frac{1}{6}+\frac{2}{5}=$ $\quad \frac{1}{6}=\frac{1\bullet 5}{6\bullet 5}=\frac{5}{30}$ $\quad \frac{2}{5}=\frac{2\bullet 6}{5\bullet 6}=\frac{12}{30}$

$\frac{5}{30}+\frac{12}{30}=\frac{17}{30}$

Add: $12\frac{1}{2}+8\frac{2}{3}=$ $\quad 12\frac{1}{2}=12\frac{1\bullet 3}{2\bullet 3}=12\frac{3}{6}$ $\quad 8\frac{2}{3}=8\frac{2\bullet 2}{3\bullet 2}=8\frac{4}{6}$

$12\frac{3}{6}+8\frac{4}{6}=20\frac{7}{6}$ $\quad \frac{7}{6}$ 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: $2\frac{1}{2}+2\frac{2}{3}$

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.**

Subtract: $\frac{7}{8}-\frac{1}{2}=$ $\frac{7}{8}=\frac{7\bullet1}{8\bullet1}=\frac{7}{8}$ $\frac{1}{2}=\frac{1\bullet4}{2\bullet4}=\frac{4}{8}$ $\frac{7}{8}-\frac{4}{8}=\frac{3}{8}$

Subtract: $5\frac{3}{4}-2\frac{1}{3}=$ $5\frac{3}{4}=5\frac{3\bullet3}{4\bullet3}=5\frac{9}{12}$ $2\frac{1}{3}=2\frac{1\bullet4}{3\bullet4}=2\frac{4}{12}$

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

**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!

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.**

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

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

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

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

1.) $\frac{2}{3} \bullet \frac{4}{5} =$	2.) $\frac{7}{3} \bullet 4\frac{1}{2} =$
3.) $2\frac{1}{2} \bullet 2\frac{1}{3} =$	4.) $3 \bullet 5\frac{2}{9} =$