Homework: http://math.mnrt.net/

Name KEY date ___ raw ___ scaled ___ percent ___

Math 8 Trimester 2 Exam 1 (220 Points)

Equation of Line

- **Answers must be exact. All fractions must be fully simplified, but do not answer in mixed numbers.**
- **To recieve the most credit for a question, show how you arrive at your answer. Show enough work so that a good student at your grade level would understand your work.**
- **All answers count for 20 points.**

[1] Plot the line $2x + 3y - 12 = 0$. Show the intercepts on your graph.

$x = 0 \Rightarrow$

$3y - 12 = 0$

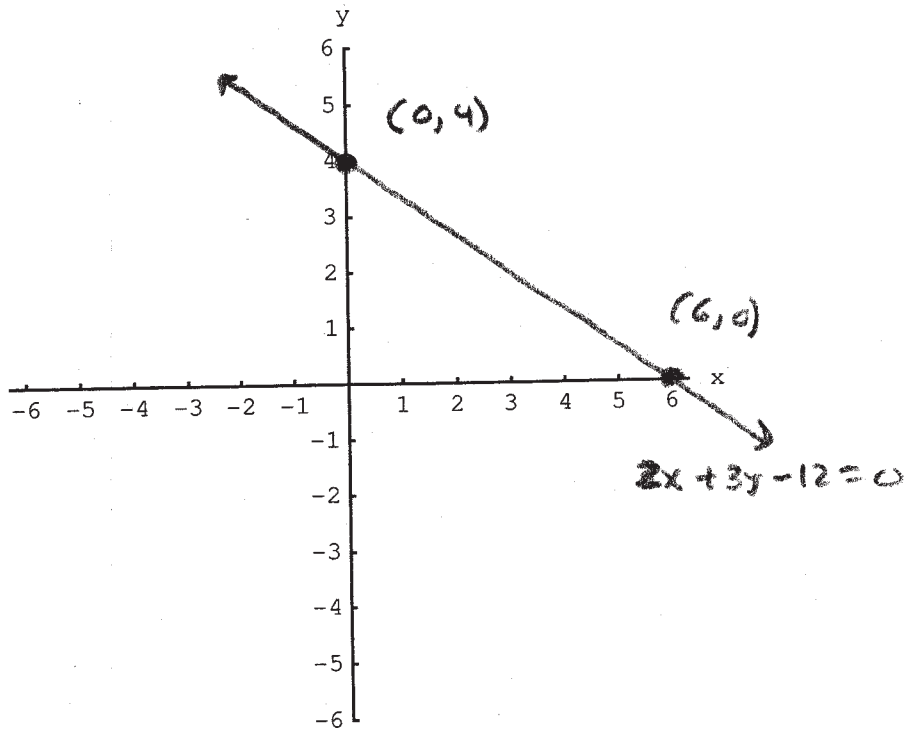
$3y = 12$

$y = 4.$

$y = 0 \Rightarrow 2x - 12 = 0$

$2x = 12$

$x = 6$



[2] Write the slope and the y-intercept of the line $y = \frac{-3}{5}x - 7$.

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

y-int $= -7$

[3] Write the slope and the y-intercept of the line $3x + 7y - 14 = 0$.

$3x + 7y - 14 = 0$

$7y = -3x + 14$

$y = \frac{-3}{7}x + 2$

$\therefore m = \frac{-3}{7}$, y-int $= 2$

[4] Find the slope of a line through $P(2, -5)$, $Q(-6, 13)$.

$$m = \frac{13+5}{-6-2}$$

$$= \frac{18}{-8}$$

$$= \frac{-9}{4}$$

[5] Write the equation of the line that is parallel to $3x + 5y - 7 = 0$ and has a y-intercept of -13. Answer in slope-intercept form.

$$y = mx + b$$

$$3x + 5y - 7 = 0$$

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

$$\therefore \quad y = \frac{-3}{5}x - 13$$

[6] Write the equation of the line through the points $P(2, 3)$ and $Q(7, 5)$.
Answer in standard form.

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

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

$m = \frac{5-3}{7-2} = \frac{2}{5}$

NOT STD FORM IS automatic −2 pts

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

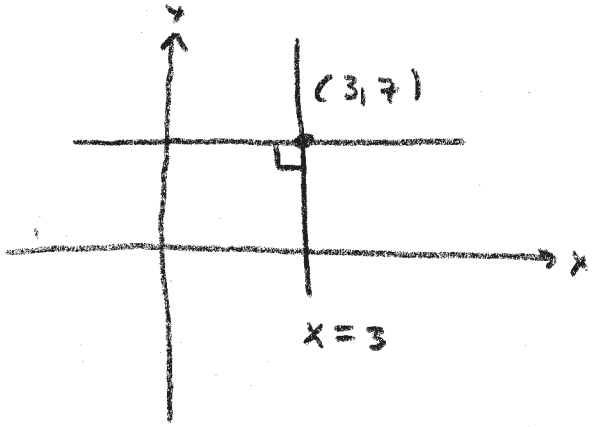
$5y - 15 = 2x - 4$

$\therefore \quad -2x + 5y = 11$

$2x - 5y = -11$ better.

[7] Write the equation of the line through $Q(3, 7)$ that is perpendicular to the line $x = 3$.

$\therefore \quad y = 7$



[8] At what point does the equation of the line through the points $P(2, 0)$ and $Q(1, -3)$ cross the y-axis?

want y-int

$$y - y_1 = m(x - x_1)$$
$$y - 0 = m(x - 2)$$
$$m = \frac{-3}{-1} = 3$$

$$y = 3(x-2)$$
$$y = 3x - 6$$

$\therefore$ cross y-axis at -6.

[9] Write the equation of the line through $P(-3, 14)$ that is parallel to the line $\ell_1 : y = \frac{-2}{7}x - 17$. Answer in standard form.

$$y - y_1 = m(x - x_1)$$
$$y - 14 = m(x + 3)$$

$y = \frac{-2}{7}$ by insp.

$$y - 14 = \frac{-2}{7}(x+3)$$

$$7y - 98 = -2x - 6$$

$\therefore \quad 2x + 7y = 92$

[10] Write the equation of the line through $P(2, 7)$ that is perpendicular to the line $\ell_1 : 2x - 6y + 13 = 0$. Answer in standard form.

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

$y - 7 = m(x - 2)$

$\ell \perp \ell_1 \Rightarrow m m_1 = -1$

$m_1 = \frac{-2}{-6} = \frac{1}{3}$

$m = -3$

$y - 7 = -3(x - 2)$

$y - 7 = -3x + 6$

$\boxed{3x + y = 13}$

[11] Find the point of intersection (if it exists) of the lines $\ell_1 : 3x + 4y = 25$ and $\ell_2 : x + 2y = 11$.

$$\begin{bmatrix} 3x+4y=25 \\ x+2y=11 \end{bmatrix} \equiv \begin{bmatrix} 3x+4y=25 \\ 2x+4y=22 \end{bmatrix} \Rightarrow \boxed{x = 3}$$

$3 + 2y = 11$

$2y = 8$

$\boxed{y = 4}$

$\therefore$ The lines intersect at the point $(3, 4)$.