

# 7.4 Linear Functions Day 2

Hi

Warm-Up Thursday

Write the equation of the line. Put your answer in slope-intercept form.

**$m = 1/3$  passing through  $(-6, 4)$**

About Me

1. Summer or Winter Olympics?
2. Favorite Olympic event?

# 7.4.1 Linear Functions Day 2

How do I find the equation of the perpendicular bisector of a line segment?

EQ:

## Parallel vs. Perpendicular

// SAME SLOPES



SLOPES ARE  
OPPOSITE RECIPROCALS  
"flippin' opposites"

ex.  $m = 3$

$$\perp m = -\frac{1}{3}$$

# 7.4.1 Linear Functions Day 2

How do I find the equation of the perpendicular bisector of a line segment?

**EQ:**

a) Find the slope of a line which is parallel to the line  $x - 3y = 21$

① Solve for  $y$

② Find slope

③  $// \rightarrow$  same  
 $\perp \rightarrow$  flip/sign

$$\begin{aligned} x - 3y &= 21 \\ -x & \quad -x \\ \hline -3y &= -x + 21 \\ \frac{-3y}{-3} &= \frac{-x}{-3} + \frac{21}{-3} \\ y &= \frac{1}{3}x - 7 \end{aligned}$$

$$m = \frac{1}{3}$$

$$//m = \frac{1}{3}$$

# 7.4.1 Linear Functions Day 2

How do I find the equation of the perpendicular bisector of a line segment?

**EQ:**

- a) Find the equation of the line containing  $(3, -2)$  and parallel to the line  $y = 4$ .

$$m = 0$$

$$y = -2$$

HOY

- b) Find the equation of the line containing  $(3, -2)$  and perpendicular to the line  $x = -5$ .

$$m = \text{undefined}$$

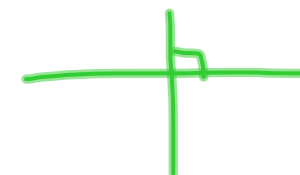
$$\frac{1}{0} \rightarrow \frac{0}{1}$$

$$+m = 0$$

$$y = -2$$

perpendicular

VUX



# 7.4.1 Linear Functions Day 2

**EQ:**

How do I find the equation of the perpendicular bisector of a line segment?

Find the equation of the perpendicular bisector of the line segment joining the points  $(-1, -3)$  and  $(4, 1)$ .

1) Find slope

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$m = \frac{1 + 3}{4 + 1} = \frac{4}{5}$$

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

2)  $\perp$  slope

3) Find midpoint

$$\left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

$$\left( \frac{-1 + 4}{2}, \frac{-3 + 1}{2} \right) \Rightarrow \left( \frac{3}{2}, -\frac{2}{2} \right)$$

$$\left( \frac{3}{2}, -1 \right)$$

4) Plug into point-slope

$$y - y_1 = m(x - x_1)$$

$$y + 1 = -\frac{5}{4} \left( x - \frac{3}{2} \right)$$

$$y + 1 = -\frac{5}{4}x + \frac{15}{8}$$

$$y = -\frac{5}{4}x + \frac{7}{8}$$

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

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

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  $2x - y = 4$ .

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

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

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

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

10. Use the concept of slope to determine whether the three points  $(-1, 2)$ ,  $(2, 4)$ , and  $(6, 9)$  are collinear, that is, whether they all lie on the same line.

**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.

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

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

