Math Module: Quiz

ANSWER KEY

Please use this answer key to score your Math Module Quiz. The points for each question are assigned below in red. For every correct question, you earn the assigned number of points; the points are "all-or-nothing" and the answer must match that presented in the answer key to warrant full credit. If the aggregate number of points for your entire quiz equals 85 or higher, then you have demonstrated mastery of the review material and are prepared to start Quantitative Methods this coming semester. If your aggregate score is lower than 85, you are permitted to continue with Quantitative Methods this semester, but are strongly urged to consider postponing the class and/or seeking additional support in solidifying their mastery of these foundational concepts. Please contact the Urban Policy program administrator or chair for more information on what support is available.

1. Fractions

   a) Circle the denominator in the following fraction: $^8/_9$ 4 points

   b) Circle the numerator in the following fraction: $^{11}/_{15}$ 4 points

   c) Convert the following fraction into a decimal (*please round to the 4th decimal place*): $^5/_{13} = .3846$ 5 points

$$
\begin{array}{r}
.3846 \\
13\overline{)5.00000} \\
\underline{3\ 9} \\
1\ 1\ 0 \\
\underline{1\ 0\ 4} \\
6\ 0 \\
\underline{5\ 2} \\
8\ 0 \\
\underline{7\ 8} \\
2
\end{array}
$$

   d) Convert the following fraction into a decimal (*please round to the nearest 100th*): $^{21}/_{11} = 1.91$ 5 points

1.909

$$11\sqrt{21.00000}$$
$$\underline{11}$$
$$10\ 0$$
$$\underline{9\ 9}$$
$$1\ 0\ 0$$
$$\underline{9\ 9}$$
$$1$$

e) Convert the following decimal into a fraction: .058 5 points

$$.058 = \frac{58}{1000} / 2 = \frac{29}{500}$$

Both the numerator and denominator can be divided by 2, which results in: $\frac{29}{500}$

f) Complete the following (please show answers in the most reduced format, i.e. least common denominators):

1. $\frac{2}{3} * \frac{11}{8} = \frac{22}{24} / 2 = \frac{11}{12}$ 4 points

Both the numerator and denominator can be divided by 2, which results in: $\frac{11}{12}$

2. $\frac{3}{10} + \frac{1}{10} = \frac{4}{10} / 2 = \frac{2}{5}$ 4 points

Both the numerator and denominator can be divided by 2, which results in: $\frac{2}{5}$

3. $\frac{3}{10} - \frac{7}{20} = \frac{3*2}{10*2} - \frac{7}{20} = \frac{6}{20} - \frac{7}{20} = -\frac{1}{20}$ 5 points

4. $\left(\frac{1}{9} * \frac{4}{5}\right) + \left(-2 * \frac{9}{15}\right) = \frac{4}{45} - \frac{18}{15} = \frac{4}{45} - \frac{18*3}{15*3} = \frac{4}{45} - \frac{54}{45} = -\frac{50}{45}$ 5 points

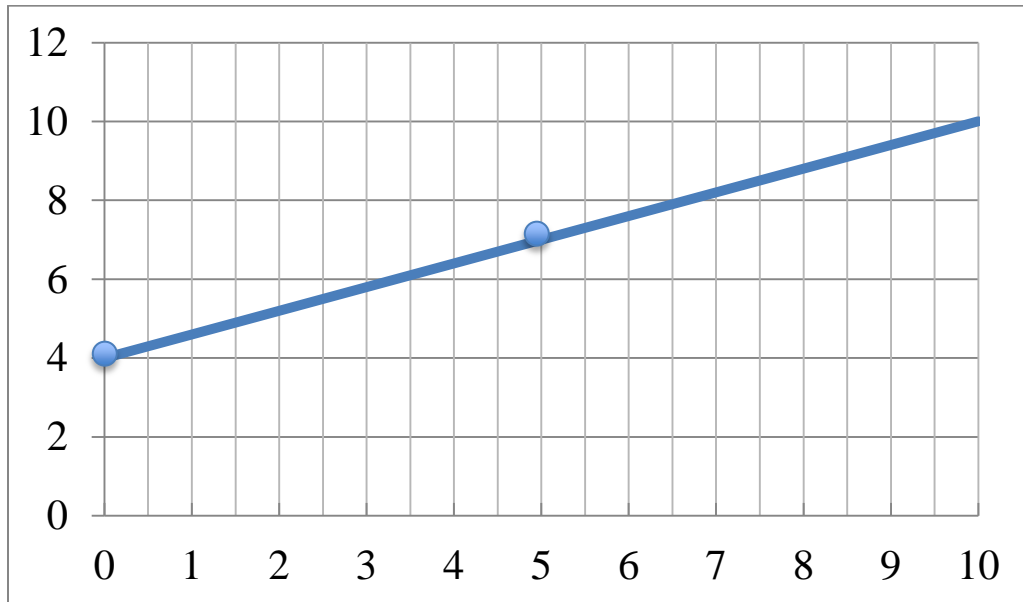Both the numerator and denominator can be divided by 5, which results in: $\frac{-10}{9}$

2. Graphing

   a) Graph the following line: $y = \frac{3}{5}x + 4$ 6 points

   Let x = 0: $y = \frac{3}{5}(0) + 4 = 4$
   First point: (0, 4)

   Let x = 5: $y = \frac{3}{5}(5) + 4 = 3 + 4 = 7$
   Second point: (5, 7)

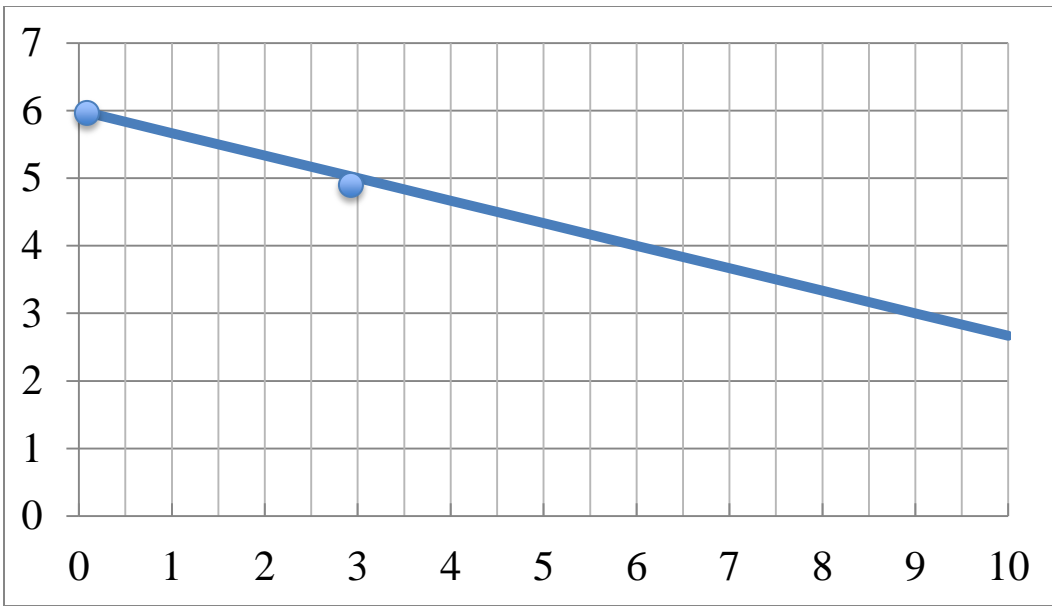   b) Graph the following line: $-\frac{1}{3}x + 6$ 6 points
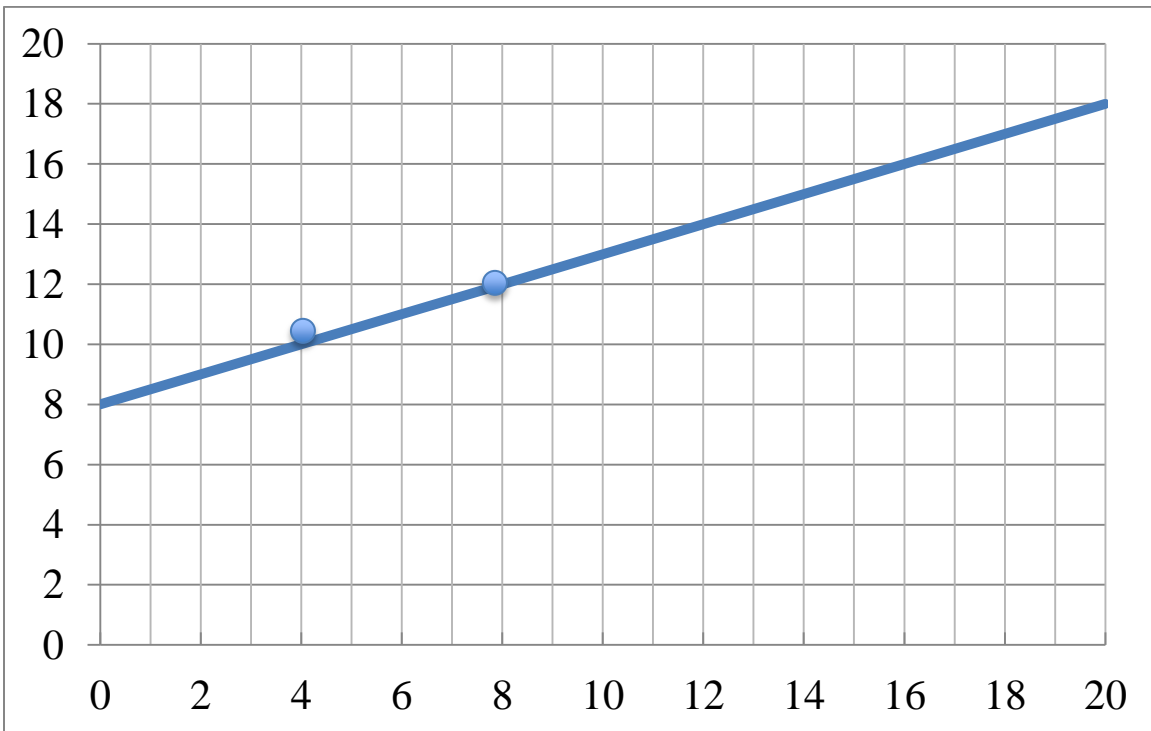
   Let x = 0: $y = -\frac{1}{3}(0) + 6 = 6$

   First point: (0, 6)

   Let x = 3: $y = -\frac{1}{3}(3) + 6 = -1 + 6 = 5$

   Second point: (3, 5)

c) Derive the equation of the following line: 8 points

The y-intercept (where x = 0), is 8.

To figure out the slope, pick two points on the line: $\frac{\Delta y}{\Delta x} = \frac{12-10}{8-4} = \frac{2}{4} = \frac{1}{2}$

4

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

3. Algebra: solving for unknown variables

    a. Solve for y: $10y + 3 = 2 + 8y$ 8 points

$$ - 3 \quad = -3$$

$$10y = 2 - 3 + 8y$$
$$-8y - 8y$$

$$10y - 8y = 2 - 3$$
$$2y = 1$$

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

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

    b. Solve for x: $x + 8(3 - 2x) = 0$ 8 points

$$x + 24 - 16x = 0$$

$$24 - 15x = 0$$
$$+ 15x = +15x$$

$$24 = 15x$$
$$\frac{24}{15} = \frac{15}{15}x$$

$$\frac{24}{15} = x$$

Both the numerator and denominator can be divided by 3, which results in: $x = \frac{8}{5}$

    c. Solve for z: $\frac{1}{4}z + 2 = \frac{9}{28}z - \frac{3}{10}$ 8 points

$$-\frac{1}{4}z -\frac{1}{4}z$$

$$2 = \frac{9}{28}z - \frac{1}{4}z - \frac{3}{10}$$

$$+\frac{3}{10} \qquad\qquad\qquad +\frac{3}{10}$$

$$2 + \frac{3}{10} = \frac{9}{28}z - \frac{1}{4}z$$

$$\frac{2*10}{10} + \frac{3}{10} = \frac{9}{28}z - \frac{1*7}{4*7}z$$

$$\frac{20}{10} + \frac{3}{10} = \frac{9}{28}z - \frac{7}{28}z$$

$$\frac{23}{10} = \frac{2}{28}z$$

$$\frac{23}{10} * 28 = \frac{2}{28}z * \frac{28}{2}$$

$$\frac{23}{10} * \frac{28}{2} = z$$

$$\frac{23}{10} * \frac{14}{1} = z$$

$$\frac{322}{10} = z$$

Both the numerator and denominator can be divided by 2, which results in: $z = \frac{161}{5} = 32.2$

4. Find the numerical answer to the following (show all work):

   a. $\sum_{i=1}^{22} i = 1 + 2 + 3 + \ldots\ldots + 19 + 20 + 21 + 22 = $ **253** 5 points

   b. $\sum_{i=1}^{5}(i^2) = (1)^2 + (2)^2 + (3)^2 + (4)^2 + (5)^2$ 5 points

      $= 1 + 4 + 9 + 16 + 25 = $ **53**

   c. $\sum_{i=1}^{10}(2i) = 2*1 + 2*2 + 2*3 + 2*4 + 2*5 + 2*6 + 2*7 + 2*8 + 2*9 + 2*10$

      5 points

      $= 2 + 4 + 6 + 8 + 10 + 12 + 14 + 16 + 18 + 20 = $ **110**