Fill-in-the-Blank

1. $y = -1$
2. -2
3. line $y = x$
4. $38 - 16i$
5. $4\sqrt{5}i$
6. $[7, \infty)$
7. left, 2 , down 3
8. $-2x^2 + 1$
9. -1
10. $3 - 5i$
11. 2 or 0 positive real zeros
12. 3

True or False

1. False
2. True
3. False
4. False
5. False
6. False
7. False
8. False
9. True
10. True
11. False
12. False

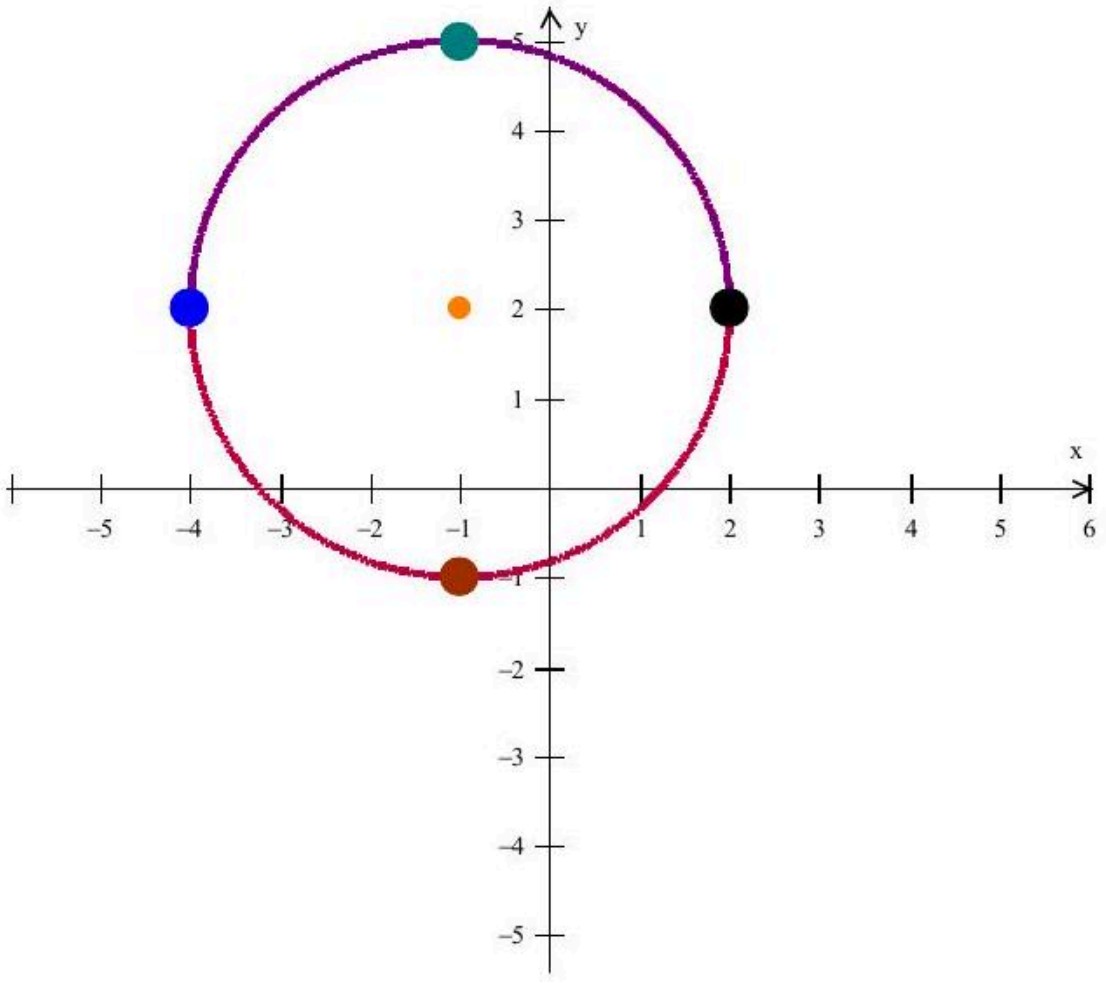
Multiple Choice

1. C
2. D
3. B
4. C
5. A
6. C

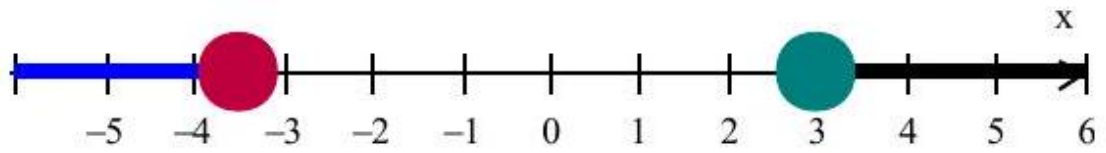
Exercises

1. Center $(h, k) = (-1, 2)$; Radius $r = 3$. See graph.

Passes through points: $(-1, 5), (2, 2), (-1, -1), (-4, 2)$
2. $x = 11/6$
3. List Price - Discount = Sale Price
$x - 0.25x = 225; x = \$300$
4. $x + (x + 1) = 525$; numbers are 262 and 263
5. $\left\{1 \pm \frac{\sqrt{2}}{2}\right\}$
6. $-\frac{8}{5} - \frac{19}{5}i$
7. $\{-2, \pm\sqrt{3}i\}$
8. $x = 1$

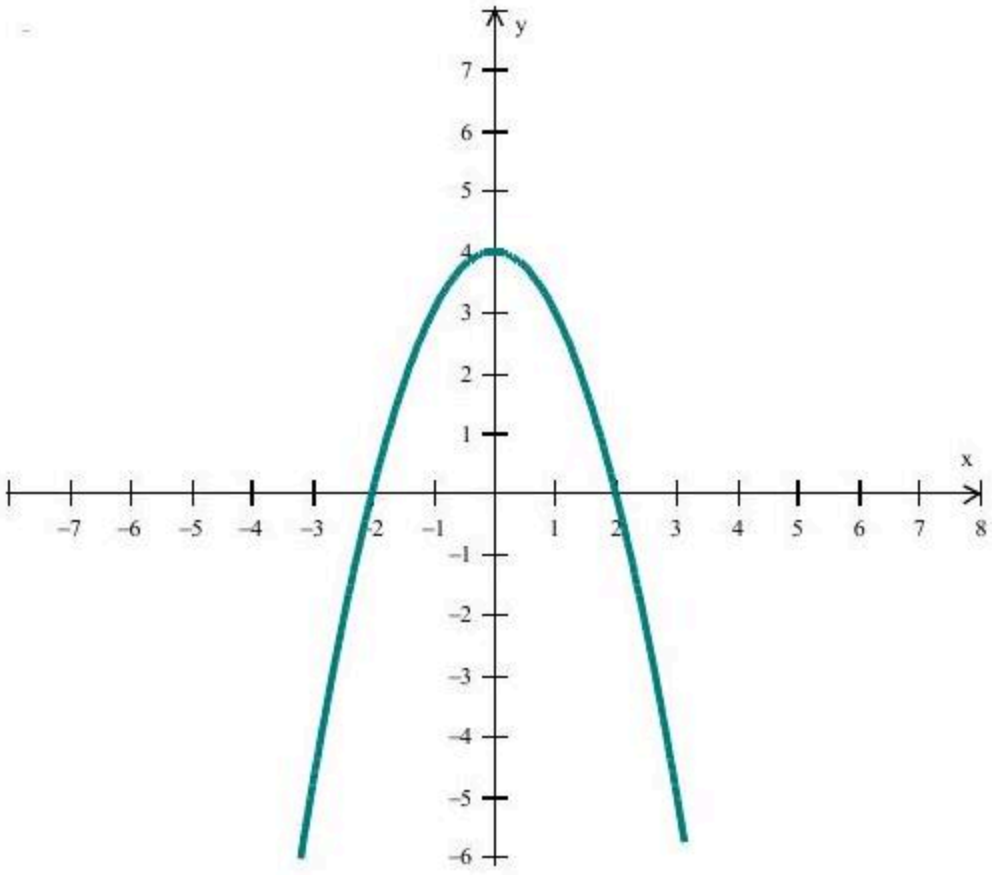


9. $\{1, -7/3\}$
10. $-4 \leq x < 6$
11. $(-\infty, 1/3) \cup (5/9, \infty)$
12. $\left[-\frac{1}{6}, \frac{5}{6}\right]$
13.



14. $(-\infty, -2) \cup (0, 4)$
15. (a) $y + 2 = \frac{7}{4}(x + 1)$ or $y - 5 = \frac{7}{4}(x - 3)$
(b) $y = \frac{7}{4}x - \frac{1}{4}$
16. See graph.
17. Graph passes the Vertical Line Test. See graph.

Each x-value corresponds to just one y-value. $y = 4 - x^2$



18. $[-4, 5)$
19. $(-7, 6]$
20. -3
21. $-3, 1, 3$
22. $(-4, -1) \cup (2, 5)$
23. (- 1, 2)
24. Neither
25. $\frac{f(3)-f(1)}{3-1} = \frac{25-(-1)}{2} = 13$
26. $f(g(x)) = [\sqrt[3]{x+2}]^3 - 2 = x + 2 - 2 = x.$

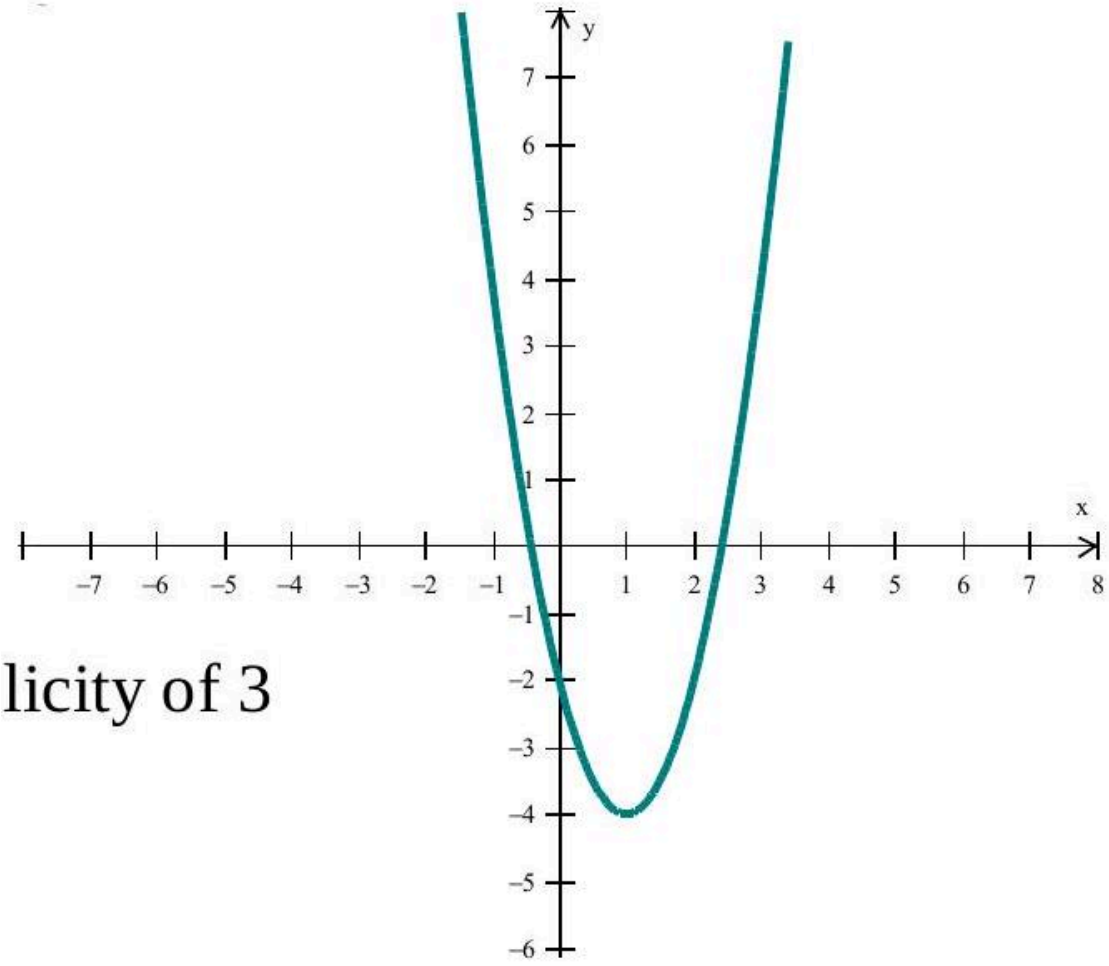
$$g(f(x)) = \sqrt[3]{(x^3 - 2) + 2} = \sqrt[3]{x^3} = x$$

The functions f and g are inverse functions.

27. $f^{-1}(x) = \frac{5}{x} + 2$
28.

(a) up

(b) $(1, -4)$
(c) $x = 1$
(d) $(0, -2)$
(e) two x-intercepts
29. (a) $x = -5, x = 3/2$
(b) $x = -5$ has multiplicity of 2, $x = 3/2$ has multiplicity of 3
(c) touches at $(-5, 0)$, crosses at $(3/2, 0)$
(d) maximum of 4 turns
(e) falls to the left (QIII) and rises to the right (QI)



licity of 3

30. Quotient: $4x^2 - 3x + 9$; Remainder: -20
31. Quotient: $x^2 - 4x - 12$; Remainder: 0 ;

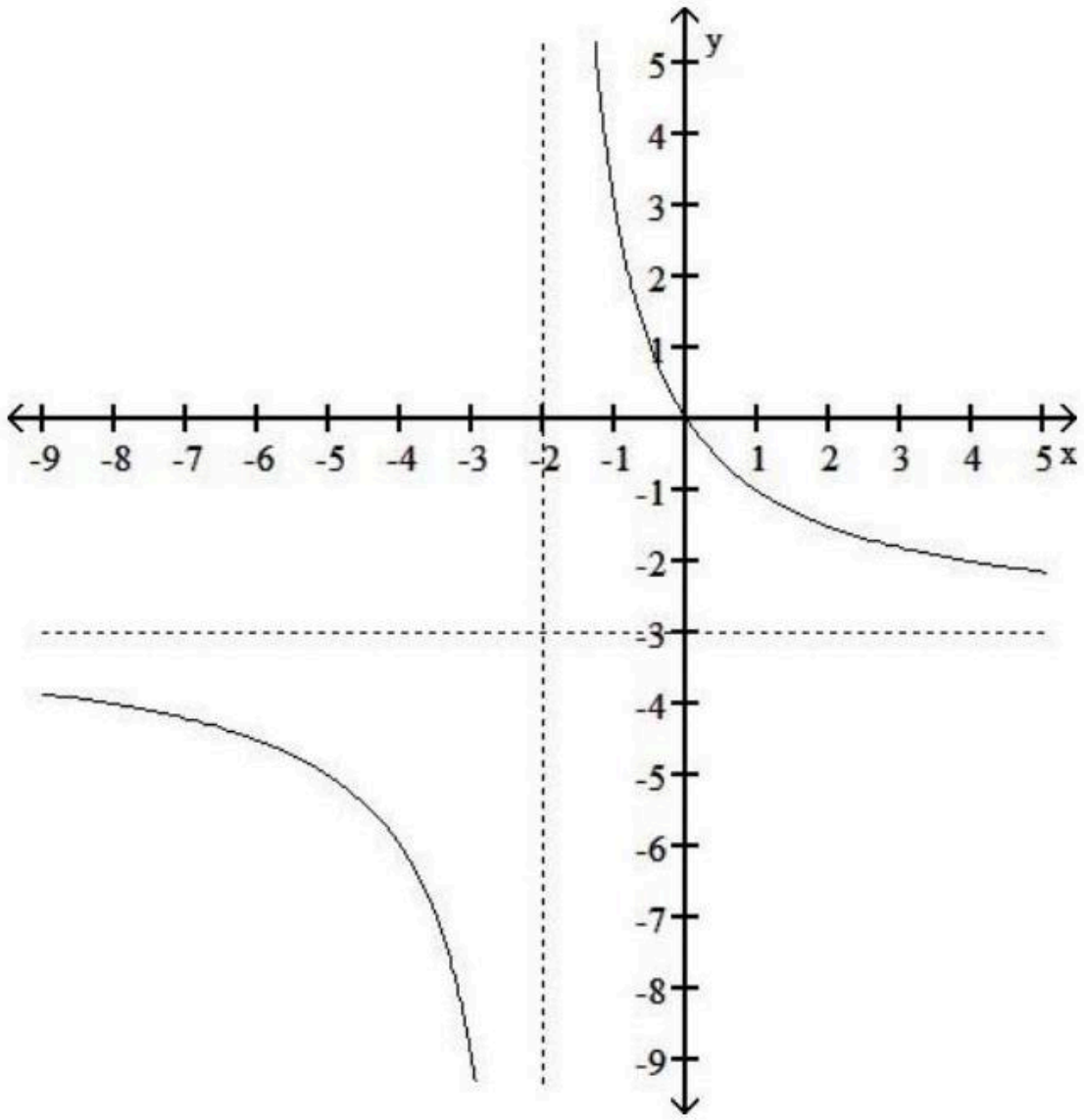
$$x^3 - 28x - 48 = (x + 4)\left(x^2 - 4x - 12\right) = (x + 4)(x - 6)(x + 2$$

32. $\left\{\pm 1, \pm 3, \pm 9, \pm \frac{1}{2}, \pm \frac{3}{2}, \pm \frac{9}{2}\right\}$
33. 3 or 1 positive real zeros; 1 negative real zero

34. Since f is a polynomial function, $f(-1) = -1$ and $f(0) = 3$, then by the Intermediate Value Theorem, the function will have a zero, *c*, in the interval $(-1, 0)$ such that $f(c) = 0$.
35.

(a) $x = -2$
(b) $y = -3$
(c) none
(d) x-intercept: $(0, 0)$;
y-intercept: $(0, 0)$
(e) See graph.
36. $(x, y) = (-2, -4)$;

Note: by Cramer's Rule $D_x = 44, D_y = 88, D = -22$.
37.
(a) $\det(A) = 2$
(b) $\begin{bmatrix} -5 & 15 \\ -16 & -2 \end{bmatrix}$
(c) $\begin{bmatrix} 49 & 63 \\ 36 & 48 \end{bmatrix}$


y
x
5
4
3
2
1
-1
-2
-3
-4
-5
-6
-7
-8
-9
-9 -8 -7 -6 -5 -4 -3 -2 -1 1 2 3 4 5