Name_____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Use the Factor Theorem to determine whether x – c is a factor of f(x).

1) $f(x) = x^4 - 45x^2 - 196$; x – 7

    A) Yes   B) No

Solve the inequality.

2) (x – 2)(x – 7) > 0

    A) (2, 7)   B) (–∞, 2)   C) (7, ∞)   D) (–∞, 2) or (7, ∞)

Solve the inequality. Express your answer using interval notation.

3) $-34 \le -5x + 1 \le -19$

    A) [4, 7]

    B) (4, 7)

    C) (–7, –4)

    D) [–7, –4]

4) |x – 2| – 8 ≤ 1

    A) (–∞, –7) or (11, ∞)   B) [–7, 11]   C) [7, 1]   D) no solution

5) $-42x - 12 \le -6(6x - 4)$

    A) [–6, ∞)

    B) (–∞, –6]

    C) (–∞, –6)

    D) [–6, ∞)

Solve the equation by factoring.

6) $5x^2 + 17x - 12 = 0$

   A) $\{-\frac{3}{5}, -4\}$ B) $\{\frac{3}{5}, -4\}$ C) $\{\frac{3}{5}, 4\}$ D) $\{-\frac{3}{5}, 4\}$

7) $x^2 - 4x - 12 = 0$

   A) $\{2, -6\}$ B) $\{-2, 6\}$ C) $\{-2, -6\}$ D) $\{2, 6\}$

Solve the problem.

8) A projectile is thrown upward so that its distance above the ground after t seconds is $h = -12t^2 + 360t$. After how many seconds does it reach its maximum height?

   A) 22.5 sec   B) 15 sec   C) 30 sec   D) 7 sec

9) The profit that the vendor makes per day by selling x pretzels is given by the function $P(x) = -0.004x^2 + 2.8x - 400$. Find the number of pretzels that must be sold to maximize profit.

   A) 1.4 pretzels   B) 700 pretzels   C) 90 pretzels   D) 350 pretzels

10) Mary and her brother John collect foreign coins. Mary has four times the number of coins that John has. Together they have 150 foreign coins. Find how many coins Mary has.

   A) 120 coins   B) 30 coins   C) 24 coins   D) 114 coins

11) The cost in millions of dollars for a company to manufacture x thousand automobiles is given by the function $C(x) = 4x^2 - 16x + 36$. Find the number of automobiles that must be produced to minimize the cost.
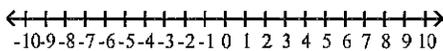
   A) 2 thousand automobiles   B) 20 thousand automobiles

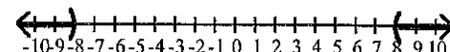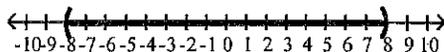   C) 4 thousand automobiles   D) 8 thousand automobiles

Solve the absolute value inequality. Other than ∅, use interval notation to express the solution set and graph the solution set on a number line.
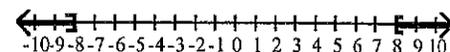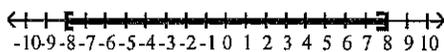
12) $|x| > 8$

   A) $(-8, 8)$

   B) $(-\infty, -8) \cup (8, \infty)$

   C) $[-8, 8]$

   D) $(-\infty, -8] \cup [8, \infty)$

Find the real solutions, if any, of the equation. Use the quadratic formula.

13) $3x^2 + 8x + 1 = 0$

   A) $\{\frac{-8 - \sqrt{13}}{3}, \frac{-8 + \sqrt{13}}{3}\}$ B) $\{\frac{-4 - \sqrt{13}}{3}, \frac{-4 + \sqrt{13}}{3}\}$

   C) $\{\frac{-4 - \sqrt{19}}{3}, \frac{-4 + \sqrt{19}}{3}\}$ D) $\{\frac{-4 - \sqrt{13}}{6}, \frac{-4 + \sqrt{13}}{6}\}$

Find the real solutions of the equation.

14) $\sqrt{x^2 - 3x + 81} = x + 6$

   A) $\{3\}$ B) $\{-3\}$ C) $\{9\}$ D) $\{-\frac{3}{2}\}$

15) $\sqrt{3x - 2} = 2$

A) $\{\frac{4}{3}\}$ B) $\{\frac{2}{3}\}$ C) $\{2\}$ D) $\{4\}$

Find the vertex and axis of symmetry of the graph of the function.

16) $f(x) = x^2 + 4x - 5$

A) $(2, -9); \ x = 2$ B) $(-2, 9); \ x = -2$ C) $(-2, -9); \ x = -2$ D) $(2, 9); \ x = 2$

Determine algebraically whether the function is even, odd, or neither.

17) $f(x) = 5x^4 - x^2$

A) even   B) odd   C) neither

Find the slope–intercept form of the equation of the line with the given properties.

18) Slope = 2; containing the point $(-3, 0)$

A) $y = -2x - 6$ B) $y = 2x - 6$ C) $y = 2x + 6$ D) $y = -2x + 6$

Solve the equation.

19) $-8x + 6(3x - 3) = -6 - 2x$

A) $\{-1\}$ B) $\{-3\}$ C) $\{-2\}$ D) $\{1\}$

20) $3(6x - 4) - 6(x + 8) = 3x - 12 + x$

A) $\{-54\}$ B) $\{6\}$ C) $\{-42\}$ D) $\{-6\}$

21) $|6x + 9| = 7$

A) $\{-\frac{2}{9}, -\frac{16}{9}\}$ B) $\{\frac{1}{3}, \frac{8}{3}\}$ C) $\{-\frac{1}{3}, -\frac{8}{3}\}$ D) no solution

Find the domain of the function.

22) $g(x) = \dfrac{2x}{x^2 - 49}$

A) all real numbers   B) $\{x \mid x \neq -7, 7\}$ C) $\{x \mid x > 49\}$ D) $\{x \mid x \neq 0\}$

Find the center (h, k) and radius r of the circle with the given equation.

23) $(x - 7)^2 + (y + 8)^2 = 25$

A) $(h, k) = (7, -8); \ r = 5$ B) $(h, k) = (-8, 7); \ r = 25$

C) $(h, k) = (7, -8); \ r = 25$ D) $(h, k) = (-8, 7); \ r = 5$

Solve the equation by completing the square.

24) $x^2 + 8x - 7 = 0$

A) $\{-4 - \sqrt{23}, -4 + \sqrt{23}\}$ B) $\{4 + \sqrt{23}\}$

C) $\{-1 - \sqrt{23}, -1 + \sqrt{23}\}$ D) $\{-4 - 2\sqrt{23}, -4 + 2\sqrt{23}\}$

Give the equation of the horizontal asymptote, if any, of the function.

25) $T(x) = \dfrac{8x^2 - 2x - 4}{6x^2 - 3x + 8}$

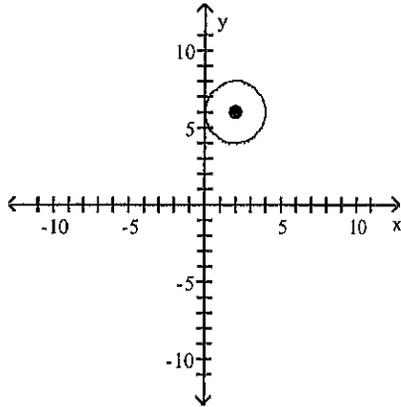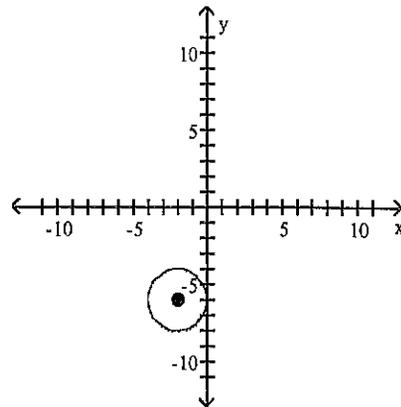A) $y = 0$ B) $y = \frac{4}{3}$ C) $y = \frac{2}{3}$ D) none

Find the center (h, k) and radius r of the circle. Graph the circle.
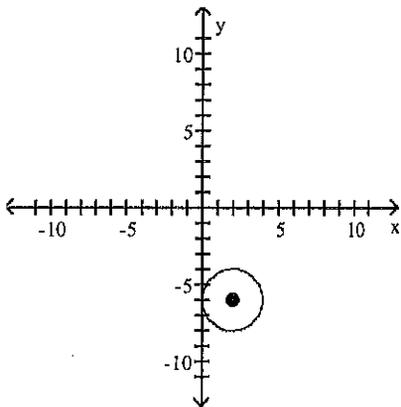
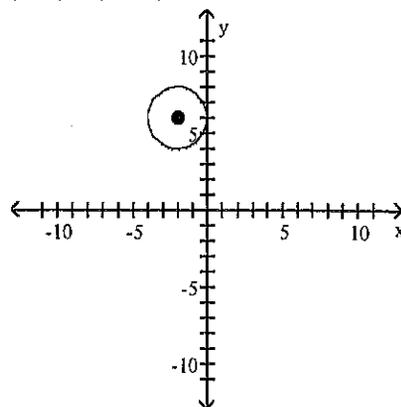26) $x^2 + y^2 + 4x + 12y + 36 = 0$

A) $(h, k) = (2, 6);\ r = 2$

B) $(h, k) = (-2, -6);\ r = 2$

C) $(h, k) = (2, -6);\ r = 2$

D) $(h, k) = (-2, 6);\ r = 2$

Find the value for the function.

27) Find $f(2)$ when $f(x) = x^2 + 5x + 2$.

    A) 12   B) –8   C) 16   D) –4

Write the expression in the standard form a + bi.

28) $\dfrac{3 - 7i}{7 + 3i}$

    A) 1   B) –i   C) –1   D) i

Find the domain of the rational function.

29) $g(x) = \dfrac{8x}{x + 5}$

    A) $\{x \mid x \neq 5\}$ B) $\{x \mid x \neq -5\}$ C) $\{x \mid x \neq 0\}$ D) all real numbers

Find the distance $d(P_1, P_2)$ between the points P_1 and P_2.

30) $P_1 = (1, 3);\ P_2 = (-2, -1)$

    A) 25   B) 10   C) 6   D) 5

Find an equation for the line, in the indicated form, with the given properties.

31) Containing the points (7, –8) and (–2, 6); general form

    A) $15x - 8y = -18$ B) $14x + 9y = 26$ C) $-15x + 8y = -18$ D) $-14x + 9y = 26$

Form a polynomial whose zeros and degree are given.

32) Zeros: -1, 1, - 4; degree 3

A) $f(x) = x^3 + 4x^2 - x - 4$ for $a = 1$

B) $f(x) = x^3 - 4x^2 + x - 4$ for $a = 1$

C) $f(x) = x^3 - 4x^2 - x + 4$ for $a = 1$

D) $f(x) = x^3 + 4x^2 + x + 4$ for $a = 1$

Find the slope of the line containing the two points.

33) $(-6, 3);\ (6, -1)$

A) $-\dfrac{1}{3}$

B) -3

C) $\dfrac{1}{3}$

D) 3

State whether the function is a polynomial function or not. If it is, give its degree. If it is not, tell why not.

34) $f(x) = x(x - 6)$

A) Yes; degree 1

B) Yes; degree 2

C) Yes; degree 0

D) No; it is a product

Solve the equation in the complex number system.

35) $x^2 - 14x + 65 = 0$

A) $\{7 - 16i, 7 + 16i\}$

B) $\{7 + 4i\}$

C) $\{11, 3\}$

D) $\{7 + 4i, 7 - 4i\}$

1) A
2) D
3) A
4) B
5) D
6) B
7) B
8) B
9) D
10) A
11) A
12) B
13) B
14) A
15) C
16) C
17) A
18) C
19) D
20) B
21) C
22) B
23) A
24) A
25) B
26) B
27) C
28) B
29) B
30) D
31) B
32) A
33) A
34) B
35) D