Trafton Academy

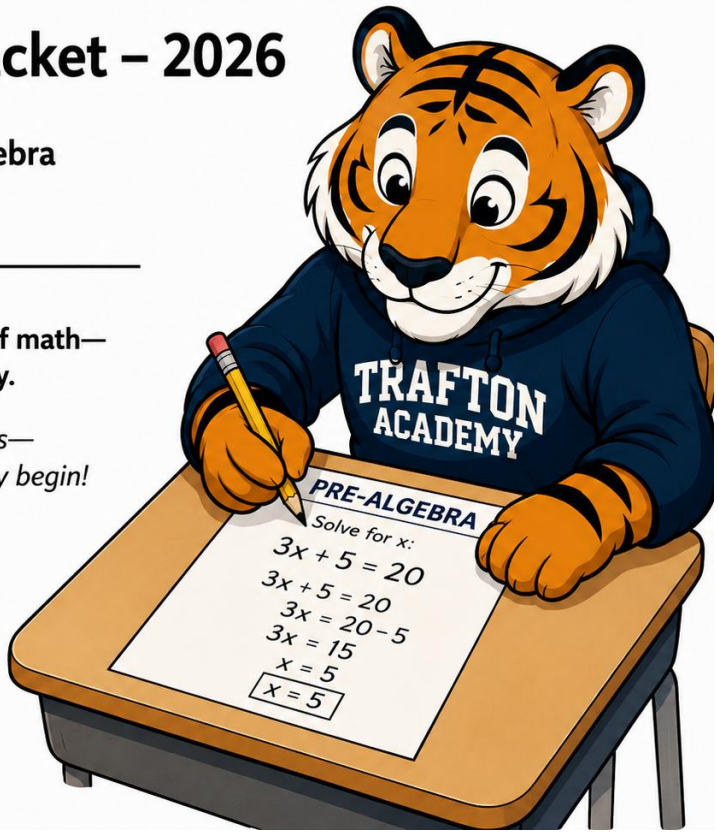
Summer Math Packet – 2026

For Students Entering Pre-Algebra

Name: _____

You're stepping into a new world of math—full of patterns, logic, and discovery.

Great minds don't just solve problems—they see possibilities. Let your journey begin!



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TRAFTON ACADEMY

Educating Minds, Building Character for Life.

Name _____

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. - **A**

Examples:

To write a decimal as a fraction, divide the numerator of the fraction by the denominator.

Use a power of ten in the denominator to change a decimal to a fraction.

Write $\frac{5}{9}$ as a decimal.

$$9\overline{)5.000} = 0.555 = 0.\overline{5}$$

because 5 repeats forever.

$$\begin{array}{r} 0.555 \\ 9\overline{)5.000} \\ -45 \\ \hline 50 \\ -45 \\ \hline 50 \\ -45 \\ \hline \end{array}$$

Write 0.32 as a fraction in simplest form.

$$0.32 = \frac{32}{100} = \frac{\div 4}{\div 4} = \frac{8}{25}$$

1.) Write 0.735353535... using bar notation to represent the repeating decimal.

$0.7\overline{35}$

2.) Write $\frac{3}{5}$ as a decimal.

3.) Write $4\frac{5}{8}$ as a decimal.

4.) Write 0.94 as a fraction in simplest form.

5.) Write 0.48 as a fraction in simplest form.

6.) There were 6 girls and 18 boys in Mrs. Johnson's math class. Write a ratio of the # of girls to the # of boys in fraction form. Then write the fraction as a repeating decimal.

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Pre-Algebra – Summer Math Packet

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

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

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

***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: $\frac{11}{12} - \frac{1}{3}$

2.) Subtract: $\frac{5}{6} - \frac{1}{4}$

3.) Subtract: $6\frac{5}{8} - 2\frac{1}{3}$

4.) Subtract: $4\frac{7}{10} - 1\frac{3}{5}$

5.) A recipe calls for $3\frac{1}{2}$ cups of milk. You only have $1\frac{3}{4}$ cups. How many more cups of milk do you need?

6.) A shelf is $7\frac{5}{6}$ feet long. You cut a piece of wood that is $3\frac{2}{3}$ feet long. How much of the shelf will be left?

7.) Emma read $8\frac{1}{4}$ chapters of a book. Her friend read $5\frac{5}{6}$ chapters. How many more chapters did Emma read than her friend?

8.) A swimming pool holds $12\frac{3}{5}$ gallons of water. After some water is used, $7\frac{4}{5}$ gallons remain. How many gallons of water were used?

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Pre-Algebra – Summer Math Packet

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

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

6.) $\frac{5}{6} \bullet \frac{3}{4} =$

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Pre-Algebra – Summer Math Packet

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: - 15 + 27	**2.)** Subtract: - 18 - 29
3.) Evaluate a – b if a = - 14 and b = - 23	**4.)** Evaluate 2x - y + z if x = - 4, y = 7, and z = - 10
5.) A scuba diver is 32 feet below sea level. She descends 18 more feet and then rises 27 feet. What is her new position relative to sea level?	**6.)** A rectangular field is 15 yards wide. It extends 35 yards east of a starting point, then 12 yards west, and then 8 more yards east. Write an addition expression to represent the net change in position and determine the result.
7.) Evaluate 3(a – b) + 2c if a = - 5, b = 12, and c = - 7	**8.)** Evaluate -2(x + 3) - 4(y - 8) if x = - 6 and y = - 2

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Pre-Algebra – Summer Math Packet

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.) Multiply: - 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

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

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?

7.) Multiply: (- 8) (15) (- 2)

8.) Evaluate if a = - 6, b = 3, and c = - 4

$a^2b - c \div b$

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Pre-Algebra – Summer Math Packet

(Continued from previous page for more practice.)

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:

8 (- 4) = 8 times – 4, the signs are different so the answer will be negative = - 32

(- 7) (- 6) = the signs are the same so the answer will be positive = 42

- 93 ÷ (- 3) = the signs are different so the answer will be negative = - 31

- 216 ÷ (- 12) = the signs are the same so the answer will be positive = 18

1.) Multiply: 24 (- 15)

2.) Divide: - 432 ÷ 12

3.) Evaluate if a = - 9 and c = 7

$$4ac - 3$$

4.) Evaluate if d = - 12, e = 8, and f = - 5

$$\frac{de + f}{e - f}$$

5.) A submarine descends 18 feet every minute for 12 minutes. Determine the total change in depth.

6.) An elevator rises 9 floors every 15 seconds for 2 minutes. Determine the total change in floors.

7.) Multiply: (- 23) (- 14)

8.) Divide: 684 ÷ (- 9)

9.) Evaluate if x = - 4, y = 6, and z = - 3

$$2xy - 3z$$

10.) Evaluate if p = 5, q = - 7, and r = - 2

$$\frac{pq - r}{q + r}$$

11.) A bank account loses $22 each week for 10 weeks. What is the total change in the account balance?

12.) A rocket rises 73 miles every 5 minutes for 25 minutes. What is the total change in altitude?

13.) Evaluate if m = - 6, n = 4, and k = - 8

$$(mn) \div (k - 2)$$

14.) Evaluate if r = - 3, s = - 5, and t = 4

$$\frac{rst}{s - t}$$

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Pre-Algebra – Summer Math Packet

Unit: Knowledge of Number Relationships & Computation
Objective: Determine equivalentforms 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.

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.

$\frac{15}{30} = \frac{1}{2} = 50\% = 0.50$

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.

7.) Write 0.35 as a percent and as a fraction in simplest form.

8.) A recipe calls for 3/4 cup of sugar. If 1 cup of sugar is 100%, what percent of a cup is 3/4 cup? Write your answer as a percent and as a decimal.

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Pre-Algebra – Summer Math Packet

Unit: Knowledge of Number Relationships & Computation
Objective: Compare, order, and describe rational numbers.
Examples:

- **RATIONAL numbers include fractions, decimals, 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, $\frac{1}{5}$

$\frac{1}{5}$ = 0.20, 22% = 0.22, 0.3 = 0.30

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

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?

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

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?

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.

7.) Order from least to greatest.

$\frac{2}{5}$, 0.36, 33%, $\frac{3}{8}$

8.) Order from greatest to least.

85%, $\frac{5}{6}$, 0.78, $\frac{3}{4}$

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Pre-Algebra – Summer Math Packet

Unit: Knowledge of Number Relationships & Computation

Objective: Determine rate of increase and decrease, discounts, simple interest, commission, sales tax. - A

Examples:

- **A percent of change is a ratio that compares the change in quantity to the original amount. If the original quantity is increased, it is a PERCENT OF INCREASE. If the original quantity is decreased, it is a PERCENT OF DECREASE.**

Last year 2,376 people attended the rodeo. This year, attendance was 2,950. What was the percent of change in attendance to the nearest whole percent?

- **Since this year's attendance is greater than last year's attendance, this is a percent of INCREASE.**
- **The amount of increase is 2,950 – 2,376 = 574. (Percent of DECREASE: original – new.)**
- **Use the proportion:** $\frac{\%}{100} = \frac{\text{amount of change}}{\text{original amount}}$ $\frac{n}{100} = \frac{574}{2{,}376}$ **n = 0.24 or 24%**
- **The rodeo attendance increased by about 24%.**

DISCOUNT

Determine the price of a $69.50 tennis racket that is on sale for 20% off.

- **Use the percent proportion to determine the amount of discount.** $\frac{20}{100} = \frac{n}{69.50}$ **20 x 69.50 = 100n**

$\frac{1390}{100} = \frac{100n}{100}$

13.90 = n

The amount of discount is $13.90

- **Subtract the amount of discount from the price.** **69.50 – 13.90 = $55.60**

The sale price of the tennis racket is $55.60.

1.) Determine the percent of change. Round to the nearest whole percent if necessary. State whether the percent of change is an INCREASE or DECREASE.

Original: 250
New: 100

2.) Determine the sale price to the nearest cent.

$39.00 jeans
40% off

3.) Determine the percent of change. Round to the nearest whole percent if necessary. State whether the percent of change is an INCREASE or DECREASE.

Original: $84
New: $100

Amount of increase: 100 – 84 = 16

$\frac{\%}{100} = \frac{16}{84} \Rightarrow n = 19.05\ldots \approx 19\%$

The percent of change is an INCREASE.

4.) Justin is buying a cell phone that has a regular price of $149. The cell phone is on sale for 15% off the regular price. What will be the sale price?

5.) Alicia planted 45 tulip bulbs last year. This year she plans to plant 65 bulbs. Determine the percent of increase in the number of tulip bulbs to the nearest tenth.

6.) You want to buy a new sweater. The regular price was $48 dollars. The sale price was $34. What was the percent of discount to the nearest percent?

7.) A computer originally priced at $1,200 is on sale for $960. What is the percent of discount?

8.) The population of a town was 18,500 last year. This year, the population is 19,610. What is the percent of increase in population to the nearest tenth?

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Pre-Algebra – Summer Math Packet

(Continued from previous page for more practice.)

Unit: Knowledge of Number Relationships & Computation

Objective: Determine rate of increase and decrease, discounts, simple interest, commission, sales tax. - A

Examples:

Example 1: What was the percent of change in the number of books in the library if the number increased from 1,850 books to 2,276 books? Round to the nearest whole percent.

- Since the number of books increased, this is a percent of INCREASE.
- Amount of increase: $2{,}276 - 1{,}850 = 426$
- Use the proportion: $\frac{\%}{100} = \frac{\text{amount of change}}{\text{original amount}}$ $\frac{n}{100} = \frac{426}{1{,}850}$
- Solve: $n = \frac{426 \times 100}{1{,}850} = 23.03 \approx 23\%$
- The number of books increased by about 23%.

Example 2: A television regularly priced at $480 is on sale for 25% off. What is the sale price?

- Use the percent proportion to find the discount.

$\frac{25}{100} = \frac{d}{480}$ $25 \times 480 = 12{,}000$ $12{,}000 \div 100 = 120$ $d = \$120$

- Subtract the discount from the original price.

$480 - 120 = 360$

- The sale price of the television is $360.

1.) Determine the percent of change. Round to the nearest whole percent if necessary. State whether the percent of change is an INCREASE or DECREASE.

Original: 320
New: 288

2.) Determine the sale price to the nearest cent.

$65.00 headphones
30% off

3.) Determine the percent of change. Round to the nearest whole percent if necessary. State whether the percent of change is an INCREASE or DECREASE.

Original: 1,200
New: 1,560

4.) A laptop is marked 20% off the regular price of $775. What is the sale price?

5.) The price of gasoline increased from $3.49 per gallon to $3.91 per gallon. What was the percent of increase? Round to the nearest whole percent.

6.) A jacket regularly priced at $92 is on sale for $69. What is the percent of discount? Round to the nearest whole percent.

7.) A city's population was 42,800 last year. This year, the population is 45,684. What is the percent of increase in population? Round to the nearest whole percent.

8.) The number of students in a school decreased from 1,250 to 1,100. What is the percent of decrease in the number of students? Round to the nearest whole percent.

9.) The value of a house decreased from $285,000 to $237,975. What is the percent of decrease in the value of the house? Round to the nearest whole percent.

10.) A store increased the price of a video game from $45 to $53.10. What is the percent of increase in the price? Round to the nearest whole percent.

Show your work! Write using pencil only ! No pens

Unit: Knowledge of Number Relationships & Computation

Objective: Determine rate of increase and decrease, discounts, simple interest, commission, sales tax. - B

Examples:

- **SALES TAX is a percent of the purchase price and is an amount paid in addition to the purchase price.**

Determine the total price of a $17.55 soccer ball if the sales tax is 6%.

Determine the sales tax by changing % to a decimal and multiply. $17.55 \bullet 0.06 = 1.0530$ (TAX)

Add price and tax to determine the total price. $17.55 + 1.05 = 18.60$

- **COMMISSION is the amount a salesman/woman makes for selling items. To determine the amount of commission, change the % to a decimal and multiply by the total amount sold.**

Determine the commission for an RV salesman, whose sales for the month of March totaled $149,000. The salesman earns a 4% commission.

Change 4% to a decimal. $4\% = 0.04$ Multiply decimal and total sold. $0.04 \bullet 149{,}000 = 5{,}960$

The RV salesman/woman will make a total commission of $5,960 for the month of March.

- **SIMPLE INTEREST the amount of money paid or earned for the use of money. To determine simple interest I, use the formula I = prt. Principal p is the amount of money deposited or invested. Rate r is the annual interest rate written as a decimal. Time t is the amount of time the money is invested in years.**

Determine the simple interest earned in a savings account where $136 is deposited for 2 years if the interest rate is 7.5% per year.

$I = prt$ $I = 136 \bullet 0.075 \bullet 2$ $I = 20.40$ The simple interest earned is $20.40

1.) Jeremy wants to buy a skateboard but does not know if he has enough money. The price of the skateboard is $85 and the sales tax is 6%. What will be the total cost of the skateboard?

2.) Blake bought two magazines for $4.95 each. If the sales tax was 6.75%, what was the total amount that he paid for the magazines?

3.) How much interest will Hannah earn in 4 years if she deposits $630 in a savings account at 6.5% simple interest?

4.) You are a real estate agent. For every house you sell you earn 3.8% commission. This month you sold 2 houses that had a combined total of $560,950. How much commission will you earn?

5.) When Melissa was born, her parents put $8,000 into a college fund account that earned 9% simple interest. Determine the total amount in the account after 18 years.

6.) A car salesman earns 7% commission on his total sales this month. If he sells 2 cars at $15,670 each, and a truck at $25,995, how much commission will he earn? (hint: You need to find the total amount of sales first)

7.) A laptop computer has a price tag of $899. The store is offering a 12% discount. What is the sale price of the laptop to the nearest cent?

8.) You invest $1,250 in a savings account that pays 5.25% simple interest. How much simple interest will you earn after 3 years?

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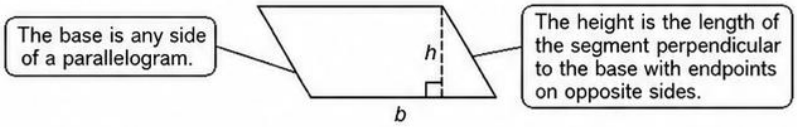
Unit: Knowledge of Measurement
Objective: Estimate and determine the area of quadrilaterals using **parallelograms** or trapezoids – A.

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.

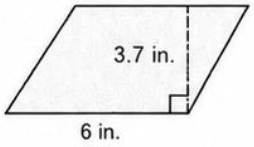
A = bh



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 $24\ in^2$

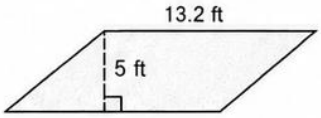
Calculate:
A = bh Area of a parallelogram
A = 6 · 3.7 Replace b with 6 and h with 3.7
A = 22.2 Multiply



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.

1.)



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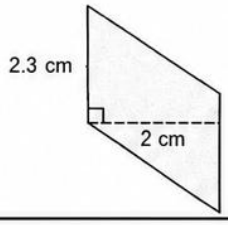

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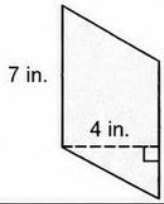
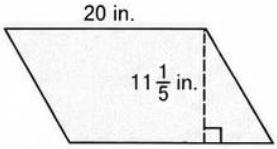
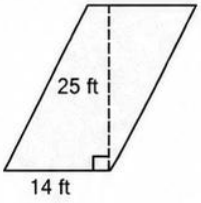


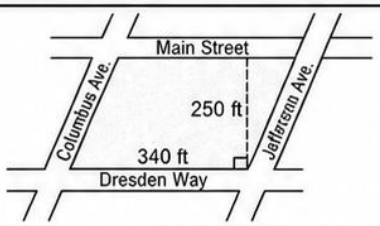
4.)



5.) Joyce wants to construct a sail with the dimensions shown. How much material will be used?



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?

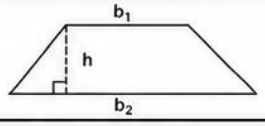


7.) A parallelogram-shaped garden has a base of 18.6 meters and a height of 9.5 meters. What is the area of the garden?

8.) The base of a parallelogram is $7\frac{3}{4}$ yards. The height is $5\frac{1}{3}$ yards. What is the area of the parallelogram?

Formula for Parallelogram:
$A = bh$
(b = base, h = height)

Formula for Trapezoid:
$A = \frac{1}{2}h(b_1 + b_2)$
(h = height, b_1 and b_2 are the lengths of the bases)



9.) Find the area of a trapezoid with bases of 16 cm and 24 cm and a height of 10 cm.

10.) Find the area of a trapezoid with bases of 8.5 ft and 15.2 ft and a height of 6.8 ft.

Show your work! Write using pencil only ! No pens

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. **$x - 3 \leq 7$**
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.
7.) The difference between twice a number and 8 is greater than -3.	**8.)** Three times a number plus 5 is less than or equal to 20. $3x + 5 \leq 20$

Show your work! Write using pencil only ! No pens

Pre-Algebra – Summer Math Packet

CONTINUING PRACTICE – Inequalities (Page 2 of 2)

Unit: Knowledge of Algebra, Patterns, and Functions
Objective: Write equations and inequalities - B

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

Words	Symbols
n is greater than or equal to 8.	$n \geq 8$
p is less than 2.	$p < 2$
q is greater than 9.	$q > 9$
k is less than or equal to -3.	$k \leq -3$

Examples:

1) Twice a number minus 4 is greater than 12. $\mathbf{2n - 4 > 12}$
2) A number plus 7 is less than or equal to 3. $\mathbf{n + 7 \leq 3}$
3) The difference of a number and 5 is at least –2. $\mathbf{n - 5 \geq -2}$
4) Tickets cost \$8.75 each. How many tickets can you buy with \$70? $\mathbf{8.75t \leq 70}$

Write an inequality for each of the following:

1.) Seven times a number is greater than 42.

2.) The difference of a number and 9 is at least 4.

3.) 18 added to a number is less than or equal to 26.

4.) Four dollars more than three times a number is less than 19.

5.) In a movie theater, student tickets are \$6.50 each. Write an inequality to show how many student tickets, s, you can buy with at most \$50.

6.) A smoothie costs \$5.25 and a sandwich costs \$7.99. Write an inequality to find how many sandwiches, w, you can buy if you have \$40 after buying one smoothie.

7.) The quotient of a number and 4 is greater than –3.

8.) Five less than twice a number is less than 11.

9.) The product of a number and –7 is at most 63.

10.) Two more than a number is greater than or equal to –5.

Show your work! Write using pencil only ! No pens

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

- 21 = - 3y	Write the equation
- 3 = - 3	Divide each side by – 3
7 = y	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
3x = 21	Simplify
3 3	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

x – 9 = -12	*Write the equation*
+ 9 = + 9	*Add 9 to both sides*
x = -3	*Simplify*

x = -3

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?

7.) A movie streaming service charges $8.99 per month plus $1.50 for each rental. If your total bill for the month is $23.99, how many rentals did you make?

8.) The temperature in a freezer is -4°F. After the door is opened, the temperature rises 1.5°F each minute. After how many minutes will the temperature be 8°F?

Show your work! Write using pencil only ! No pens

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

Divide each side by 2

$x < 8$ 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 $4x - 6 > -10$

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.

Let t = time in hours.

Distance = rate × time

$105 \leq 70t$ Write the inequality (at or below)

$\frac{105}{70} \leq \frac{70t}{70}$ Divide each side by 70

$1.5 \leq t$

It will take at least 1.5 hours.

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?

7.) A concert ticket costs \$45. You have a gift card with \$200 on it. Parking at the venue costs \$15. Write and solve an inequality to find how many concert tickets you can buy.

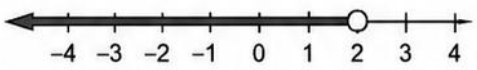
8.) A recipe calls for at least 2 eggs for every 3 cups of flour. If you use 12 cups of flour, write and solve an inequality to find the minimum number of eggs needed.

Show your work! Write using pencil only ! No pens

Unit: Knowledge of Algebra, Patterns, and Functions
Objective: Identify or graph solutions of inequalities on a number line.

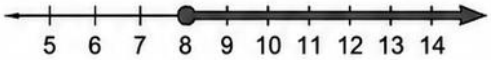
Examples: Graph each inequality on a number line.

x < 2



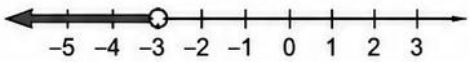
The open circle means that the number is **not** included in the solution.

y ≥ 8



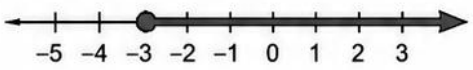
The closed circle means that the number is included in the solution.

m < −3

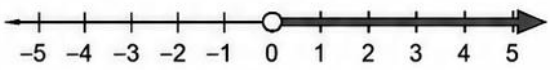


The solution is all numbers less than negative three.
-3 is **not** included in the solution.

1.) Write an inequality for the graph.

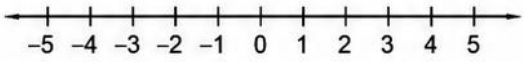


2.) Write an inequality for the graph.



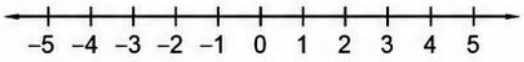
3.) Graph the inequality.

b ≥ −1



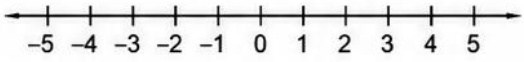
4.) Graph the inequality.

z < 3



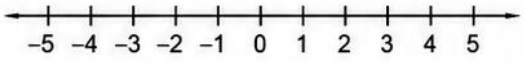
5.) Solve the inequality, then graph it on the number line.

y + 9 ≤ 13

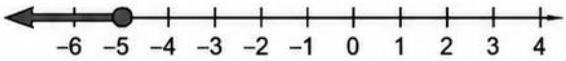


6.) Solve the inequality, then graph it on the number line.

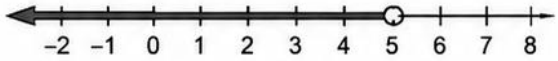
4x − 6 > −10



7.) Write an inequality for the graph.

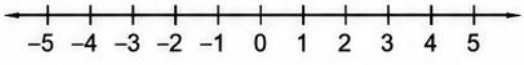


8.) Write an inequality for the graph.



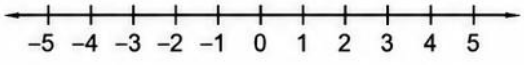
9.) Graph the inequality.

w ≤ −2



10.) Graph the inequality.

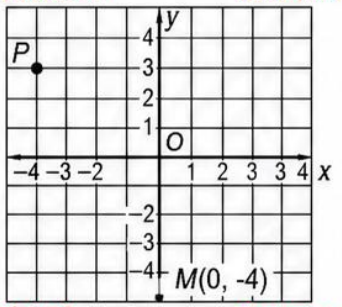
p > 1



Show your work! Write using pencil only ! No pens

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**.

Quadrant 2 Quadrant 1



Quadrant 3 Quadrant 4

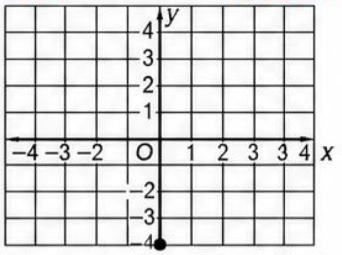
Example 1: Name the ordered pair for point P. Then identify the quadrant in which P lies.

- 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.

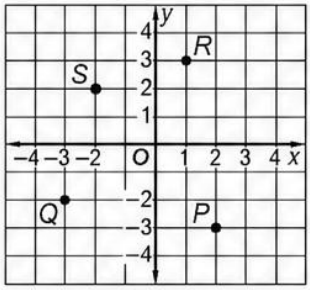
Example 2: Graph and label the point M (0, -4).

- 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).



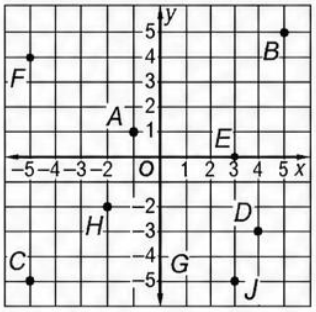
1.) Name the ordered pair for each point graphed at the right. Then identify the quadrant in which each point lies.

	Coordinates	Quadrant
P	(2 , -3)	IV
Q	(-3 , -2)	III
R	(1 , 3)	I
S	(-2 , 2)	II



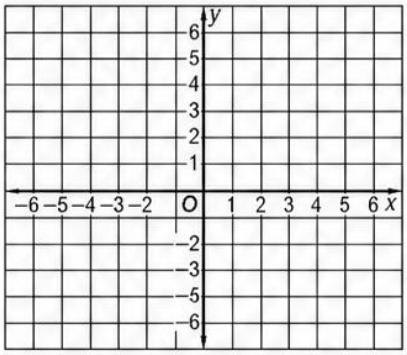
2.) Find each of the points below on the coordinate plane. Then identify the quadrant in which each point lies.

	Coordinates	Quadrant
A	(___, ___)	____
J	(___, ___)	____
B	(___, ___)	____
H	(___, ___)	____



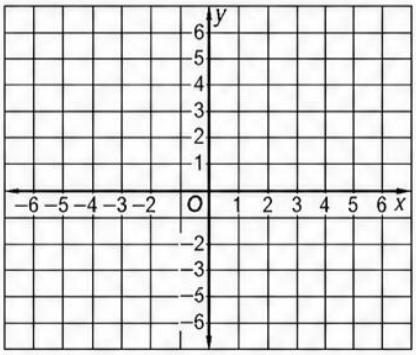
3.) Graph and label each point on the coordinate plane.

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)



Show your work! Write using pencil only ! No pens

Pre-Algebra – Summer Math Packet

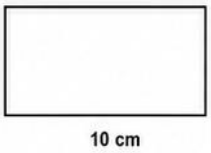
Unit: Knowledge of Algebra, Patterns, and Functions

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.

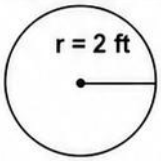


P = 2L + 2W	Write the equation
P = 2(10) + 2(8)	Replace L and W with the length and width
P = 20 + 16	Multiply
P = 36 cm	Simplify and add the correct label

Example 2:

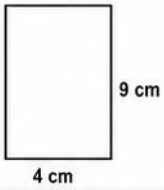
The area **A** of a circle equals the product of pi **(π)** and the square of its radius **(r)**. **$A = \pi r^2$** **($\pi \approx 3.14$)**

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

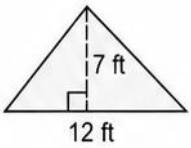


$A = \pi r^2$	Write the equation
$A = 3.14 \cdot (2)^2$	Replace π with 3.14 and r with 2
$A = 3.14 \cdot 4$	Square the 2
$A = 12.56$ ft^2	Simplify and add the correct label

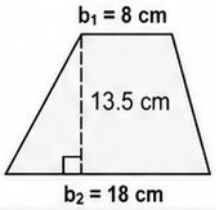
1.) The formula for finding the area of a rectangle is **A = L • W**. Use this formula to find the area of the rectangle.



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

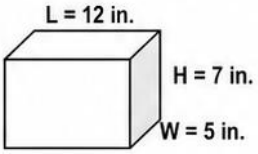


3.) A trapezoid has two bases (b_1 and b_2). The formula for finding the area of a trapezoid is: $A = \frac{1}{2}h(b_1 + b_2)$



Find the area of the trapezoid.

4.) The formula for finding the volume of a rectangular prism is **V = L • W • H**. Find the volume of the box.



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 = πd**. Use this formula to find out how far Juan ran.

7.) A triangular sign has a base of 15 cm and a height of 20 cm. Use the formula **$A = \frac{1}{2}bh$** to find the area of the sign.

8.) A cylindrical can has a diameter of 10 cm and a height of 15 cm. The formula for the volume of a cylinder is **$V = \pi r^2 h$**. Use $\pi \approx 3.14$ to find the volume of the can. (The radius r is half the diameter.)