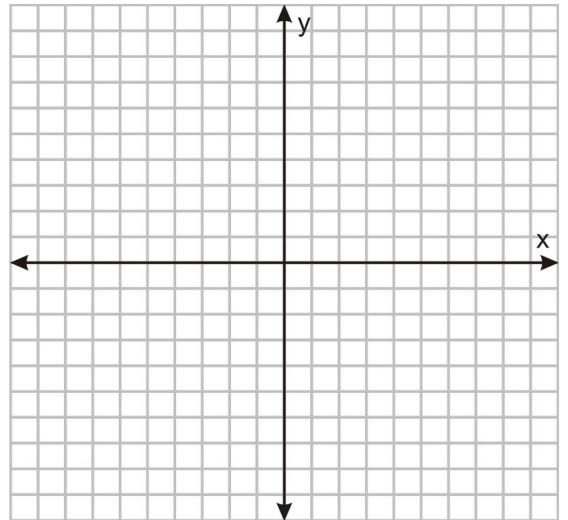
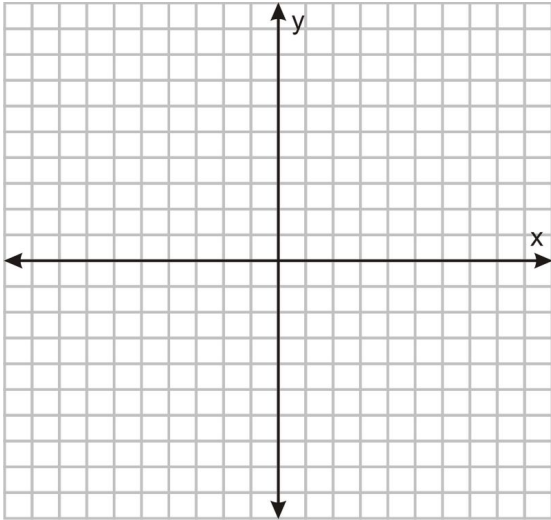


Review 3.1-3.3

1. Graph the following:

a. $f(x) = x^2 + 4x - 4$

b. $g(x) = -2(x + 3)^2 + 5$

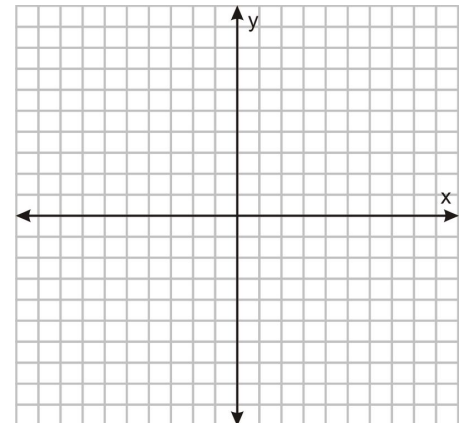
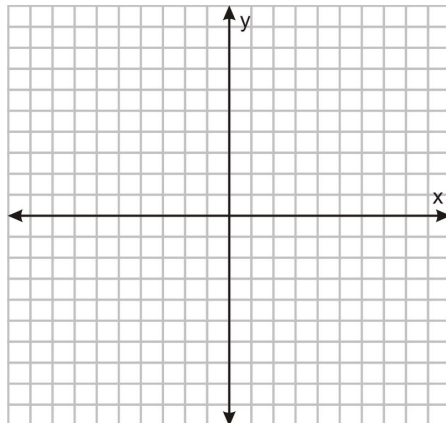
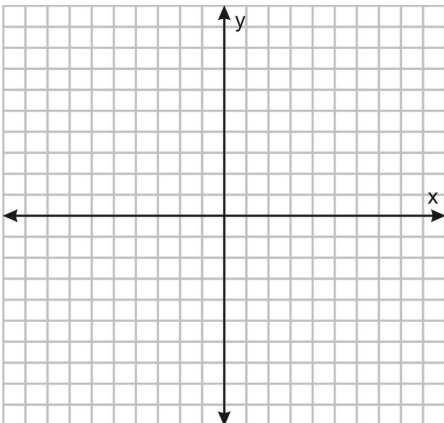


2. Graph the following by writing the equation in vertex form. Identify the vertex and axis of symmetry.

a. $f(x) = x^2 + 2x - 5$

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

c. $h(x) = -3x^2 + 12x - 8$



3. Divide the following using long division

$$\frac{12x^3 - 11x^2 + 9x + 18}{4x + 3}$$

4. Perform the following division using synthetic division:

a. $\frac{4x^3 - 15x^2 + 11x - 10}{x - 3}$

b. $(2x^3 + 4x^2 - 5) \div (x + 3)$

5. Let $f(x) = -3x^4 + 15x^2 - 50x + 25$. Use the remainder theorem to find $f(4)$.

6. Determine whether the given number k is a zero of $f(x)$.

a. $f(x) = 2x^3 - 3x^2 - 18$; $k = 2$

b. $f(x) = x^4 - 4x^3 - 14x^2 + 36x + 45$; $k = -3$

c. $f(x) = x^4 - x^3 + 6x^2 + 14x - 20$; $k = 1 + 3i$

7. Determine whether $x + 4$ is a factor of $f(x) = x^5 + 6x^4 + 11x^3 + 12x^2 + 5x - 20$.

8. Factor $f(x) = 6x^3 - 37x^2 + 32x + 15$ into linear factors given that 5 is a zero.

9. Consider the polynomial function.

$$f(x) = 8x^4 - 26x^3 - 27x^2 + 11x + 4$$

a. List all possible rational zeros.

b. Find all the complex zeros and factor $f(x)$ into linear factors.

10. Consider the polynomial function.

$$f(x) = 15x^4 + x^3 - 52x^2 + 20x + 16$$

a. List all possible rational zeros.

b. Find all the complex zeros and factor $f(x)$ into linear factors.

11. Find a polynomial function $f(x)$ of degree 3 with real coefficients that satisfies the given conditions.

a. Zeros of $-3, -2$, and 5 ; $f(-1) = 6$

b. 4 is a zero of multiplicity 3 ; $f(2) = -24$

12. Find a polynomial function $f(x)$ of least degree having only real coefficients and zeros -4 and $3 - i$.

13. Determine the different possibilities for the numbers of positive, negative, and nonreal complex zeros of $f(x) = -2x^4 + 3x^3 - 5x^2 + 4x - 1$.