8-8. For each equation below, make tables that include *x*-values from −2 to 2 and draw each graph. Homework Help ✎

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

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

c. $y = x^3 - 4x$

d. What are the parent functions for these equations?

8-9. Polynomials are expressions that can be written as a sum of terms of the form:

$$(\text{any number}) . \ x^{(\text{whole number})}$$

Which of the following equations are polynomial equations? For those that are not polynomials, explain why not. Check the lesson 8.1.1 Math Notes box for further details about polynomials. Homework Help ✎

a. $f(x) = 8x^5 + x^2 + 6.5x^4 + 6$

b. $y = \frac{3}{5}x^6 + 19x^2$

c. $y = 2^x + 8$

d. $f(x) = 9 + \sqrt{x} - 3$

e. $P(x) = 7(x - 3)(x + 5)^2$

f. $y = x^2 + \frac{1}{x^2 + 5}$

g. Write an equation for a new polynomial function and then write an equation for a new function that is not a polynomial.

8-10. Describe the possible numbers of intersections for each of the following pairs of graphs. Sketch a graph for each possibility. For example, a circle could intersect a line twice, once, or not at all. Your solution to each part should include all of the possibilities and a sketched example of each one. Homework Help ✎

a. Two different lines.

b. A line and a parabola.

c. Two different parabolas.

d. A parabola and a circle.

8-11. Solve the following system: <u>Homework Help</u> ✎

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

8-12. A table can be used as a useful tool for finding some inverse functions. When the function has only one x in it, the function can be described with a sequence of operations, each applied to the previous result. Consider the following table for $f(x) = 2\sqrt{x-1} + 3$. <u>Homework Help</u> ✎

	1st	2nd	3rd	4th
What f does to x:	subtracts 1	$\sqrt{\ }$	multiplies by 2	adds 3

Since the inverse must undo these operations, in the opposite order, the table for $f^{-1}(x)$ would look like the one below.

	1st	2nd	3rd	4th
What does f^{-1} to x:	subtracts 3	divides by 2	$(\ )^2$	adds 1

a. Copy and complete the following table for $g^{-1}(x)$ if $g(x) = \frac{1}{3}(x+1)^2 - 2$

	1st	2nd	3rd	4th
What g does to x:	adds 1	$(\ )^2$	divides by 3	subtracts 2
What g^{-1} does to x:			$\sqrt{\ }$	

b. Write the equations for $f^{-1}(x)$ and $g^{-1}(x)$.

8-13. Describe the difference between the graphs of $y = x^3 - x$ and $y = x^3 - x + 5$. <u>Homework Help</u> ✎

8-14. Sketch the graph of each equation below. <u>Homework Help</u> ✎

a. $y = \sin(2\pi x)$

b. $y = 3\sin(\pi x)$

c. $y = 2\sin(2\pi x) + 1$

8-15. An arithmetic sequence starts out $-23, -19, -15\ldots$ <u>Homework Help</u> ✎

a. What is the equation?

b. How many times must the generator be applied so that the result is greater than 10,000?

8-16. Without a calculator, find two solutions $0° \le \theta < 360°$ that make each of the following equations true. <u>Homework Help</u> ✎

a. $\cos \theta = \frac{1}{2}$

b. $\tan \theta = -1$

c. $\sin \theta = \frac{\sqrt{3}}{2}$

d. $\cos \theta = -\frac{\sqrt{3}}{2}$

8-17. Which of the following equations are polynomial functions? For each one that is not, **justify** why not. Homework Help ✎

a. $y = 3x^2 + 2x^2 + x$

b. $y = (x - 1)^2(x - 2)^2$

c. $y = x^2 + 2^x$

d. $y = 3x - 1$

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

f. $y^2 = (x - 2)^2 - 1$

g. $y = \frac{1}{x^2} + \frac{1}{x} + \frac{1}{2}$

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

i. $y = x$

j. $y = -7$

8-18. Samantha thinks that the equation $(x - 4)^2 + (y - 3)^2 = 25$ is equivalent to the equation $(x - 4) + (y - 3) = 5$. Is she correct? Are the two equations equivalent? Explain how you know. If they are not equivalent, explain Samantha's mistake. Homework Help ✎

8-19. Find the **roots** (the solutions when $y = 0$) of each of the following polynomial functions. Homework Help ✎

a. $y = x^2 - 6x + 8$

b. $f(x) = x^2 - 6x + 9$

c. $y = x^3 - 4x$

8-20. Sketch a graph of $y = x^2 - 7$. Homework Help ✎

a. How many roots does this graph have?

b. What are the roots of the function?

8-21. Solve $x^2 + 2x - 5 = 0$. Homework Help ✎

a. How many x-intercepts does $y = x^2 + 2x - 5$ have?

b. Approximately where does the graph of $y = x^2 + 2x - 5$ cross the x-axis?

8-22. Graph the inequality $x^2 + y^2 \leq 25$, and then describe its graph in words. Homework Help ✎

8-23. Find x if $2^{p(x)} = 4$ and $p(x) = x^2 - 4x - 3$. Homework Help ✎

8-24. Start with the graph of $y = 3^x$, then write new equations that will shift the graph as described below.
Homework Help ✎

a. Down 4 units.

b. Right 7 units.

8-25. THE COUNTY FAIR FERRIS WHEEL

Consider this picture of a Ferris wheel. The wheel has a 60-foot diameter and is drawn on a set of axes with the Ferris wheel's hub (center) at the origin. Use a table like the one below and draw a graph that relates the angle (in standard position) of the spoke leading to your seat to the approximate height of the top of your seat above or below the height of the central hub. The table below starts at −90°, your starting position before you ride around the wheel. Homework Help ✎

x (angle)	−90°	−45°	0°	45°	90°	135°	180°	....	270°
y (height)	−30'								

a. The wheel goes around (counter-clockwise) several times during a ride. How could you reflect this fact in your graph? Update your graph.

b. What is the maximum distance above or below the center that the top of your seat attains during the ride?

c. Find an equation to fit the County Fair Ferris wheel ride.