

Assessment #3 Review – Linear Equations

DIRECTIONS: Solve the following equations for the specified variable.

1. $\frac{x-c}{2} = d$, for x

$$2 \cdot \frac{x-c}{2} = d \cdot 2 \rightarrow \boxed{x = 2d + c}$$

$$x - \frac{c}{2} = 2d$$

$$x - \frac{c}{2} + \frac{c}{2} = 2d + \frac{c}{2}$$

2. $r = \frac{wp}{w}$, for p

$$\boxed{\frac{r}{w} = p}$$

3. $7a - b = 15a$, for a

$$7a - 15a = b$$

$$\frac{-8a}{-8} = \frac{b}{-8} \rightarrow \boxed{a = \frac{b}{-8}}$$

4. $d + 3n = 1$, for n

$$-d \quad -d$$

$$\frac{3n}{3} = \frac{1-d}{3} \rightarrow \boxed{n = \frac{1-d}{3}}$$

DIRECTIONS: Determine if the following equations are linear (write yes or no). If yes, rewrite the equation in standard form. If no, explain what is preventing the equation from being written in standard form.

5. $y = 2x - 3$ yes $y = 2x - 3$
 ~~$y = 2x - 3$~~ $-2x \quad -2x$
 $\boxed{y - 2x = -3}$

6. $7 + xy = 8$ no

there are two variables being multiplied together

7. $3y = -1 + 11x$
 $-11x \quad -11x$

$$3y - 11x = -1$$
 yes

8. $4x - 5 = y^2$

no because y is raised to a power of 2

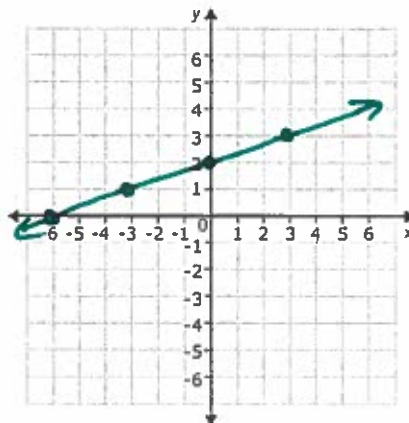
Directions: For #9-10, create a table by (1) solving the given equation for y and (2) generating 4 coordinates using the x -values given. Then, graph the coordinates.

9. $3y - x = 6$

$$+x \quad +x$$

$$3y = 6 + x \rightarrow y = \frac{6+x}{3}$$

x	$\frac{6+x}{3}$	y	(x, y)
-6	$\frac{6+(-6)}{3} = \frac{0}{3}$	0	(-6, 0)
-3	$\frac{6+(-3)}{3} = \frac{3}{3}$	1	(-3, 1)
0	$\frac{6+(0)}{3} = \frac{6}{3}$	2	(0, 2)
3	$\frac{6+(3)}{3} = \frac{9}{3}$	3	(3, 3)



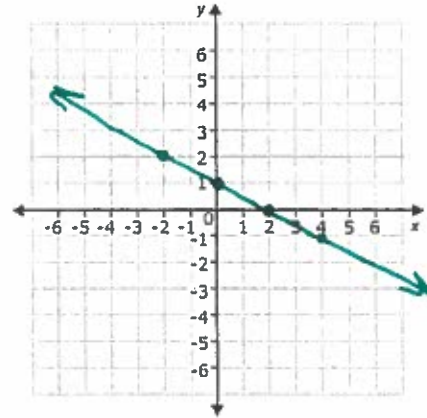
$$10. -1 = -y - \frac{1}{2}x$$

$$+y \quad +y$$

$$y - 1 = -\frac{1}{2}x \rightarrow y = -\frac{1}{2}x + 1$$

$$+1 \quad +1$$

x	$-\frac{1}{2}x + 1$	y	(x, y)
-2	$-\frac{1}{2}(-2) + 1 = 1 + 1$	2	(-2, 2)
0	$-\frac{1}{2}(0) + 1 = 0 + 1$	1	(0, 1)
2	$-\frac{1}{2}(2) + 1 = -1 + 1$	0	(2, 0)
4	$-\frac{1}{2}(4) + 1 = -2 + 1$	-1	(4, -1)



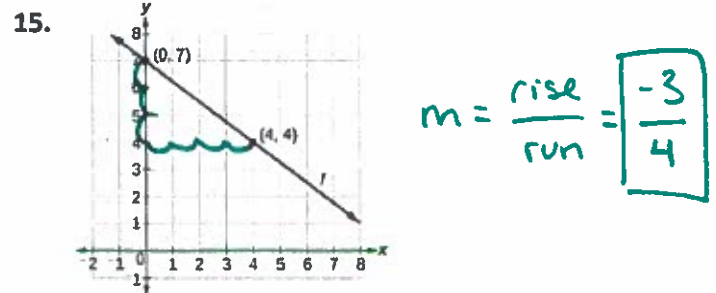
DIRECTIONS: For each of the following equations, calculate the x- and y-intercepts using algebra. Show all steps! (Be sure to label which intercept is which.)

	<u>x-INT (y=0)</u>	<u>y-INT (x=0)</u>
11. $3x - 2y = -6$	$3x - 2(0) = -6$ $3x = -6$ $x = -2 \rightarrow (-2, 0)$	$3(0) - 2y = -6$ $-2y = -6$ $y = 3 \rightarrow (0, 3)$
12. $y = -15 + 3x$	$0 = -15 + 3x$ $15 = 3x$ $x = 5 \rightarrow (5, 0)$	$y = -15 + 3(0)$ $y = -15 \rightarrow (0, -15)$

DIRECTIONS: For the following tables, graphs, or coordinates, calculate the slope.

13. (6, -7) and (4, -8)

$$m = \frac{-8 - (-7)}{4 - 6} = \frac{-1}{-2} = \boxed{\frac{1}{2}}$$



14.

x	y
4	3
8	3
12	3

$$m = \frac{3 - 3}{8 - 4} = \frac{0}{4} = \boxed{0}$$

DIRECTIONS: Calculate the missing value to ensure the two coordinates have the given slope.

16. (-5, 2) and (3, r) has a slope of $-\frac{1}{2}$

$$-\frac{1}{2} = \frac{r - 2}{3 - (-5)} \rightarrow \frac{-1}{2} = \frac{r - 2}{8}$$

$$2(r - 2) = -8$$

$$2r - 4 = -8 \rightarrow 2r = -4 \rightarrow r = -2$$

$\boxed{r = -2}$

17. (3, 2) and (r, -4) a slope of $\frac{3}{2}$

$$\frac{3}{2} = \frac{-4 - 2}{r - 3} \rightarrow \frac{3}{2} = \frac{-6}{r - 3}$$

$$-12 = 3(r - 3) \rightarrow -12 = 3r - 9 \rightarrow -3 = 3r \rightarrow r = -1$$

$\boxed{r = -1}$

Word Problem Party!

18. It is expected that 563 quadrillion thermal units of Btu (British thermal units) of energy will be consumed worldwide in 2015. In 2003, worldwide consumption was 421 quadrillion Btu. What is the expected rate of change in consumption from 2003 to 2015?

$$\frac{563 - 421}{2015 - 2003} = \frac{142}{12} = \frac{71}{6} = \boxed{11.83 \text{ Btu per year}}$$

19. **QUILTING** A sewing circle creates a certain number of quilts every year to sell at the state fair. Their quilt production can be represented by $y = x + 3$, where x is the number of years they have participated in the fair and y is the total number of quilts created that year. What is the y -intercept of this equation? Interpret it in context.

$$y = (0) + 3 \quad \star \text{The first year they participated}$$

$$y = 3 \rightarrow (0, 3) \quad \text{in the fair, they created 3 quilts.}$$

20. **PENGUINS** An emperor penguin travels a distance of 70 miles each year back to the place of its birth. If that same penguin moves at a speed of 2.4 miles per hour, the function $y = 70 - 2.4x$ represents its distance y from its birthplace x hours after it has started its journey home. What is the x -intercept of this equation? Interpret it in context.

$$0 = 70 - 2.4x \quad (29.17, 0)$$

$$-70 = -2.4x \quad \star \text{After 29.17 hours of traveling,}$$

$$x = 29.17 \quad \text{the penguin has arrived @ its place of birth}$$

21. **LONGEVITY** The graph shows the predicted life expectancy for men and women born in a given year.

- a. Find the rates of change for women from 2000-2025 and 2025-2050.

$$\frac{84 - 80}{2025 - 2000} = \frac{4}{25} = \boxed{.16} \quad \left| \quad \frac{87 - 84}{2050 - 2025} = \frac{3}{25} = \boxed{.12}$$

- b. Find the rates of change for men from 2000-2025 and 2025-2050.

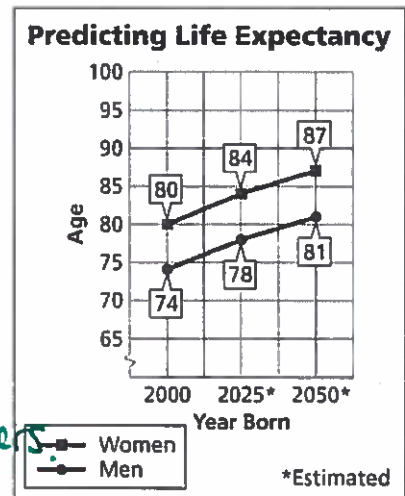
$$\frac{78 - 74}{2025 - 2000} = \frac{4}{25} = \boxed{.16} \quad \left| \quad \frac{81 - 78}{2050 - 2025} = \frac{3}{25} = \boxed{.12}$$

- c. Explain the meaning of your results in Exercises 1 and 2.

Though women's life expectancy is higher than men's, the two rates of increase are identical for both genders.

- d. Find the average annual rate of change in the life expectancy of women from 2000-2050.

$$\frac{87 - 80}{2050 - 2000} = \frac{7}{50} = \boxed{.14 \text{ years (in age) per year}}$$



Source: USA TODAY

22. In 2004, there were approximately 275 students in the Delaware High School band. In 2010, that number increased to 305. Find the annual rate of change in the number of students in the band.

$$\frac{305 - 275}{2010 - 2004} = \frac{30}{6} = \boxed{5 \text{ students per year}}$$

