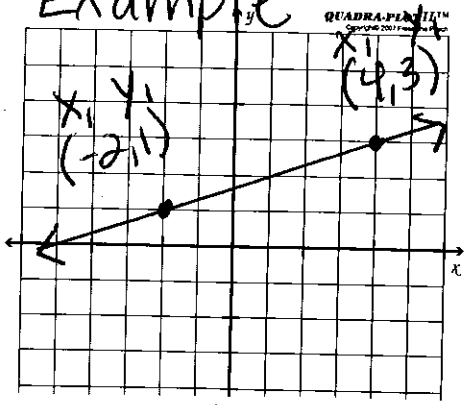
Point-Slope: $y - y_1 = m(x - x_1)$

use this formula to find the equation of a line when you are given: ① a graph that doesn't cross the y-axis at a whole # ② when given a point and the slope ③ when given 2 pts. on the line.

① Example



1st: Find the slope (use $\frac{\text{rise}}{\text{run}}$)

$m = \frac{2}{6} = \frac{1}{3}$

2nd: Plug m and 1 of the points into $y - y_1 = m(x - x_1)$

$(x_1, y_1) = (-2, 1)$

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

$y - 1 = \frac{1}{3}x + \frac{2}{3}$

$+1 \quad +1$

$y = \frac{1}{3}x + 1\frac{2}{3}$

$(x_1, y_1) = (4, 3)$

$y - 3 = \frac{1}{3}(x - 4)$

$y - 3 = \frac{1}{3}x - \frac{4}{3}$

$+3 \quad +3$

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

3rd: Solve for y (put in $y = mx + b$)

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② $m = -3$, line passes through $(-1, 7)$

x_1, y_1

1st: put in $y - y_1 = m(x - x_1)$

2nd: solve for y, so the final answer is in slope-intercept form. ($y = mx + b$)

$y - 7 = -3(x - {}^{-}1)$

point-slope: $\boxed{y - 7 = -3(x + 1)}$

$y - 7 = -3x - 3$

$+7 \quad +7$

slope-intercept: $\boxed{y = -3x + 4}$

③ $(4, -1)$ $(3, 2)$

x_2, y_2 x_1, y_1

1st: Find the slope

$m = \frac{y_2 - y_1}{x_2 - x_1}$ $\quad m = \frac{-1 - 2}{4 - 3} = \frac{-3}{1}$

$\boxed{m = -3}$

2nd: pick a point and plug it and m into point-slope

$(3, 2)$ $m = -3$ $\quad y - y_1 = m(x - x_1)$

x_1, y_1

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

3rd: solve for y.

$y - 2 = -3x + 9$

$+2 \quad +2$

$y = mx + b$

$\boxed{y = -3x + 11}$

ex 4 ★ Not one of the cases

x	y	
3	6	-2
2	4	-6
-1	-2	-4
-3	-6	

Is the data linear? If so, model the data with an equation.

$\frac{-2}{-1} = 2$ ✓

$\frac{-6}{-3} = 2$ ✓

$\frac{-4}{-2} = 2$ ✓

Since I got all the same #'s then it is Linear.

Slope $\boxed{m = 2}$

then to write the eq., pick a point from the table, use the slope in

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

(2, 4)
x_1, y_1

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

leave in point-slope form unless it tells you to put in slope-intercept.

Name _____ Class _____ Date _____

Practice 6-5

Point-Slope Form and Writing Linear Equations

Write an equation in point-slope form for the line through the given points or through the given point with the given slope.

1. $(5, 7), (6, 8)$
2. $(-2, 3); m = -1$
3. $(1, 2), (3, 8)$
4. $(-2, 3); m = 4$
5. $(4, 7); m = \frac{3}{2}$
6. $(6, -2); m = -\frac{4}{3}$
7. $(0, 5), (-3, 2)$
8. $(8, 11), (6, 16)$
9. $(4, 2), (-4, -2)$
10. $(15, 16), (13, 10)$
11. $(0, -7); m = -4$
12. $(-3, 4), (1, 6)$
13. $(1, 2); m$ undefined
14. $(-6, 7); m = -\frac{1}{2}$
15. $(21, -2), (27, 2)$
16. $(7, 5); m = 0$
17. $(8, -2), (14, 1)$
18. $(4, 8), (2, 12)$
19. $(-5, 13), (-10, 9)$
20. $(6, 2); m = \frac{3}{4}$
21. $(5, -3); m = -2$
22. $(4, 3.5); m = 0.5$
23. $(-6, 2); m = \frac{5}{3}$
24. $(100, 90), (80, 120)$
25. $(-3, 6), (3, -6)$
26. $(11, 7), (9, 3)$
27. $(2, 7); m = \frac{5}{2}$
28. $(-9, 8); m = -\frac{5}{3}$

Is the relationship shown by the data linear? If it is, model the data with an equation.

29.

x	y
2	3
3	7
4	11
5	15

30.

x	y
−3	4
−1	6
1	7
3	10

31.

x	y
−4	12
−1	8
5	−4
10	−8

32.

x	y
−2	5
3	−5
7	−13
11	−21

33.

x	y
−6	−5
−2	1
0	4
8	16

34.

x	y
−6	11
−3	9
6	3
15	−3

35.

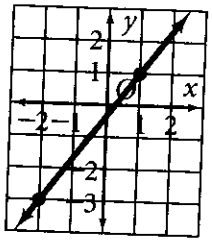
x	y
−7	−3
−5	0
−1	3
3	7

36.

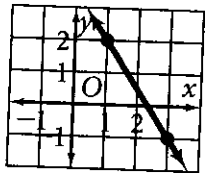
x	y
−4	1
2	4
6	6
14	10

Write an equation of each line in point-slope form.

37.



38.



39.