6 Using Technology Wisely Worksheet

Concepts:

- Advantages and Disadvantages of Graphing Calculators
- How Do Calculators Sketch Graphs?
- When Do Calculators Produce Incorrect Graphs?
- The Greatest Integer Function
- Graphing Calculator Skills
  - Locating the Graph (TRACE AND TABLE)
  - Changing the Viewing Window (WINDOW)
  - Connected Mode vs. Dot Mode
  - The ZOOM Features
  - Finding Approximate Coordinates for Intersection Points
  - Finding Approximate Coordinates for x-intercepts
- The Intersection Method Revisited
- The Intercept Method Revisited

(Sections 2.1-2.2)

1. Sketch a complete graph of each equation. Make sure that you label the axes for each graph. Which graphs can you draw without the assistance of a calculator? If you used your calculator to help you sketch a graph, what feature(s) of the calculator helped you to sketch a reasonable graph?

   (a) $y = 3x + 7$
   Can be drawn by hand. This is a line with y-intercept $(0, 7)$ and slope 3.

   (b) $4x^2 + 9y^2 = 36$
   Must graph $y = \frac{\sqrt{36-4x^2}}{3}$ and $y = -\frac{\sqrt{36-4x^2}}{3}$ with the calculator.

   (c) $y = 5x^7 - 20x^4 + 3x^2 - 8$
   Must be graphed with the calculator.

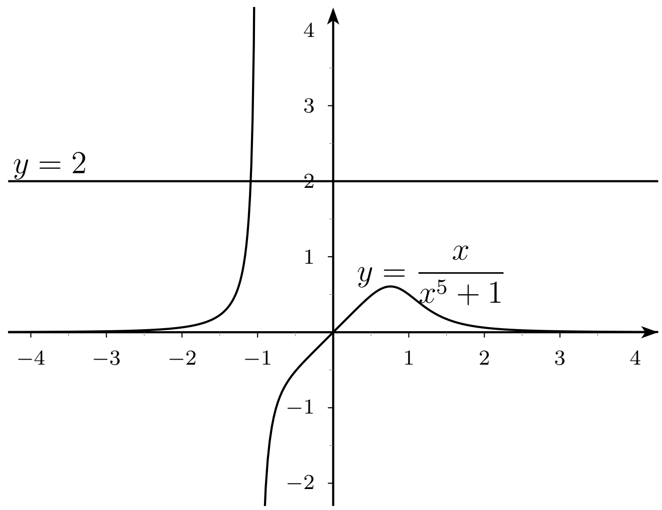
2. Which of the following equations should be solved algebraically and which should be solved graphically? Solve each equation. If the solution you find is approximate, be sure to indicate that it is approximate with $\approx$. If you use a graph to find a solution, be sure to sketch the graph and label it.

   (a) $3x^6 = 5x^3 + 2$

   Solve algebraically to get two solutions: $x = \sqrt[3]{-\frac{1}{3}}$ **and** $x = \sqrt[3]{2}$**.**

   (b) $\dfrac{x}{x^5 + 1} = 2$

   Solve graphically to get one solution: $x \approx -1.09097$**.**



   (c) $\sqrt{x + 7} = x$

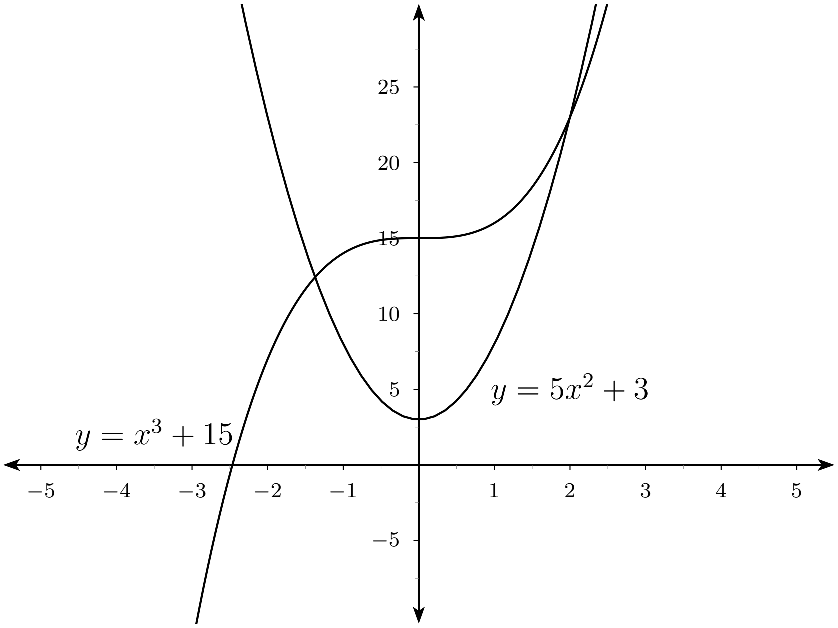
   Solve algebraically to get one solution: $x = \frac{1+\sqrt{29}}{2}$**.**

   (d) $x^3 + 15 = 5x^2 + 3x$

   Solve algebraically to get three solutions: $x = 5$**,** $x = \sqrt{3}$**, and** $x = -\sqrt{3}$**.**

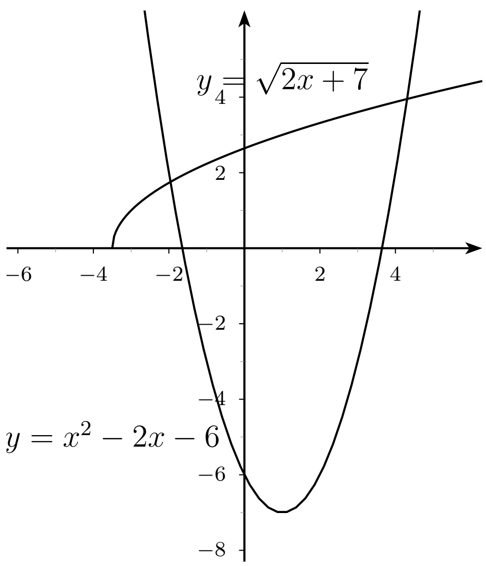
(e) $x^3 + 15 = 5x^2 + 3$

Solve graphically to get two solutions: $x \approx -1.372$ **and** $x = 2$**.**



3. Show that the equation $x^2 - 2x - 6 = \sqrt{2x+7}$ has two real solutions by graphing the left and right sides in the standard window and counting the number of intersection points. Approximate the solutions. (Make sure you use $\approx$ for approximate solutions.)

   $\mathbf{x} \approx \mathbf{-1.959}$ and $\mathbf{x} \approx \mathbf{4.309}$.



4. What would you enter in your calculator if you wanted the graph of $2x - 4(y+3)^4 + 1 = 0$?

   Graph $y = -3 + \sqrt[4]{\frac{2x+1}{4}}$ **and** $y = -3 - \sqrt[4]{\frac{2x+1}{4}}$**.**