Name KEY Class Date

5-1 Practice

Form K

Rate of Change and Slope

Each rate of change is constant. Find the rate of change and explain what it represents.

Rate of Δ = $\frac{1}{3}$

Each fence takes 3 hours to paint.

1. Fences Painted

Hours	Fences	
3	1	
6	2	+1
9	3	+1
12	4	+1
		+3, +3, +3

2. Miles Per Hour

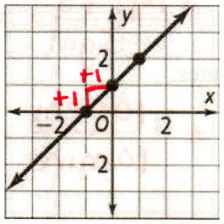
Hours	Miles	
2	70	
4	140	+70
6	210	+70
8	280	+70
		+2, +2, +2

Rate of Δ = $\frac{70}{2}$ = 35 mph

You drive 70 miles every 2 hours, or 35 mph.

Find the slope of each line.

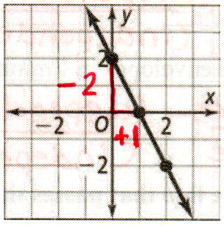
3.



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

$m = 1$

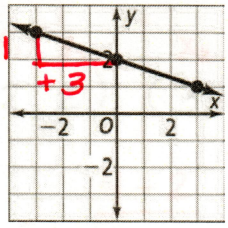
4.



$m = \frac{-2}{1}$

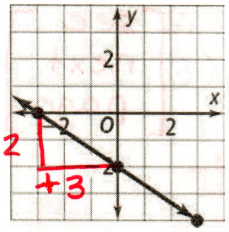
$m = -2$

5.



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

6.



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

Find the slope of the line that passes through each pair of points. $m = \frac{y_2 - y_1}{x_2 - x_1}$

7. (–4, 5), (1, 1)

8. (0, 0), (–1, 3)

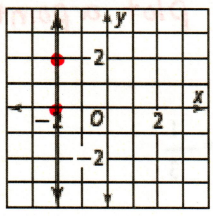
9. (2, 2), (3, 4)

10. (5, 3), (–2, –4)

[See Solns p. 3]

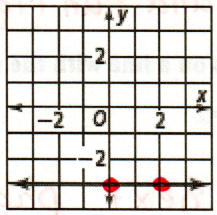
Find the slope of each line.

11.



$m = \frac{2}{0}$ = undefined

12.



$m = \frac{0}{2} = 0$

Name_____ Class_____ Date_____

5-1 Practice (continued) Form K

Rate of Change and Slope

Without graphing, tell whether the slope of a line that models each linear relationship is *positive*, *negative*, *zero*, or *undefined*. Then find the slope.

13. The cost of a pair of jeans is $22.50 for 1 pair and $67.50 for 3 pairs.

$\frac{\text{cost}}{\text{pair}} = \frac{\$67.50}{3} = \$22.50/\text{pr}$; positive

14. An employee earns $28.50 after 3 hours and $237.50 after 25 hours.

$\frac{\$}{\text{hr}} = \frac{\$237.50}{25} = \$9.50/\text{hr}$; positive

State the independent variable and the dependent variable in each situation. Then find the rate of change for each situation.

15. The cost of three gallons of milk is $8.85 and five gallons of milk is $14.75.

$\frac{\text{cost}}{\text{gallon}}$ (dependent) (independent) $\frac{\$8.85}{3\text{ gal}} = \frac{\$14.75}{5\text{ gal}} = \$2.95/\text{gal}$

16. Jacques filled 10 envelopes in 1 minute and 100 envelopes in 10 minutes.

$\frac{\text{envelopes}}{\text{minute}}$ (dependent) (independent) $\frac{10\text{ env}}{1\text{ min}} = \frac{100\text{ env}}{10\text{ min}} = 10\text{ env.}/1\text{ min}$

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

17. $(7, -1), (7, 1)$

18. $(3, -2), (-2.5, 9)$

19. $\left(\frac{1}{3}, \frac{2}{5}\right), \left(-\frac{1}{3}, \frac{3}{5}\right)$ [see Solns p. 4]

20. $\left(-\frac{3}{4}, \frac{2}{3}\right), \left(-\frac{3}{4}, \frac{5}{3}\right)$

21. Writing Explain why the slope of a vertical line is always undefined.

$m = \frac{\text{rise}}{\text{run}}$ The line rises, but has 0 run.

22. Writing Describe how to draw a line that passes through the origin and has a slope of $\frac{3}{5}$.

Begin with a point at (0,0). From (0,0) rise 3 units, and run right 5 units, and plot a point

Each pair of points lies on a line with the given slope. Find x or y.

23. $(2, 2), (5, y)$; slope $= 2$

24. $(9, 4), (x, 6)$; slope $= -\frac{1}{3}$

[see Solns. p. 4]

ALGEBRA I

WS 5-1 PRACTICE (PAGE 3)

To find the slope between two points (x_1, y_1) (x_2, y_2)

$$m = \frac{y_2 - y_1}{x_2 - x_1} \quad \left(\frac{\text{rise}}{\text{run}}\right)$$

7. $(\overset{x_1}{-4}, \overset{y_1}{5})$ $(\overset{x_2}{1}, \overset{y_2}{1})$

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

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

8. $(\overset{x_1}{0}, \overset{y_1}{0})$ $(\overset{x_2}{-1}, \overset{y_2}{3})$

$$m = \frac{3-0}{-1-0}$$

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

$$m = -3$$

9. $(\overset{x_1}{2}, \overset{y_1}{2})$ $(\overset{x_2}{3}, \overset{y_2}{4})$

$$m = \frac{4-2}{3-2}$$

$$m = \frac{2}{1}$$

$$m = 2$$

10. $(\overset{x_1}{5}, \overset{y_1}{3})$ $(\overset{x_2}{-2}, \overset{y_2}{-4})$

$$m = \frac{-4-3}{-2-5}$$

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

$$m = 1$$

ALGEBRA I
WS 5-1 PRACTICE (con't)

Find the slope. $m = \frac{y_2 - y_1}{x_2 - x_1}$

17. $(\overset{x_1}{7}, \overset{y_1}{-1})$ $(\overset{x_2}{7}, \overset{y_2}{1})$

$$m = \frac{1 - (-1)}{7 - 7}$$

$$m = \frac{2}{0}$$

m = undefined

18. $(\overset{x_1}{3}, \overset{y_1}{-2})$; $(\overset{x_2}{-2.5}, \overset{y_2}{9})$

$$m = \frac{9 - (-2)}{-2.5 - 3}$$

$$m = \frac{11}{-5.5}$$

$m = -2$

19. $(\overset{x_1}{\frac{1}{3}}, \overset{y_1}{\frac{2}{5}})$ $(\overset{x_2}{-\frac{1}{3}}, \overset{y_2}{\frac{3}{5}})$

$$m = \frac{\frac{3}{5} - \frac{2}{5}}{-\frac{1}{3} - \frac{1}{3}}$$

$$m = \frac{\frac{1}{5}}{-\frac{2}{3}}$$

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

$$m = -\frac{3}{10}$$

20. $(\overset{x_1}{-\frac{3}{4}}, \overset{y_1}{\frac{2}{3}})$ $(\overset{x_2}{-\frac{3}{4}}, \overset{y_2}{\frac{5}{3}})$

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

$$m = \frac{\frac{3}{3}}{0}$$

$$m = \frac{1}{0}$$

m = undefined

23. $(\overset{x_1}{2}, \overset{y_1}{2})$ $(\overset{x_2}{5}, \overset{y_2}{y})$; $m = 2$

$$2 = \frac{y - 2}{5 - 2}$$

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

$$6 = y - 2$$

$$+2 \qquad +2$$

$$8 = y$$

24. $(\overset{x_1}{9}, \overset{y_1}{4})$ $(\overset{x_2}{x}, \overset{y_2}{6})$; $m = -\frac{1}{3}$

$$\frac{-1}{3} = \frac{6 - 4}{x - 9}$$

$$\frac{-1}{3} = \frac{2}{x - 9}$$ Proportion

$$(-1)(x - 9) = (3)(2)$$

$$-x + 9 = 6$$

$$-9 \qquad -9$$

$$-x = -3$$

$$x = 3$$