

Name: _____

Matrix Madness | 1.6H

Solve the following equations for the unknown variable.

1. $3(2x + 1) = 2(x + 3) + 3x$

$x = 3$

2. $2(2x + 3) + 5(x + 4) = 4(2x + 5) + 8$

$x = 2$

Decide which of the two expressions is greater, if the expressions are equal, or if the relationship cannot be determined from the statement. Write an equation or inequality that shows your answer. Explain why your answer is correct.

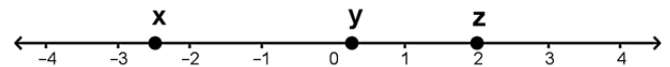
3. Statement: $10 - 2x < 6$
Which is greater? x or 2

$x > 2$

4. Statement: n is an integer
Which is greater? n or $-n$

Cannot be determined; If n is positive, then $n > -n$, if n is negative then $n < -n$.

5. Statement: Given the number line at right
Which is greater? 1 or yz



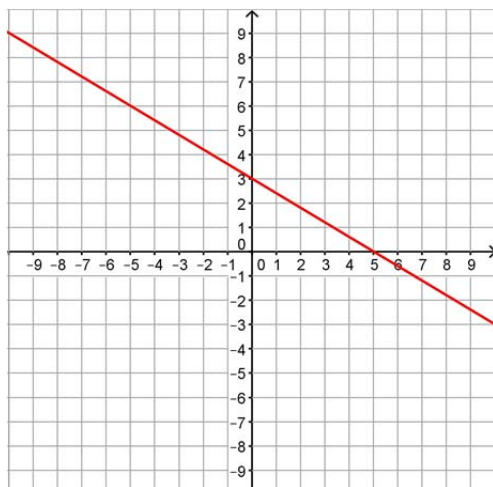
It appears $1 > yz$, since it looks as if $y < \frac{1}{2}$

State the slope and y-slope intercept. Then graph each line.

6. $3x + 5y = 15$

slope: $-\frac{3}{5}$

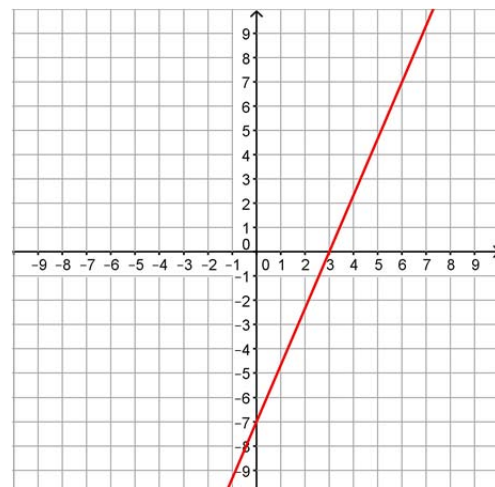
y-intercept: $(0, 3)$



7. $7x - 3y = 21$

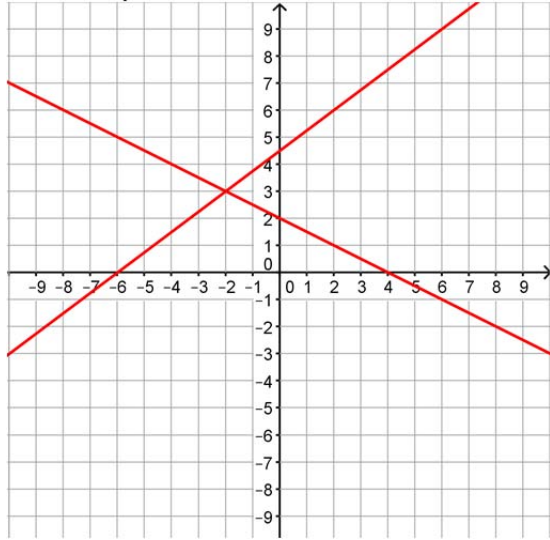
slope: $\frac{7}{3}$

y-intercept: $(0, -7)$



Solve linear equations and pairs of simultaneous linear equations (simple, with a graph only). Justify the solution numerically.

8.
$$\begin{cases} 4x + 8y = 16 \\ -3x + 4y = 18 \end{cases}$$



$(-2, 3)$

Write the equation that describes the situation. Then answer any additional questions.

9. A machine salesperson earns a base salary of \$40,000 plus a commission of \$300 for every machine he sells. Write an equation that shows the total amount of income the salesperson earns, if he sells x machines in a year.

$y = 40000 + 300x$

10. At a school play, children's tickets cost \$3 each and adult tickets cost \$7 each. The total amount of money earned from ticket sales equals \$210.

- a. Write a linear model that relates the number of children's tickets sold to the number of adult tickets sold.

$3c + 7a = 210$

- b. How many children's tickets were sold if 24 adult tickets were sold?

14 children's tickets

11. Conner has \$25,000 in his bank account. Every month he spends \$1,500. He does not add money to the account.

- a. Write a linear model that shows how much money will be in the account after x months.

$y = 25000 - 1500x$

- b. How much money will Conner have in his account after 8 months?

\$13,000

12. Solve the following equation to isolate B : $A = 2\pi rh + 2B$

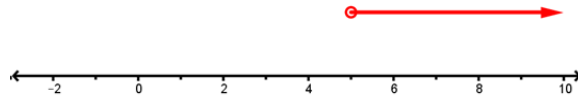
$$B = \frac{A - 2\pi rh}{2}$$

Solve each inequality and write your answers in both inequality and interval notations.. Graph the solutions on the number line AND state 3 numbers in the solution set for each inequality.

13. $4(x + 5) - 13 > 2x + 17$

$$x > 5$$

$$(5, \infty)$$

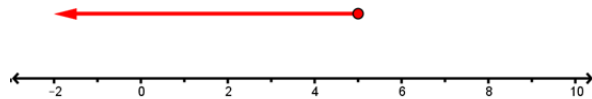


3 numbers in the solution set: **answers vary**

14. $-7y + 1 \geq -29 - 2y$

$$y \leq 6$$

$$(-\infty, 6]$$

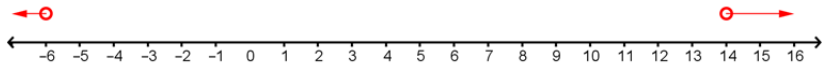


3 numbers in the solution set: **answers vary**

15. $|4 - x| > 10$

$$x > 14 \text{ or } x < -6$$

$$(-\infty, -6) \text{ or } (14, \infty)$$

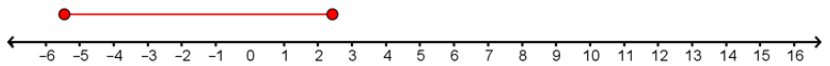


16. $|2x + 3| \leq 8$

$$x \leq 2.5 \text{ and } x \geq -5.5$$

$$\text{OR } -5.5 \leq x \leq 2.5$$

$$[-5.5, 2.5]$$



Answer the following questions on matrices.

17. If matrix A has dimensions 2×3 and matrix B has dimensions 3×1 what would be the dimensions of the product matrix?

$$2 \times 1$$

18. Are the matrices $A = \begin{bmatrix} 2 & 4 \\ 8 & 6 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 2 \\ 4 & 3 \end{bmatrix}$ equal? If not, what is one way to make them equal?

$$\text{They are not equal. } \frac{1}{2}A = B \text{ or } A = 2B$$

19. What has to be true about two matrices in order to add them?

They must have the same dimensions

20. Given $A = \begin{bmatrix} 1 & -2 \\ 3 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 5 & 0 \\ -7 & 3 \end{bmatrix}$ answer the following:

a. $A + B$

$$\begin{bmatrix} 6 & -2 \\ -4 & 7 \end{bmatrix}$$

b. $B + A$

$$\begin{bmatrix} 6 & -2 \\ -4 & 7 \end{bmatrix}$$

c. $A \cdot B$

$$\begin{bmatrix} 19 & -6 \\ -13 & 12 \end{bmatrix}$$

d. $B \cdot A$

$$\begin{bmatrix} 5 & -10 \\ 2 & 26 \end{bmatrix}$$

e. What does this show about the commutative properties of matrices?

Commutative Property of Addition holds true for matrices while the Commutative Property of Multiplication does not.

21. Use the following matrices:

$$A = \begin{bmatrix} 7 & 6 \\ 2 & 4 \\ 0 & 3 \end{bmatrix}$$

$$B = \begin{bmatrix} 5 & 9 \\ 1 & 2 \end{bmatrix}$$

$$C = \begin{bmatrix} 3 & 8 \\ 6 & 9 \end{bmatrix}$$

$$D = [-1 \quad -2 \quad -3]$$

a. Which product exists, AB or BA ?

AB

b. Which product exists, AD or DA ?

DA

c. Find BC

$$\begin{bmatrix} 69 & 121 \\ 15 & 26 \end{bmatrix}$$

d. Find $B - 3C$

$$\begin{bmatrix} -4 & -15 \\ -17 & -25 \end{bmatrix}$$

e. Calculate $2B - BC$

$$\begin{bmatrix} -59 & -103 \\ -13 & -22 \end{bmatrix}$$

f. Calculate DA

$$[-11 \quad -23]$$

22. A florist creates three special floral arrangements. One uses three lilies. The second uses three lilies and four carnations. The third uses four daisies and three carnations. Lilies cost \$2.15 each, carnations cost 90 cents each and daisies cost \$1.30 each. Write a matrix to represent the number of each type of flower in each arrangement. Write a matrix to represent the cost of each type of flower. Find the matrix representing the cost of each floral arrangement.

$$\begin{bmatrix} 3 & 0 & 0 \\ 3 & 4 & 0 \\ 0 & 3 & 4 \end{bmatrix} \cdot \begin{bmatrix} 2.15 \\ 0.90 \\ 1.30 \end{bmatrix} = \begin{bmatrix} 6.45 \\ 10.05 \\ 7.90 \end{bmatrix}$$

The first arrangement cost \$6.45, the second \$10.05, and the third \$7.90