Math-8 Algebra 2

math.mnrt.net ***Equation of Line - Practice Exam*** **Feb. 17, 2014**

Name: _____

Score: _____ out of **120** points. Percent: _____. Grade: _____.

- Partial credit is given. Clearly written well reasoned solutions make it easier for the grader to appreciate what you know. Messy or poorly reasoned solutions have the opposite effect.
- You have 45 minutes and there are 10 questions. So you have an average of 4.5 minutes per question. You have time to double check your work.
- A lot of space follows each question. That does not necessarily mean the solution is long.
- Answers must be completely simplified: fractions in lowest terms, all arithmetic performed.
- Advice. First pass: skip problems you cannot do easily. Second pass: work problems you skipped on first pass.
- This exam consists of 6 pages. Keep turning pages until you know you have reached the end.

Note to 2016-2017 students. This is an old exam for practice. Questions an the exam you take will not necessarily be limited to just the kinds of questions in the old exam. You should expect a question or two that will test understanding of the material as well as computational skill.
Solutions appear at the end of the practice exam.

1. (11 points) Find the slope of the line through the points $(3, -5), (-7, 9)$.

2. (6 points) At what point do the lines $x = 8$ and $y = -2$ intersect?

3. (6 points) Are the lines $y = \frac{1}{5}x - 221$ and $y = \frac{-1}{5}x + 63$ parallel?

4. (6 points) Are the lines $y = \frac{2}{11}x - 635$ and $y = \frac{2}{11}x + 113$ parallel?

5. Consider the equation $y = \frac{-2}{7}x - \frac{3}{5}$.

(a) (5 points) What the slope?

(b) (5 points) What is the y-intercept?

(c) (5 points) What the x-intercept?

6. For the equation $2x + 5y = 19$,

(a) (9 points) What is the slope?

(b) (9 points) What is the y-intercept?

7. (19 points) Write the equation of the line that is parallel to $2x + 3y = 1$ and goes through the point $(-2, 7)$. Answer in standard form.

8. (19 points) Write the equation of the line through the points $(-2, 3)$ and $(5, -10)$. Answer in standard form.

9. (10 points)
Find the number a that would make the line $y = ax + 5$ parallel to the line $2x - 3y = 1$.

10. (10 points) At what point does the equation of the line through the points $(-1, 5)$ and $(21, 36)$ intersect the y-axis?

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1. (11 points) Find the slope of the line through the points $(3, -5), (-7, 9)$.

Solution:

$$m = \frac{9+5}{-7-3}$$
$$= \frac{-7}{5}.$$

2. (6 points) At what point do the lines $x = 8$ and $y = -2$ intersect?

Solution: $(8, -2)$.

3. (6 points) Are the lines $y = \frac{1}{5}x - 221$ and $y = \frac{-1}{5}x + 63$ parallel?

Solution: No. By inspection the slopes are $\frac{1}{5} \neq \frac{-1}{5}$.

4. (6 points) Are the lines $y = \frac{2}{11}x - 635$ and $y = \frac{2}{11}x + 113$ parallel?

Solution: Yes. By inspection the slopes are identical and equal to $\frac{2}{11}$.

5. Consider the equation $y = \frac{-2}{7}x - \frac{3}{5}$.

(a) (5 points) What the slope?

Solution: By inspection the slope is $\frac{-2}{7}$.

(b) (5 points) What is the y-intercept?

Solution: By inspection the y-intercept is $\frac{-3}{5}$.

(c) (5 points) What the x-intercept?

Solution: Since the second coordinate of every point on the x-axis is zero, set $y = 0$ and solve for x.

$$0 = \frac{-2}{7}x - \frac{3}{5}$$
$$0 = -10x - 21$$
$$\therefore x = \frac{-21}{10}.$$

6. For the equation $2x + 5y = 19$,

(a) (9 points) What is the slope?

Solution:

$$\begin{aligned} 2x + 5y &= 19 \\ 5y &= -2x + 19 \\ y &= -\frac{2}{5}x + \frac{19}{5} \end{aligned}$$

Therefore, slope is $\frac{-2}{5}$.

(b) (9 points) What is the y-intercept?

Solution: The y-intercept is $\frac{19}{5}$. (Work shown in part (a) above.)

7. (19 points) Write the equation of the line that is parallel to $2x + 3y = 1$ and goes through the point $(-2, 7)$. Answer in standard form.

Solution: Use $y - y_1 = m(x - x_1)$.

$$\begin{aligned} 2x + 3y &= 1 \\ 3y &= -2x + 1 \\ y &= \frac{-2}{3}x + \frac{1}{3}, \\ \implies m &= \frac{-2}{3}. \end{aligned}$$

Then,

$$\begin{aligned} y - y_1 &= m(x - x_1) \\ y - 7 &= \frac{-2}{3}(x + 2). \\ \therefore 2x + 3y &= 17. \end{aligned}$$

8. (19 points) Write the equation of the line through the points $(-2, 3)$ and $(5, -10)$. Answer in standard form.

Solution: Use $y - y_1 = m(x - x_1)$.

$$m = \frac{-10 - 3}{5 + 2} = \frac{-13}{7}.$$

Then,

$$\begin{aligned} y - y_1 &= m(x - x_1) \\ y - 3 &= \frac{-13}{7}(x + 2). \\ \therefore 13x + 7y &= -5. \end{aligned}$$

9. (10 points)
Find the number a that would make the line $y = ax + 5$ parallel to the line $2x - 3y = 1$.

Solution:

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

If the lines must be parallel, then $a = \frac{2}{3}$.

10. (10 points) At what point does the equation of the line through the points $(-1, 5)$ and $(21, 36)$ intersect the y-axis?

Solution: Use $y - y_1 = m(x - x_1)$.

$$m = \frac{36-5}{21+1} = \frac{31}{22}$$

Then,

$$\begin{aligned} y - y_1 &= m(x - x_1) \\ y - 5 &= \frac{31}{22}(x + 1) \\ 22y - 110 &= 31x + 31 \\ 22y &= 31x + 141 \\ y &= \frac{31}{22}x + \frac{141}{22}. \end{aligned}$$

Therefore, the line intersects the y-axis at the point $\left(0, \frac{141}{22}\right)$.