Linear Functions

Key Ideas:

1. **Distance and Midpoint**
   - **label your points** $(x_1, y_1), (x_2, y_2)$
2. **Parallel / Perpendicular Slopes**
   - **parallel (same), perpendicular (negative reciprocals)**
3. **Forms of the Equation**
   - **slope-intercept form**
   - **slope-point form**
   - **general form (no fractions or decimals!)**

***Note:** **Substitute into formulas carefully! Watch your positive and negative signs!!**

1. Calculate the ***distance*** from $A(6,-4)$ to $B(1,5)$:

$x_1\ y_1 \qquad x_2\ y_2$

$$d = \sqrt{(1-6)^2 + (5-(-4))^2}$$

$$= \sqrt{25 + 81}$$

$$= \sqrt{106}$$

9. Find the ***midpoint*** of $A(-5,3)$ and $B(-11,-7)$:

$x_1 \; y_1 \qquad x_2 \; y_2$

$$M = \left(\frac{-5+(-11)}{2}, \frac{3+(-7)}{2}\right)$$

$$= (-8, -2)$$

10. Determine the slope of a line ***perpendicular*** to: $3x - 5y + 10 = 0$

$$3x + 10 = 5y$$

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

$m = \frac{3}{5}$

$$m = \frac{-5}{3}$$

11. Write an equation for a line having: ***slope*** of $\frac{-3}{5}$, ***y-intercept*** of -8

$$y = \frac{-3}{5}x - 8$$

12. Write an equation for a line having: ***slope*** of 4, passing through $P(-2, 9)$

$$y - y_1 = m(x - x_1)$$
$$y - 9 = 4(x + 2)$$

13. Write an equation for a line: passing through $A(5, -1)$ and $B(-3, 4)$

$$m = \frac{4 - (-1)}{-3 - 5} = \frac{5}{-8}$$

$$y + 1 = -\frac{5}{8}(x - 5)$$

14. Write in ***general form***: $y - 2 = \frac{-2}{3}(x + 6)$

$$3y - 6 = -2x - 12$$
$$2x + 3y + 6 = 0$$

15. Write in ***general form***: ***parallel*** to $5y = 3x - 1$, passing through $P(8, -2)$

$$y = \frac{3}{5}x - \frac{1}{5}$$

(m)

$$\parallel m = \frac{3}{5} \quad (8, -2)$$

$$y + 2 = \frac{3}{5}(x - 8)$$
$$5y + 10 = 3x - 24$$
$$0 = 3x - 5y - 34$$