Geometry Notes Section 3-6

Oct 24

Lines in the Coordinate Plane

Slope-Intercept Form

$y = mx + b$

slope | *y*-intercept

$y = 4x + 7$

(x,y) any pt. on line

y-intercept (0, *b*) is the point (0, 7)

Point-Slope Form

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

slope

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

point (x_1 , y_1) on the line is (-5, 2)

$m = \frac{y - y_1}{x - x_1}$

Standard Form

$Ax + By = C$

Use slope-intercept form to write the equation of each line.

1. the line through (5, -1) with slope 2

$y = mx + b$

$-1 = 2 \cdot 5 + b$

$-1 = 10 + b$

$-11 = b$

$y = 2x - 11$

2. the line with *x* -intercept -5 and y- intercept 3

(0,y) (x,0) (-5, 0)

b (0,3)

$m = \frac{0 - 3}{-5 - 0}$

$m = \frac{3}{5}$

$y = mx + b$

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

Use point-slope form to write the equation of each line, but write the final equations in slope-intercept form.

3. the line through $(-4, 6)$ with slope $\frac{1}{2}$

(x_1, y_1) m

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

$y - 6 = \frac{1}{2}(x - (-4))$

$y - 6 = \frac{1}{2}(x + 4)$

$y = \frac{1}{2}x + 2 + 6$

$y = \frac{1}{2}x + 8$

4. the line through (4, -1) and (3, -5)

(x_1, y_1)

$y - y_1 = m(x - x_1)$ $m = \frac{-1-(-5)}{4-3}$

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

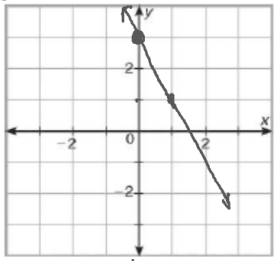
$y + 1 = 4x - 16$

$-1 \quad -1$

$y = 4x - 17$

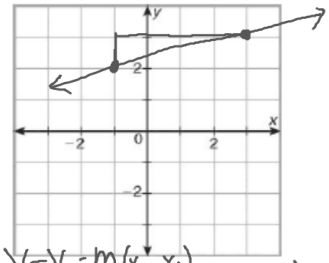
Graph each line.

7. $y = \frac{-2}{1}x + 3$ $(0, 3)$



b

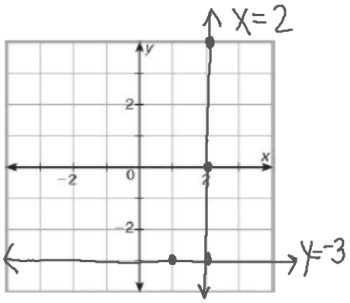
8. $y - 2 = \frac{1}{4}(x + 1)$ $(-1, 2)$



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

m $x - (-1)$

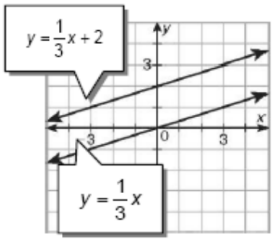
9. $y = -3$ and $x = 2$



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

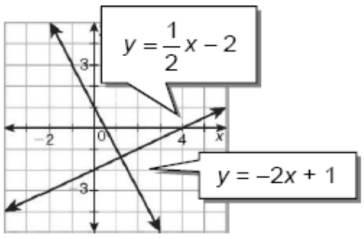
$(2, -3)$ $(2, 0)$

Parallel Lines



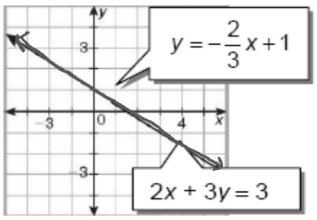
same slope
different *y*-intercepts

Intersecting Lines



different slopes

Coinciding Lines



same slope
same *y*-intercept

Determine whether the lines are parallel, intersect, or coincide.

10. $y = 2x + 5$
    $y = 2x - 1$

= slopes, diff. y-ints

parallel

11. $y = \frac{1}{3}x + 4$ (m = $\frac{1}{3}$, b = 4)
    $x - 3y = -12$

$\frac{-3y}{-3} = \frac{-1x}{-3} - \frac{12}{-3}$

$y = \frac{1}{3}x + 4$ (m, b)

Coincide

12. $y = 5x - 2$ (m = 5, b = −2)
    $1x + 4y = 8$

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