Practice for Quiz 2

Math 130 *Kovitz* Spring 2019: the quiz is on Tuesday, March 26.

1. Consider the quadratic function given by the equation

$$y = 5x^2 + 4x - 1.$$

   (a) Complete the square of $5x^2 + 4x - 1$ and get it into standard form (vertex form). State the vertex.

   (b) i. Find the vertex using the shortcut formula and show that it is the same as found by completing the square. Plot it on the x-, y-plane.
   ii. Decide whether the graph opens up or down.
   iii. Find the equation of the line of symmetry. Draw it on the plane.
   iv. Find the y-intercept and its symmetric partner. Plot them.
   v. Find, if any, all x-intercepts. If found, plot them.

   (c) From this, draw the graph of the quadratic function.

2. Consider the quadratic function given by the equation

$$y = 4x^2 + 5x - 6.$$

   (a) Complete the square of $4x^2 + 5x - 6$ and get it into standard form (vertex form). State the vertex.

   (b) i. Find the vertex using the shortcut formula and show that it is the same as found by completing the square. Plot it on the x-, y-plane.
   ii. Decide whether the graph opens up or down.
   iii. Find the equation of the line of symmetry. Draw it on the plane.
   iv. Find the y-intercept and its symmetric partner. Plot them.
   v. Find, if any, all x-intercepts. If found, plot them.

   (c) From this, draw the graph of the quadratic function.

Answers follow.

Answers.

1. (a) $5\left(x+\frac{2}{5}\right)^2-\frac{9}{5}=5(x+0.4)^2-1.8$. The vertex is at $(-0.4,-1.8)$.

   (b) i. $\left(\frac{-4}{10},-1-\frac{16}{20}\right)=(-0.4,-1.8)$. It is the same.
   Plot omitted, but it is in the third quadrant.

   ii. The graph opens up.

   iii. $x=-0.4$. The graph of this vertical line is omitted, but it passes through the second and third quadrants.

   iv. $(0,-1)$ and $(-0.8,-1)$. Plots omitted.

   v. $(-1,0)$ and $(0.2,0)$. Plots omitted.

   (c) Graph omitted.

2. (a) $4\left(x+\frac{5}{8}\right)^2-\frac{121}{16}=4(x+0.625)^2-7.5625$. The vertex is at $(-0.625,-7.5625)$.

   (b) i. $\left(\frac{-5}{8},-6-\frac{25}{16}\right)=(-0.625,-7.5625)$. It is the same.
   Plot omitted, but it is in the third quadrant.

   ii. The graph opens up.

   iii. $x=-0.625$. The graph of this vertical line is omitted, but it passes through the second and third quadrants.

   iv. $(0,-6)$ and $(-1.25,-6)$. Plots omitted.

   v. $(-2,0)$ and $(0,75,0)$. Plots omitted.

   (c) Graph omitted.