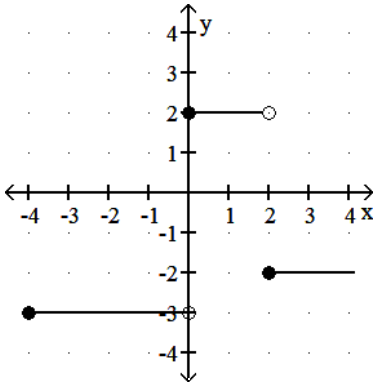
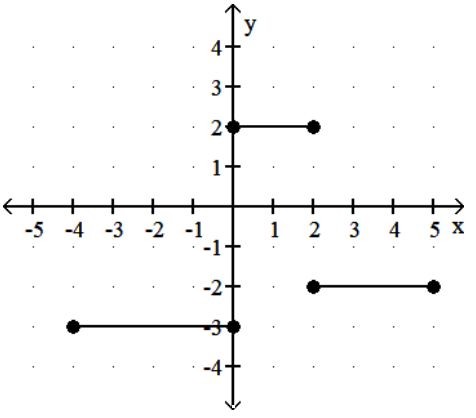
Graph the function.

1) $r(x) = \begin{cases} -3 & \text{for } -4 \le x < 0 \\ 2 & \text{for } 0 \le x < 2 \\ -2 & \text{for } x \ge 2 \end{cases}$ 1) _____

A)



B)



Determine the end behavior of the graph of the function.

2) $f(x) = -9x^7 - 6x^5 - 4x^4 + 7$ 2) _____

A) Down left and down right
B) Up left and down right
C) Down left and up right
D) Up left and up right

Find the zeros of the function and state the multiplicities.

3) $f(x) = -2x^6(x + 7)^2(x - 5)^6$ 3) _____

A) 0 (multiplicity 6), 7 (multiplicity 2), -5 (multiplicity 6)
B) 0 (multiplicity 6), -7 (multiplicity 2), 5 (multiplicity 6)

Use long division to divide.

4) $(3x^3 - 10x^2 - 23x - 13) \div (x - 5)$ 4) _____

A) $3x^2 + 5x - 1$
B) $3x^2 + 5x + 2 - \dfrac{3}{x - 5}$

Use synthetic division to divide the polynomials.

5) $(s^4 + 5s^3 + 2s^2 - 17s + 7) \div (s - 1)$ 5) _____

A) $s^3 + 6s^2 + 8s - 9 - \dfrac{2}{s - 1}$
B) $s^3 + 6s^2 + 8s - 9$

List the possible rational zeros.

6) $f(x) = 4x^4 - 3x^3 + 8x + 14$ 6) _____

A) $\pm 1, \pm\frac{1}{2}, \pm\frac{1}{4}, \pm 2, \pm 7, \pm 14, \pm\frac{7}{2}, \pm\frac{7}{4}$

B) $\pm 1, \pm\frac{1}{2}, \pm\frac{1}{4}, \pm 2, \pm\frac{2}{7}, \pm 4, \pm\frac{4}{7}$

C) $1, \frac{1}{2}, \frac{1}{4}, 2, 7, \frac{7}{2}, \frac{7}{4}$

D) $-1, -\frac{1}{2}, -\frac{1}{4}, -2, -7, -\frac{7}{2}, -\frac{7}{4}$

Answer:

7) A polynomial of degree 10 has zeros 4, 5*i*. Find: 7) _____

A) Another zero: _____

B) Max number of complex zeros:_____

C) Max number of real zeros: _____

D) Min number of complex zeros:_____

Solve the problem.

8) The following table represents the result of a synthetic division. 8) _____

-3	5	9	-4	-5
		-15	18	-42
	5	-6	14	-47

Use *x* as the variable. Identify the dividend., the divisor, the quotient and the remainder.

A) $5x^3 + 9x^2 - 4x - 5$ _____

B) $x + 3$ _____

C) -47 _____

D) $5x^2 - 6x + 14$ _____

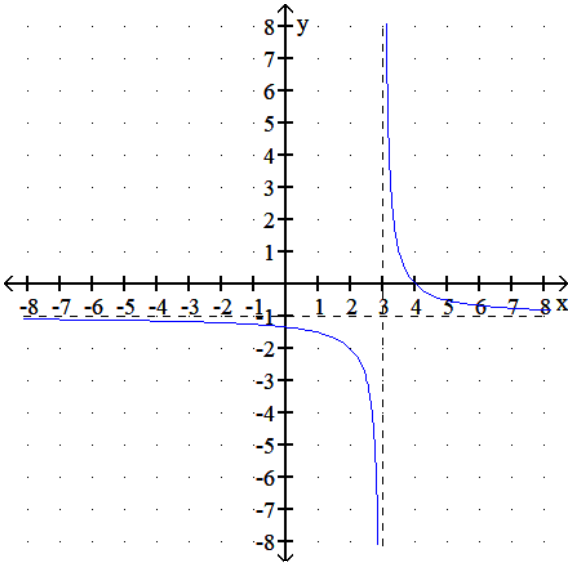
9) Express the polynomial as a product of linear factors: $f(x) = 2x^3 - 5x^2 - 31x + 84$ given that -4 is a zero. 9) _____

A) $(x - 4)(2x + 7)(x - 3)$

B) $(x + 4)(2x - 7)(x - 3)$

The graph of the rational function. Find:

10) $f(x) > 0$ 10) _____



A) Equation of horizontal Asymptote if any.
B) Equation of vertical Asymptote if any.
C) Domain_____ Range_____
D) x-intercept(s):_____ y-intercept(s):_____

Solve the inequality. Write the solution set in interval notation.

11) $\frac{x+3}{x-6} > 0$ 11) _____

A) $(-\infty, 6) \cup (3, \infty)$ B) $(-\infty, -3) \cup (6, \infty)$

12) $-x^2 - 11x - 28 \leq 0$ 12) _____

A) $(-\infty, -4] \cup [7, \infty)$ B) $(-\infty, -7] \cup [-4, \infty)$