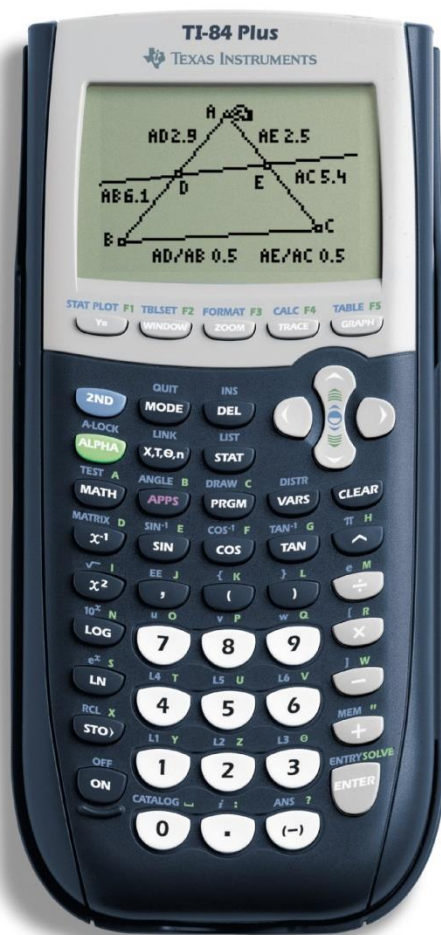


Summer Review for Students

Entering Algebra 1

1. Order of Operations
2. Evaluating Expressions
3. Solving Equations
4. Proportions
5. Diamond Problems



All Algebra students are required to have a TI 84-Plus Graphing Calculator for this course.

The calculator will be used throughout this course, on the Algebra Keystone Exam, and in future math courses.

Please keep your eyes open for sales and purchase one before school begins.

This packet will be collected the 2nd day of class AND you will be given a quiz on the material, sometime within the first two weeks of school.

Order of Operations → When simplifying expressions, it is important to follow Order of Operations. The order of operations is listed below.

G

Grouping Symbols – There are several types of grouping symbols, including parentheses (), brackets [], absolute value bars | |, square root symbols $\sqrt{\quad}$, and fraction bars $\frac{\quad}{\quad}$.

- Always simplify what's inside the grouping symbol before getting rid of it.

E

Exponents – Simplify exponents. Remember, there is a difference between

$$-3^2 \quad \text{and} \quad (-3)^2$$

MD

Multiplication and Division – If a problem involves both multiplication and division, always simplify from left to right (whichever one is written first, gets simplified first).

AS

Addition and Subtraction – If a problem involves both addition and subtraction, always simplify from left to right (whichever one is written first, gets simplified first).

ORDER OF OPERATIONS – Simplify each expression using order of operations. SHOW ALL WORK.

1. $6 + 3 \cdot (7 - 3 \cdot 2)$

2. $(3 - 5)^2 + \sqrt{10 + 3 \cdot 5}$

3. $16 \div 2 \cdot 4$

4. $\frac{3 \cdot 2^2 + 8 \div (5 - 3)}{9 - 5}$

5. $\frac{13 + 12}{8 - 3} + |-4 + 6|$

6. $16 - 2^3 + |3 - 8|$

Evaluating Expressions → When evaluating expressions, substitute the value of the variable into the expression and simplify the expression by following order of operations.

** When substituting, always put the number you are substituting in parenthesis ().

EXAMPLE: Evaluate $3x^2 + \frac{3+y}{z}$ for $x = -4, y = 8, \text{ and } z = -2$.

$$3(-4)^2 + \frac{3+(8)}{(-2)} \quad \text{GROUPING SYMBOLS}$$

$$3(-4)^2 + \frac{11}{-2} \quad \text{EXPONENTS}$$

$$3(16) + \frac{11}{-2} \quad \text{MULTIPLY \& DIVIDE (LEFT \rightarrow RIGHT)}$$

$$\begin{array}{l} 48 + \frac{11}{-2} \\ 48 + (-5.5) \quad \text{ADD} \\ \boxed{42.5} \end{array}$$

EVALUATING EXPRESSIONS – Evaluate each expression. SHOW ALL WORK.

$$x = 12 \quad y = -2 \quad z = 4$$

7. $2x^2 + 3y^2$

8. $z^3 + y^2$

9. $\frac{2x}{5y}$

10. $x + |y + z|$

11. $|x + |y|| + \sqrt{z}$

12. $\sqrt{2x - y - 1} + (3y)^2$

Solving Equations → Although there are many ways to solve an equation, following the steps below will reduce both the amount of work that you need to do and the chances of making a mistake.

STEP 1: Combine like terms on the left side of the equation.

STEP 2: Combine like terms on the right side of the equation.

STEP 3: Bring your variables to the same side of the equation, by adding or subtracting.

STEP 4: Isolate the variable, by adding or subtracting the constant.

STEP 5: Divide by the coefficient to find the value of the variable.

EXAMPLE: Solve: $3x(-4) + 2x(-3) = 4x + 2x - 5 + 8$

$$5x - 7 = (4x + 2x) - 5 + 8$$

$$\begin{array}{r} 5x - 7 = 6x + 3 \\ -5x \qquad -5x \end{array}$$

$$\begin{array}{r} -7 = 1x + 3 \\ -3 \qquad -3 \end{array}$$

$$\frac{-10}{1} = \frac{1x}{1}$$

$$\boxed{-10 = x}$$

ALWAYS INCLUDE THE SIGN IN FRONT OF EACH TERM. IT TELLS YOU WHAT TO DO

** Sometimes the variables may cancel out and you get two **different numbers** on each side of the equal sign (for example, $2 = 4$). If this happens, there is **no solution** to the problem.

** Sometimes the variables may cancel out and you get the **same number** on each side of the equal sign (for example, $3 = 3$). If this happens, the solution is **all real numbers**.

SOLVING EQUATIONS. Solve each equation. SHOW ALL WORK.

13. $2x + 3 = -x + 8$

14. $3x + 2 - 5x = 2x - 7 + 1$

15. $\frac{1}{2}x - 3 = 7$

$$16. \frac{2}{5}x + \frac{1}{3} = 1$$

$$17. 4x - 2 + 8 = 3x + 6 + x$$

$$18. 6x - 2 - 4x + 8 = 2x + 5$$

$$19. 3x + 6x - 2 + 8 = 3x - 10 + 2x + 1$$

$$20. 6x + 2 - 4x + 8 = 3x - x + 5$$

Solving Proportions → A proportion is two equal fractions. To solve a proportion, simply cross multiply and the products will be equal. Lastly, isolate the variable.

EXAMPLE: $\frac{4x}{3} = \frac{2}{5}$

$$(2)(3) = (4x)(5)$$

$$\frac{6}{20} = \frac{20x}{20}$$

$$\frac{3}{10} = x$$

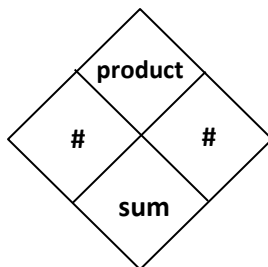
SOLVING EQUATIONS. Solve each equation. SHOW ALL WORK.

$$21. \frac{4}{9} = \frac{x}{10}$$

$$22. \frac{3x}{8} = \frac{6}{5}$$

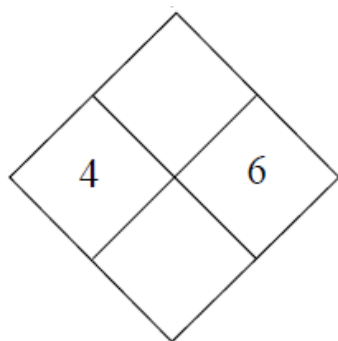
$$23. \frac{4}{5} = \frac{8}{2x}$$

Diamond Problems → In a Diamond Problem, you need to find the missing two numbers in the diamond, such that:

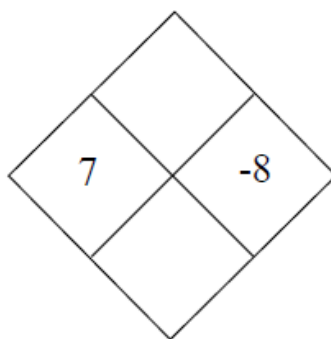


DIAMOND PROBLEMS. Complete each diamond.

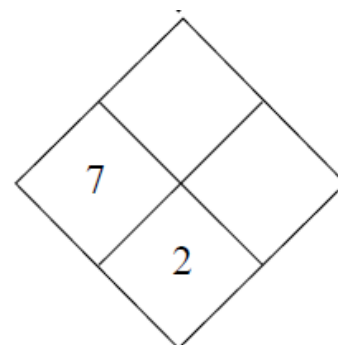
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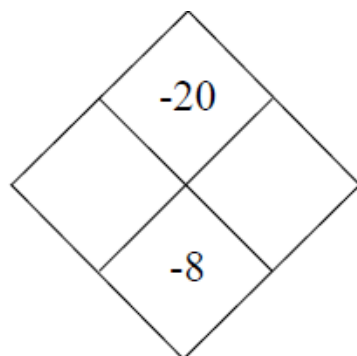
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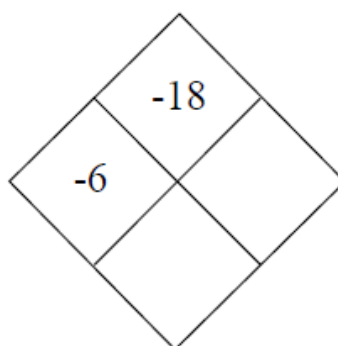
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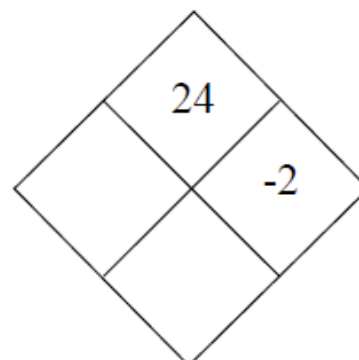
27.



28.



29.



SOLUTIONS:

- | | | | | |
|---------------------------------------|-----------------|------------------------------|--------------------------------|------------------------------|
| 1. 9 | 2. 9 | 3. 32 | 4. 4 | 5. 7 |
| 6. 13 | 7. 300 | 8. 68 | 9. -2.4 | 10. 14 |
| 11. 16 | 12. 41 | 13. $x = \frac{5}{3}$ | 14. $x = 2$ | 15. $x = 20$ |
| 16. $x = \frac{5}{3}$ | 17. All real #s | 18. No solution | 19. $x = -3.75$ | 20. No solution |
| 21. $x = \frac{40}{9}$ or $4.\bar{4}$ | 22. $x = 3.2$ | 23. $x = 5$ | 24. Top = 24
Bottom = 10 | 25. Top = -56
Bottom = -1 |
| 26. Top = -35
Right = -5 | 27. -10 and 2 | 28. Right = 3
Bottom = -3 | 29. Left = -12
Bottom = -14 | |