Math 10C Worksheet
Linear Functions

Name: __KEY__

1. Determine the slope of pair of points.

    a. (2, 5) and (4, 10)

$$m = \frac{10-5}{4-2}$$
$$m = \frac{5}{2}$$

(Increasing)/ Decreasing/ Neither
Parallel m = $\frac{5}{2}$
Perependicular m = $-\frac{2}{5}$

    b. (-5, 7) and (3, -9)

$$m = \frac{-9-7}{3-(-5)}$$
$$m = \frac{-16}{8} \quad m = -2$$

Increasing/ (Decreasing)/ Neither
Parallel m = -2
Perependicular m = $\frac{1}{2}$

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    c. (2, 3) and (2, 10)

$$m = \frac{10-3}{2-2}$$
$$m = \frac{7}{0} \quad m = undefined$$

Increasing/ Decreasing/ (Neither)
Parallel m = $undefined$
Perependicular m = 0

    d. (5, 10) and (-3, 10)

$$m = \frac{10-10}{-3-5}$$
$$m = \frac{0}{-8} \quad m = 0$$

Increasing/ Decreasing/ (Neither)
Parallel m = 0
Perependicular m = $undefined$

2. State the slope and y intercept for each of the following.
    a. $y = -x + 7$

m = -1
b = 7

    b. $y = \frac{2}{3}x - 6$

m = $\frac{2}{3}$
b = -6

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    c. $7x + 3y = 21$

m = $\frac{-7}{3}$
b = 7

$$\frac{3y}{3} = \frac{-7x}{3} + \frac{21}{3}$$
$$y = -\frac{7}{3}x + 7$$

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3. State whether the pair of lines are parallel, perpendicular, or neither.

    a. $y = 2x - 5$ and $y = -\dfrac{1}{2}x + 6$

        $\perp$

    b. $y = 3x - 5$ and $y = -3x - 5$

        neither

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    c. $y = 7x - 4$ and $y = 7x + 3$

        $||$

    d. $y = 3x + 1$ and $y = 7x - 4$

        neither

4. Algebraically determine the x and y intercepts. (2 marks each)

    a. $y = 3x + 6$

$$y = 3(0) + 6$$
$$\boxed{y = 6}$$

$$0 = 3x + 6$$
$$-6 \qquad -6$$
$$\frac{-6}{3} = \frac{3x}{3}$$
$$\boxed{-2 = x}$$

    b. $y - 9 = \dfrac{2}{3}(x + 6)$

$$y - 9 = \frac{2}{3}(0 + 6)$$
$$y - 9 = \frac{2}{3}(6)^2$$
$$y - 9 = 4 \qquad \boxed{y = 13}$$
$$+9 \quad +9$$

$$0 - 9 = \frac{2}{3}(x + 6)$$
$$3 \times -9 = \cancel{3} \times \frac{2}{\cancel{3}}(x + 6)$$
$$-27 = 2x + 12$$
$$-12 \qquad -12$$

    c. $2x - 3y - 18 = 0$

$$2(0) - 3y - 18 = 0$$
$$-3y = 18$$
$$\frac{-3y}{-3} = \frac{18}{-3}$$
$$\boxed{y = -6}$$

$$2x - 3(0) - 18 = 0$$
$$\frac{2x}{2} = \frac{18}{2}$$
$$\boxed{x = 9}$$

$$\frac{-39}{2} = \frac{2x}{2}$$
$$\boxed{\frac{-39}{2} = x}$$

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5. Graph $y = \dfrac{1}{2}x - 4$

$m = \dfrac{1}{2}$ OR $\dfrac{-1}{-2}$

y – intercept = -4
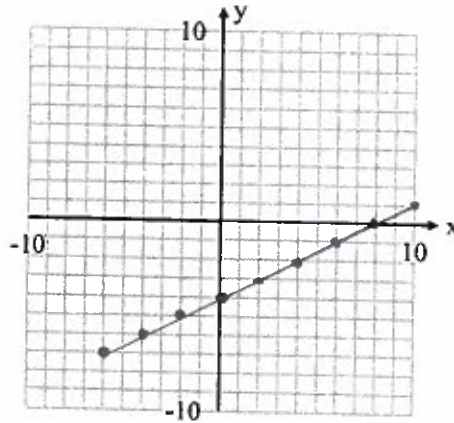
6. Convert each equation to general form.
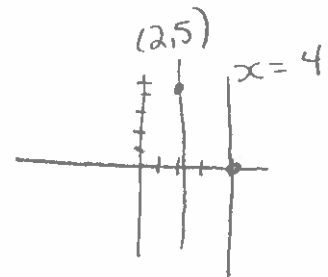
a. $y = 2x - 7$

$2x - y - 7 = 0$

b. $(y-5) = \dfrac{\cancel{8} \times 1}{8}(x-3)$

$8(y-5) = x - 3$

$8y - 40 = x - 3$
$-8y \qquad +40$
$\quad +40$

$x - 8y + 37 = 0$

7. The equation of the line containing (2, 5) and parallel to x = 4 is

$x = 2$

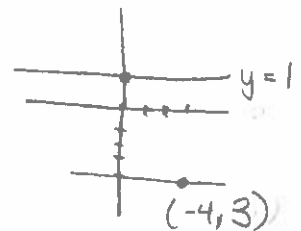8. The equation of the line containing (– 4, 3) and parallel to y = 1 is

$m = 0$
$y = mx + b$
$3 = -4(0) + b$
$3 = b$

$y = 3$

9. Sketch and increasing, decreasing, undefined, and zero slope line.

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Increasing   Decreasing   undefined   Zero

10. Write the equation of a new line in Point-slope form, given that it passes through the point (2, 3) and is parallel to $y = 4 - 2x$

$$Y - Y_1 = m(x - x_1)$$ $$m = -2$$

2    $$Y - 3 = -2(x - 2)$$

11. Write the equation of a new line in Point-slope form, given that it passes through the point (-5, 2) and is perpendicular to $2x - 5y + 2 = 0$

$$Y - Y_1 = m(x - x_1)$$

2    $$Y - 2 = -\frac{5}{2}(x + 5)$$

$$\frac{5y}{5} = \frac{2x + 2}{5}$$

$$y = \frac{2}{5}x + \frac{2}{5}$$

$$m = \frac{2}{5} \perp -\frac{5}{2}$$

12. Write the equation of a new line in slope y-intercept form, given that it passes through the point (0, 4) and is perpendicular to $y + 3 = -2(x + 6)$

$y = mx + b$ $m = -2 \perp \frac{1}{2}$

$y = \frac{1}{2}x + 4$

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13. Write the equation of a new line in general form, given that it passes through the point (3, -2) and is parallel to $3x - 2y + 10 = 0$

$Ax + By + C = 0$ $\frac{2}{2}y = \frac{3x}{2} + \frac{10}{2}$

2 $2(y + 2) = \frac{3}{2}(x - 3)$ $y = \frac{3}{2}x + 5$

$\frac{2y + 4 = 3x - 9}{-2y \quad -4}$ $m = \frac{3}{2} \parallel \frac{3}{2}$

$3x - 2y - 13 = 0$

14. Write the equation of a new line in general form, given that it passes through the point (4, 10) and is perpendicular to $5x - y + 3 = 0$

$Ax + By + C = 0$ $y = 5x + 3$

2 $5(y - 10) = \frac{-1}{5}(x - 4)$ $m = \frac{5}{1} \perp \frac{-1}{5}$

$5y - 50 = -x + 4$

$x + 5y - 54 = 0$

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