

Pick any 4 problems!

Finding Slope From Two Points

Find the slope of the line through each pair of points.

*≠ then the perpendicular slope!*

1)  $(19, -16), (-7, -15)$

2)  $(1, -19), (-2, -7)$

$$\frac{-16 - (-15)}{19 - (-7)} = \frac{-16 + 15}{19 + 7} = \frac{-1}{26}$$

$$m = -4$$
$$\perp m = \frac{1}{4}$$

$$m = -\frac{1}{26} \quad \perp m = 26$$

3)  $(-4, 7), (-6, -4)$

4)  $(20, 8), (9, 16)$

$$m = \frac{11}{2} \quad \perp m = -\frac{2}{11}$$

$$\frac{8 - 16}{20 - 9} = \frac{-8}{11}$$

$$m = -\frac{8}{11} \quad \perp m = \frac{11}{8}$$

5)  $(17, -13), (17, 8)$

$$\frac{-13 - 8}{17 - 17} = \frac{-21}{0}$$

$$\frac{N}{O} = \frac{O}{K}$$

6)  $(19, 3), (20, 3)$

$$\frac{3 - 3}{19 - 20} = \frac{0}{-1}$$

$$m = \text{undefined}$$
$$\perp m = 0$$

$$m = 0 \quad \perp m = \text{undefined}$$

7)  $(3, 0), (-11, -15)$

8)  $(19, -2), (-11, 10)$

$$m = \frac{15}{14} \quad \perp m = -\frac{14}{15}$$

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

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

$\perp m =$  negative reciprocal (Missy Elliott flip & reverse)

13) through: (2, -4), slope = -1

14) through: (2, 5), slope = undefined

15) through: (3, 1), slope =  $\frac{1}{2}$

16) through: (-1, 2), slope = 2

Pick any 4 problems from 17-24. Show work!

Write the point-slope form of the equation of the line described.

17) through:  $(x_1, y_1)$  (4, 2), parallel to  $y = -\frac{3}{4}x - 5$

$m = -\frac{3}{4}$   $\perp m = \frac{4}{3}$  point (4, 2)

$y - 2 = -\frac{3}{4}(x - 4)$

18) through: (-3, -3), parallel to  $y = \frac{7}{3}x + 3$

$y + 3 = \frac{7}{3}(x + 3)$

parallel = same slope

19) through: (-4, 0), parallel to  $y = \frac{3}{4}x - 2$

$y - 0 = \frac{3}{4}(x + 4)$

20) through:  $(x_1, y_1)$  (-1, 4), parallel to  $y = -5x + 2$

$m = -5$   $\perp m = \frac{1}{5}$  point (-1, 4)

$y - 4 = -5(x + 1)$

21) through:  $(x_1, y_1)$  (2, 0), parallel to  $y = \frac{1}{3}x + 3$

$m = \frac{1}{3}$   $\perp m = -3$  point (2, 0)

$y - 0 = \frac{1}{3}(x - 2)$

22) through: (4, -4), parallel to  $y = -x - 4$

$y + 4 = -1(x - 4)$

23) through: (-2, 4), parallel to  $y = -\frac{5}{2}x + 5$

$y - 4 = -\frac{5}{2}(x + 2)$

24) through:  $(x_1, y_1)$  (-4, -1), parallel to  $y = -\frac{1}{2}x - 1$

$m = -\frac{1}{2}$   $\perp m = 2$  point (-4, -1)

$y + 1 = 2(x + 4)$

point-slope:  $y - y_1 = m(x - x_1)$

point = (x, y)

Pick any three! SHOW WORK!

Solving Systems of Equations by Substitution

Solve each system by substitution.

1)  $y = 6x - 11$   
 $-2x - 3y = -7$

$x = 2$

$-2x - 3(6x - 11) = -7$   
 $-2x - 18x + 33 = -7$   
 $-20x + 33 = -7$   
 $-20x = -40$

$6(2) - 11$   
 $12 - 11$   
 $y = 1$   
 $(2, 1)$

2)  $2x - 3y = -1$   
 $y = x - 1$

$(4, 3)$

3)  $y = -3x + 5$   
 $5x - 4y = -3$

$(1, 2)$

4)  $-3x - 3y = 3$   
 $y = -5x - 17$

$-3x - 3(-5x - 17) = 3$   
 $-3x + 15x + 51 = 3$   
 $12x = -48$   
 $x = -4$   
 $-5(-4) - 17$   
 $-20 - 17$   
 $y = -37$

$(4, -37)$

5)  $y = -2$   
 $4x - 3y = 18$

$(3, -2)$

6)  $y = 5x - 7$   
 $-3x - 2y = -12$

$(2, 3)$

7)  $-4x + y = 6$   
 $-5x - y = 21$

$(-3, -6)$

8)  $-7x - 2y = -13$   
 $x - 2y = 11$

$-7(11 + 2y) - 2y = -73$   
 $-77 - 14y - 2y = -73$   
 $-16y = 4$   
 $y = -4$   
 $x = 11 + 2(-4)$   
 $x = 11 - 8 = 3$   
 $(3, -4)$

9)  $-5x + y = -2$   
 $-3x + 6y = -12$

$(0, -2)$

10)  $-5x + y = -3$   
 $3x - 8y = 24$

$(0, -3)$



Pick any 4 from 9-20! Show work!

Find the midpoint of the line segment with the given endpoints.

9)  $(-4, 4), (5, -1)$

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

10)  $(-1, -6), (-6, 5)$

$$\left( -\frac{7}{2}, -\frac{1}{2} \right)$$

11)  $(2, 4), (1, -3)$

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

12)  $(-4, 4), (-2, 2)$

$$\left( \frac{-4-2}{2}, \frac{4+2}{2} \right) = \left( -\frac{6}{2}, \frac{6}{2} \right) = (-3, 3)$$

13)  $(5, 2), (-4, -3)$

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

14)  $(-1, 1), (5, -5)$

$$(2, -2)$$

15)  $(2, -1), (-6, 0)$

$$(-2, -\frac{1}{2})$$

16)  $(-3.1, -2.8), (-4.92, -3.3)$

$$\left( \frac{-3.1-4.92}{2}, \frac{-2.8-3.3}{2} \right) = (-4.01, -3.05)$$

17)  $(-5.1, -2), (1.4, 1.7)$

$$(-1.85, -0.15)$$

18)  $(4.9, -1.3), (-5.2, -0.6)$

$$(-1.5, -0.95)$$

19)  $(5.1, 5.71), (6, 3.6)$

$$(5.55, 4.655)$$

20)  $(3.1, -2.1), (-0.52, -0.6)$

$$(1.29, -1.35)$$

Find the other endpoint of the line segment with the given endpoint and midpoint. Extension!

21) Endpoint:  $(-1, 9)$ , midpoint:  $(-9, -10)$

$$(-17, -29)$$

22) Endpoint:  $(2, 5)$ , midpoint:  $(5, 1)$

$$(8, -3)$$

23) Endpoint:  $(5, 2)$ , midpoint:  $(-10, -2)$

$$(-25, -6)$$

24) Endpoint:  $(9, -10)$ , midpoint:  $(4, 8)$

$$(-1, 26)$$

25) Endpoint:  $(-9, 7)$ , midpoint:  $(10, -3)$

$$(29, -13)$$

26) Endpoint:  $(-6, 4)$ , midpoint:  $(4, 8)$

$$(14, 12)$$

~~Critical thinking questions:~~

~~27) Find the point that is one-fourth of the way from  $(2, 4)$  to  $(10, 8)$ .~~

~~28) One endpoint of a line segment is  $(8, -1)$ . The point  $(5, -2)$  is one-third of the way from that endpoint to the other endpoint. Find the other endpoint.~~

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