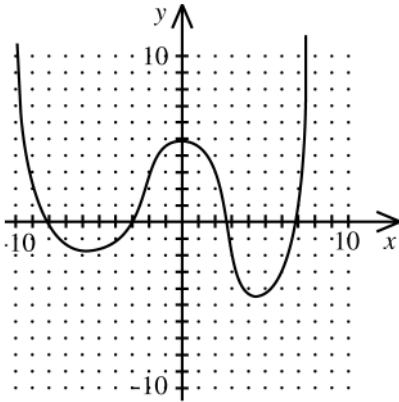


1. Solve by factoring:  $3x^2 - x - 4 = 0$
- [A]  $-\frac{4}{3}, 1$                       [B]  $4, -3$                       [C]  $8, -6$                       [D]  $\frac{4}{3}, -1$
2. Find a quadratic equation with the given roots:  $-2$  and  $\frac{5}{3}$
- [A]  $3x^2 + x + 10 = 0$                       [B]  $3x^2 - x - 10 = 0$   
[C]  $3x^2 - x + 10 = 0$                       [D]  $3x^2 + x - 10 = 0$
3. Solve by using the Square Root Property:  $x^2 - 4x + 4 = 36$
- [A]  $\{-4, 8\}$                       [B]  $\{2, -6\}$                       [C]  $\{-2, 6\}$                       [D]  $\{4, -8\}$
4. Solve by using the quadratic formula:  $4x^2 + 7x - 15 = 0$
- [A]  $-3, \frac{5}{4}$                       [B]  $-3, \frac{4}{5}$                       [C]  $3, -\frac{5}{4}$                       [D]  $3, -\frac{4}{5}$
5. Find the nature of the roots of the equation:  $5x^2 - 5x - 3 = 0$
- [A] two real roots                      [B] two imaginary roots  
[C] one real root and one imaginary root                      [D] one real root
6. Find the equation of the axis of symmetry:  $f(x) = -5(x - 7)^2 - 5$
- [A]  $x = 7$                       [B]  $x = 5$                       [C]  $x = -5$                       [D]  $x = -7$
7. Find the equation for the parabola with the given vertex that passes through the given point:  
vertex:  $(-1, -1)$   
point:  $(-2, -5)$
8. Solve:  $x^2 - 7x + 12 < 0$
- [A]  $3 < x < 4$                       [B]  $x < 3$  or  $x > 4$                       [C]  $-4 < x < -3$                       [D]  $x < -4$  or  $x > -3$
9. If  $h(x) = x^2 + 5x - 4$ , find  $h(1)$ .                      [A]  $-2$                       [B]  $2$                       [C]  $-8$                       [D]  $-10$

10. Determine whether the degree of the function below is odd or even. How many real zeroes does the function have?



- [A] even; 3 zeroes    [B] even; 4 zeroes    [C] odd; 4 zeroes    [D] odd; 3 zeroes

Solve:

11.  $x^4 - 4x^2 + 4 = 0$     [A]  $\pm 2$     [B]  $\pm i\sqrt{2}$     [C]  $\pm 2i$     [D]  $\pm\sqrt{2}$
12.  $x + 5\sqrt{x} - 36 = 0$     [A] 4    [B] 81    [C] 9    [D] 16
13. Use synthetic substitution:  $f(x) = 5x^3 + 5x^2 - 6x$ , find  $f(5)$   
 [A] 780    [B] 720    [C] 144    [D] 470
14. Given the polynomial and one of its factors, find the remaining factors:  
 $2x^3 + 17x^2 + 46x + 40$ ;  $(x + 2)$   
 [A]  $(2x + 5)(x + 4)$     [B]  $(2x - 5)(x - 4)$     [C]  $(2x - 5)(x + 4)$     [D]  $(2x + 5)(x - 4)$
15. Given that one zero is 2, which of the following is *not* a zero of  $f(x)$ ?  
 $f(x) = x^3 + 4x^2 - 4x - 16$   
 [A] -2    [B] -4    [C] 2    [D] -5
16. Given the function and one of its zeros, find all of the zeros of the function:  
 $g(x) = x^3 + 5x^2 + 16x + 80$ ;  $4i$

17. Find  $[g \circ f](x)$ :  $f(x) = x + 3$

$$g(x) = \frac{x-1}{8}$$

[A]  $\frac{x+23}{8}$

[B]  $\frac{x+2}{8}$

[C]  $\frac{9x+23}{8}$

[D]  $\frac{x^2+2x-3}{8}$

18. Find  $f(x)^{-1}$ :  $f(x) = 2x^3 - 2$

[A]  $\sqrt[3]{\frac{x+2}{2}}$

[B]  $\frac{1}{2x^3-2}$

[C]  $\frac{(x+2)^3}{8}$

[D]  $2x^{-1} - 2$

19. Find the inverse of the relation:  $y = -9x + 3$

20. Find the midpoint of a line segment connecting the points:  $(-4, 7)$  and  $(6, 1)$

21. Find the distance between the points:  $(3, -5)$  and  $(5, 1)$

22. Write the equation  $x = y^2 + 2y + 3$  in the form  $x = a(y - k)^2 + h$ , and then sketch the graph of the equation.

23. Write the equation in standard form for the circle with center at  $(-1, -6)$  and radius  $5\sqrt{5}$ .

24. Write the equation in standard form, then sketch the graph of the equation:

$$x^2 + y^2 - 6x - 10y + 34 = 9$$

25. Write the equation in standard form for the ellipse with foci  $(3, 0)$  and  $(-3, 0)$  and endpoints on the vertical axis of  $(0, 9)$  and  $(0, -9)$ .

26. Graph:  $\frac{(x-4)^2}{16} - \frac{(y-4)^2}{25} = 1$

Write the equation in standard form:

27.  $x^2 + y^2 + 4x - 6y = -4$

28.  $5x^2 + 30x - y + 41 = 0$

29.  $4x^2 - 9y^2 - 8x - 90y = 257$

Identify the graph of the equation:

30.  $3x^2 - 30x = y - 76$       [A] parabola      [B] hyperbola      [C] ellipse      [D] circle

31.  $9x^2 - 4y^2 + 18x + 16y = 43$   
[A] parabola      [B] ellipse      [C] hyperbola      [D] circle

32.  $x^2 + y^2 - 8x + 8y + 23 = 0$   
[A] ellipse      [B] circle      [C] hyperbola      [D] parabola

[1] \_\_\_\_\_

[2] \_\_\_\_\_

[3] \_\_\_\_\_

[4] \_\_\_\_\_

[5] \_\_\_\_\_

[6] \_\_\_\_\_

[7] \_\_\_\_\_

[8] \_\_\_\_\_

[9] \_\_\_\_\_

[10] \_\_\_\_\_

[11] \_\_\_\_\_

[12] \_\_\_\_\_

[13] \_\_\_\_\_

[14] \_\_\_\_\_

[15] \_\_\_\_\_

[16] \_\_\_\_\_

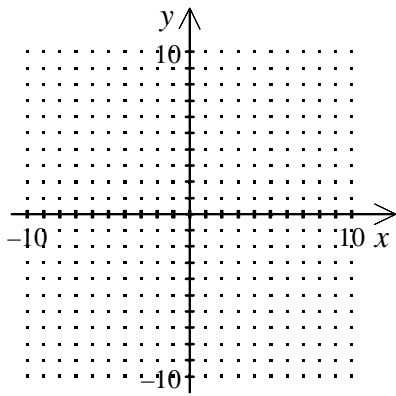
[17] \_\_\_\_\_

[18] \_\_\_\_\_

[19] \_\_\_\_\_

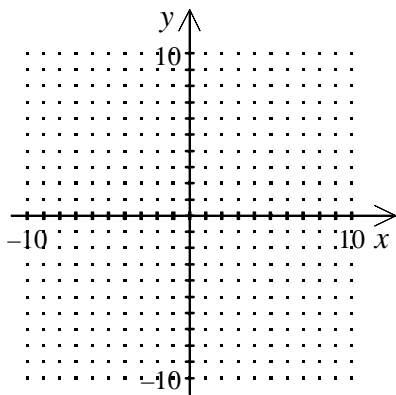
[20] \_\_\_\_\_

[21] \_\_\_\_\_



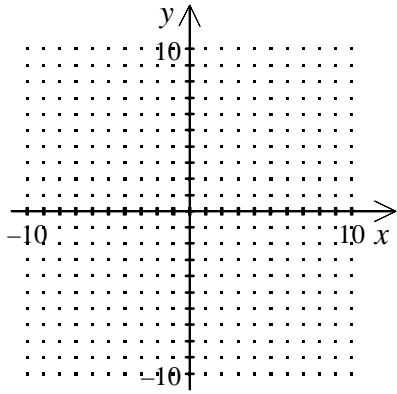
[22] \_\_\_\_\_

[23] \_\_\_\_\_



[24] \_\_\_\_\_

[25] \_\_\_\_\_



[26] \_\_\_\_\_

[27] \_\_\_\_\_

[28] \_\_\_\_\_

[29] \_\_\_\_\_

[30] \_\_\_\_\_

[31] \_\_\_\_\_

[32] \_\_\_\_\_

---

[1] [D]

---

[2] [D]

---

[3] [A]

---

[4] [A]

---

[5] [A]

---

[6] [A]

---

[7]  $y = -4(x + 1)^2 - 1$

---

[8] [A]

---

[9] [B]

---

[10] [B]

---

[11] [D]

---

[12] [D]

---

[13] [B]

---

[14] [A]

---

[15] [D]

---

[16]  $4i, -4i, -5$

---

[17] [B]

---

[18] [A]

---

[19]  $y = -\frac{1}{9}x + \frac{1}{3}$

---

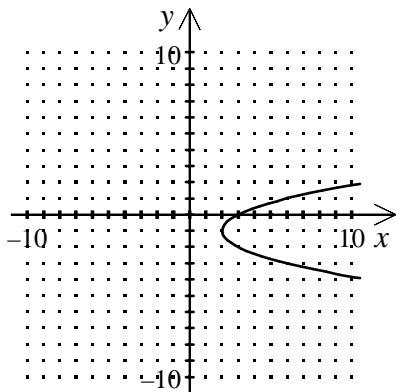
[20] (1, 4)

---

[21]  $2\sqrt{10}$

---

$$x = (y+1)^2 + 2$$



[22] \_\_\_\_\_

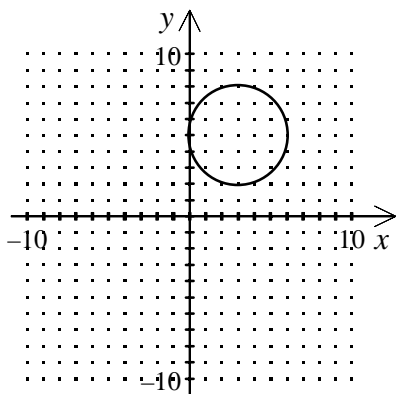
---

$$[23] (x+1)^2 + (y+6)^2 = 125$$

\_\_\_\_\_

---

$$(x-3)^2 + (y-5)^2 = 9$$

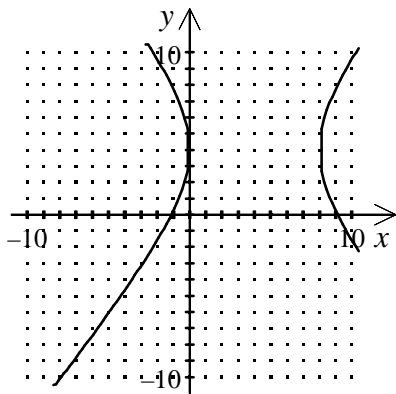


[24] \_\_\_\_\_

---

$$[25] \frac{x^2}{90} + \frac{y^2}{81} = 1$$

\_\_\_\_\_



[26] \_\_\_\_\_

[27]  $(x+2)^2 + (y-3)^2 = 9$  \_\_\_\_\_

[28]  $y = 5(x+3)^2 - 4$  \_\_\_\_\_

[29]  $\frac{(x-1)^2}{9} - \frac{(y+5)^2}{4} = 1$  \_\_\_\_\_

[30] [A] \_\_\_\_\_

[31] [C] \_\_\_\_\_

[32] [B] \_\_\_\_\_