7.4 Linear Functions Day 2 Name _____

Write an equation for the perpendicular bisector of the line segment determined by each pair of points.

1. $(3,-5)$; $(-6,10)$

$x_1\ y_1\ \ x_2\ y_2$

$m = \frac{10+5}{-6-3} = \frac{15}{-9} = \frac{-5}{3}$ $\perp m = \frac{3}{5}$

Midpoint $\left(\frac{3+-6}{2}, \frac{-5+10}{2}\right)$

$\left(\frac{-3}{2}, \frac{5}{2}\right)$ (x_1, y_1)

Equation $y - \frac{5}{2} = \frac{3}{5}\left(x - \left(\frac{-3}{2}\right)\right)$

$y = \frac{3}{5}x + \frac{17}{5}$

2. $(-1,3)$; $(5,-3)$

$y = x - 2$

Write an equation of the line that is determined by the given conditions.

3. Contains the point $(4,-1)$ and is perpendicular to the line $2x - y = 4$.

flippin' opposite

$2x - y = 4$

$-2x \quad -2x$

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

$y = 2x - 4$ $\perp m = \frac{-1}{2}$

$x_1\ y_1$

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

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

$-1 \quad -1$

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

4. Contains the point $(-2,4)$ and is parallel to the line $x - 4y = 8$.

$y = \frac{1}{4}x + \frac{9}{2}$

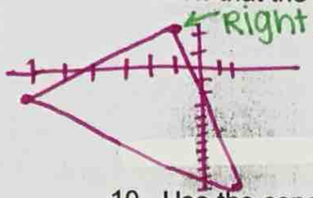
5. Contains the point $(-2,0)$ and is parallel to the line $x = 4$.

$x = -2$

6. Contains the point $(0,2)$ and is perpendicular to the line $y = 8$.

$x = 0$

7. Show that the triangle with vertices $(-1,2)$, $(-6,-2)$, and $(2,-12)$ is a right triangle.



Right Angle?

$(-1,2)$ and $(-6,-2)$ $\quad$ $(-6,-2)$ and $(2,-12)$

$m = \frac{4}{5}$ $\quad$ $m = \frac{-5}{4}$

slopes are perpendicular → right angle ✓

10. Use the concept of slope to determine whether the three points A: $(-1,2)$, B: $(2,4)$, and C: $(6,9)$ are collinear, that is, whether they all lie on the same line. SAME SLOPE BETWEEN ALL 3 POINTS

$m_{\overline{AB}} = \frac{2}{3}$ $\quad m_{\overline{BC}} = \frac{5}{4}$ $\quad m_{\overline{AC}} = 1$

NO

For #11-13, use the following information:
A house was purchased 8 years ago for $42,000. This year it was appraised at $67,500. Assume that the value V of the house changes linearly with time (t).

11. Find a linear equation that models this problem situation.

$(0, 42{,}000)$ and $(8, 67{,}500)$

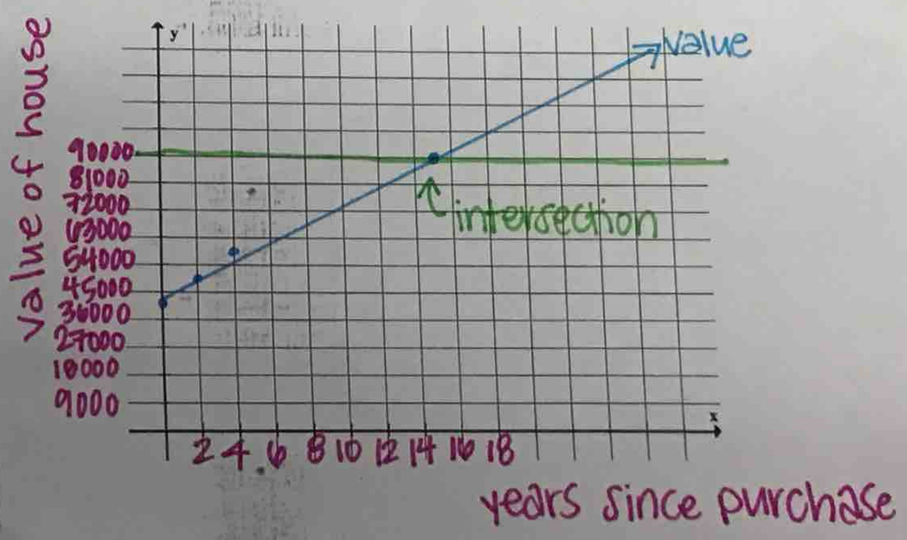
$V = 3187.5t + 42000$

12. Determine algebraically when this house will be worth $90,000.

$90000 = 3187.5t + 42000$

$-42000 \qquad -42000$

$\frac{48000}{3187.5} = \frac{3187.5t}{3187.5}$

About 15 years

13. Determine graphically when this house will be worth $90,000.