

1. Write the equation of the line that passes through the two given points.

a) $(-3, -4)$ and $(6, 2)$

b) $f(-4) = 4$ and $f(3) = -10$

2. Write the equation of the parabola: Vertex: $(3, 5)$, Additional point: $(0, -22)$

3. Find the average rate of change of $f(x) = 2x^2 - 3x + 1$ from $x = -1$ to $x = 5$

4. Use a graphing utility to answer the following questions.

A rock is tossed straight up into the air with an initial velocity of 24 feet per second from an initial height of four feet.

This motion of the rock can be represented by the function $s(t) = -16t^2 + 24t + 4$

a) How high is the rock after 1 second?

b) What is the maximum height of the rock?

c) When does the rock hit the ground?

d) When will the rock reach a height of 9 feet?

5. Determine degree, leading coefficient and end behavior of the graph of each polynomial function.

a) $y = 3x^4 + 6x^3 - x^2 + 12$

b) $y = 50 - 3x^3 + 5x^2$

6. Graph each polynomial function

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

b) $y = -x^2(x + 2)(x - 3)^2$

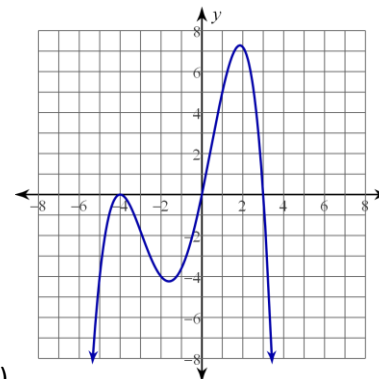
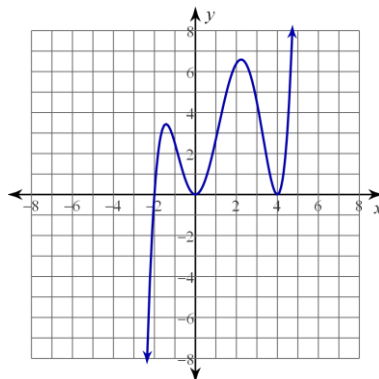
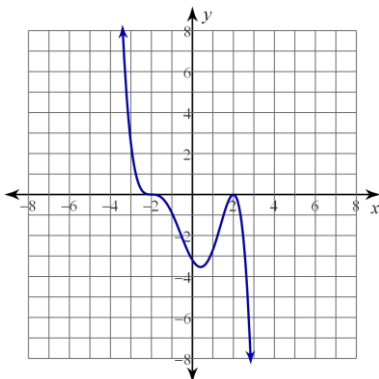
c) $y = -(x + 3)^2(x - 3)$

d) $y = x^2(x - 5)^3(x + 1)$

e) $y = -x^2(x + 2)(x + 1)^2(x - 4)^3$

f) $y = x^3(x + 5)^5(x - 3)^8$

7. Write a possible polynomial equation in factored form for each of the graphs below.



8. Divide each polynomial using long division.

a) $(12x^2 + 18x - 17) \div (6x - 3)$

b) $(2x^3 + 13x^2 + 16x + 5) \div (x + 5)$

9. Divide using synthetic division.

a) $(3x^3 - 70x + 2) \div (x - 5)$

b) $(2x^3 + x^2 - 8x + 4) \div (x + 2)$

10. Determine whether each binomial is a factor of $x^3 - 9x^2 + 15x + 25$.

a) $x - 2$

b) $x + 1$

c) $x - 5$

d) $x - 3$

11. Use the Rational Root Theorem to list all possible rational roots for each equation.

a) $2x^3 - 5x^2 + x - 8$

b) $x^3 - 4x^2 - 15x + 18$

12. Find all roots. (Is it factorable? If not, use Rational Root Theorem)

a) $y = 2x^3 - 5x^2 - x + 6$

b) $g(x) = x^4 - x^3 - 4x^2 + 2x + 4$

c) $y = x^3 - 10x - 12$

d) $g(x) = x^4 - 13x^2 + 36$

e) $f(x) = x^3 + 3x^2 - 2$

f) $f(x) = 3x^4 + 17x^3 + 34x^2 + 28x + 8$

13. Graph each polynomial by hand. Confirm the graph using a graphing calculator. (Is it factorable? If not, use Rational Root Theorem)

a) $y = x^3 - 3x^2 - 4x + 12$

b) $y = x^3 - 3x - 2$

c) $y = x^4 + x^3 - 3x^2 - 5x - 2$

d) $y = x^5 + 3x^4 - 3x^3 - 7x^2 + 6x$

e) $y = -x^5 + 4x^4 + 4x^3 - 16x^2$

f) $y = x^3 + 2x^2 - 9x - 18$

14. Write a polynomial function in standard form with rational coefficients with the given roots.

a) $\sqrt{2}$, $-\sqrt{2}$, and 5

b) $-2, \frac{3}{2}, 0$

c) $1 - \sqrt{2}$, $1 + \sqrt{2}$

15. Use the remainder theorem to evaluate each expression when $f(x) = 3x^4 - 2x^3 - x^2 + 4x - 1$.

a) $f(-3)$

b) $f(2)$

c) $f(-1)$

Make sure you can do the following on your graphing calculator: Find minimums and maximums, find x-intercepts, and find the y value at a given x value.