

Graphing – Problems

1. (a) Which of the following equations can be graphed:

$$x^2 + y^2 = -4, x + y = -4, x^2 + xy = 1.$$

- (b) Which of the following functions have graphs that intersect the x -axis:

$$y = -2(x + 1)^2 - 10, y = \frac{-3}{x - 1}, y = |x + 7| - 3$$

- (c) Which of the following functions have graphs that intersect the y -axis:

$$y = -2(x + 1)^2 - 10, y = \frac{-3}{x - 1}, y = |x + 7| - 3$$

- (d) At how many distinct points do the circle given by equation $x^2 + y^2 = 5$ and the line with equation $y = 2x + 3$ intersect?

2. Find the center and radius of the following circles:

$$x^2 + y^2 = 25, (x - 1)^2 + (y + 2)^2 = 7, 3x^2 - 12x - 18y + 3y^2 = 0$$

3. Find the vertex, roots, and graph each of the following:

(a) $y = 3(x - 1)^2 + 9$

(b) $y = x^2 + 2x - 48$

(c) $y = x(x - 10)$

(d) $y = x^2 - 2x - 35$

(e) $y = 3x^2 + 6x - 22$

(f) $y = -x^2 + 12x + 1$

(g) $y = (x + 3)^2$

4. Graph the following functions:

(a) $y = 2\sqrt{x}$

(b) $y = 2^{-x}$

(c) $y = \frac{1}{x-2}$

(d) $y = x^3 + 2$

5. The graph of $y = f(x)$ can be obtained from the graph of $y = g(x)$ by shifting, stretching and/or reflecting. Describe the specific transformation required to turn the graph of $y = g(x)$ into the graph of $y = f(x)$ for each pair of functions.

(a) $f(x) = 5(7)^{3-x} + 8$, $g(x) = 7^x$

(b) $f(x) = \frac{2}{x+3} + 4$, $g(x) = \frac{1}{x}$

(c) $f(x) = 5(x-4)^2$, $g(x) = x^2$

(d) $f(x) = -\sqrt{-2x}$, $g(x) = \sqrt{x}$

6. Identify the graphs of the following equations as parabolas, circles, ellipses, hyperbolas, or none of the above. For parabolas, find the vertex; for circles, find the center and radius; for ellipses find the length of the major and minor axis; and for hyperbolas, find the equation of the asymptotes.

(a) $y + x^2 = 1$

(b) $2y^2 + x^2 = 1$

(c) $y^2 - x^2 = 1$

(d) $y^2 - x^2 = -1$

(e) $2y^2 + x^2 = -1$

(f) $(x-3)^2 = 5 - (y-2)^2$

(g) $\frac{x^2}{5} + \frac{y^2}{16} = 1$

(h) $x^2 + 2x + y^2 - 4y = 10$

(i) $9x^2 + 4y^2 = 36$

(j) $9x^2 - 16y^2 = 144$