

1. Which of the following is the square that is completed when solving the equation, $0 = 2x^2 - 20x - 7$, by completing the square?

- a. $x + 25^2$
- b. $x - 25^2$ 1_____
- c. $x + 5^2$
- d. $x - 5^2$

2. Express the perimeter of a rectangle whose length is 5 more than its width in terms of its width, w .

- a. $P = 4w + 10$
- b. $P = 5 + 3w$ 2_____
- c. $P = 2w + 5$
- d. $P = 4w + 5$

3. Find all real solutions of the equation $\sqrt{4x+5} + 4 = x$.

- a. $x = 1, 11$
- b. $x = 0$
- c. $x = 11$
- d. There are no real solutions.

3._____

4. Find the maximum value of $f(x) = -2x^2 + 12x - 20$.

- a. $f(3) = -2$
- b. $f(-2) = 3$
- c. $f(-3) = 2$ 4_____
- d. $f(2) = -3$

5. Which of the following is the range of $f(x) = \sqrt{x} + 4$?

- a. $[0, \infty)$
- b. $[4, \infty)$
- c. $-\infty, 4$ 5_____
- d. $-\infty, \infty$

6. Find the slope and y-intercept of the line $2x - 5y = 4$.

- a. $m = -\frac{2}{5}, 0, 4$
- b. $m = -\frac{5}{2}, 0, 4$
- c. $m = \frac{2}{5}, \left(0, -\frac{4}{5}\right)$ 6_____
- d. $m = \frac{5}{2}, \left(0, \frac{4}{5}\right)$

7. Given $f(x) = (x-1)^2$ and $g(x) = \frac{1}{x-1}$, which of the following is $f \circ g(x)$?

a. $f \circ g(x) = \left(\frac{1}{x-1}\right)^2$

b. $f \circ g(x) = x-1, x \neq 1$

c. $f \circ g(x) = \left(\frac{-x}{x-1}\right)^2, x \neq 1$

7_____

d. $f \circ g(x) = \left(\frac{2-x}{x-1}\right)^2, x \neq 1$

8. If the inverse of a function f exists on the interval $[0, 2]$ and $f^{-1}(0) = -1$ and $f^{-1}(2) = 4$, then which of the following is true?

a. The domain of f is $[0, 2]$.

b. 0 and 2 are in the domain of f .

c. The point $(4, 2)$ is on the graph of f .

d. f is a decreasing function.

8_____

9. Solve the inequality, $-8 < 12 - 4x \leq 16$, and express the solution in interval notation.

a. $[-5, 1]$

b. $[-1, 5]$

c. $[-5, 1]$

d. $[-1, 5]$

9_____

10. Solve $|5x+3| < 6$.

a. $x \leq \frac{-9}{5}$ or $x \geq \frac{3}{5}$

b. $\left[\frac{-9}{5}, \frac{3}{5}\right]$

c. $\left(\frac{-9}{5}, \frac{3}{5}\right)$

d. $x < \frac{-3}{5}$ and $x > \frac{9}{5}$

10_____

11. Which of the following is true of the graph of the quadratic function $f(x) = -3x^2 - 2x + 3$?

- a. The vertex is in quadrant II.
- b. The axis of symmetry is $x = 2$. 11._____
- c. The minimum is 3.
- d. There are no x -intercepts.

12. Find the equation of a quadratic function with the vertex $(-1, -2)$, that passes through the point $(-3, 10)$, and opens upward.

- a. $f(x) = 3x^2 + 2x + 1$
- b. $f(x) = -3x^2 + 2x - 1$
- c. $f(x) = 3x^2 + 6x + 1$ 12._____
- d. $f(x) = -3x^2 + 2x + 5$

13. Use long division to divide $(-x^3 + 2x + 4) \div (x + 3)$.

- a. $-x^2 + 3x - 7 + \frac{25}{x+3}$
- b. $-x^2 + 5x - 11 + \frac{33}{x+3}$ 13._____
- c. $-x^2 + 3x + 11 - \frac{27}{x+3}$
- d. $-x^2 + 5x + 15 - \frac{41}{x+3}$

14. Solve: $49x^4 - 25x^2 = 0$.

- a. $x = \pm \frac{25}{49}$
- b. $x = 0, \pm \frac{5}{7}$
- c. $x = \pm \frac{49}{25}$
- d. $x = 0, \pm \frac{7}{5}$

14._____

15. An ellipse has vertices at $(\pm 5, 0)$ and foci at $(\pm 4, 0)$. Find the equation of the ellipse in standard form.

- a. $\frac{x^2}{25} + \frac{y^2}{9} = 1$
- b. $\frac{x^2}{9} + \frac{y^2}{25} = 1$
- c. $\frac{x^2}{16} + \frac{y^2}{25} = 1$
- d. $\frac{x^2}{25} + \frac{y^2}{16} = 1$

15._____

16. Find the domain of the function $f(x) = \sqrt{-3x-10}$.

a. $x \leq -\frac{10}{3}$

b. $x \geq 0$

c. $x \geq -\frac{10}{3}$

d. $x \leq 0$

16. _____

17. Find the inverse of the function $f(x) = \frac{-2+2x}{-4+3x}$.

a. $f^{-1}(x) = \frac{3-4x}{2-2x}$

b. $f^{-1}(x) = \frac{4x-2}{3x-2}$

c. $f^{-1}(x) = \frac{3x-4}{2x-2}$

d. $f^{-1}(x) = \frac{2-2x}{3-4x}$

17. _____

18. Find the slope-intercept form of the equation of the line through the point $(-6, 3)$, parallel to the line $-3x-7y = -3$.

a. $y = \frac{3}{7}x + \frac{3}{7}$

b. $y = -\frac{7}{3}x - \frac{7}{3}$

c. $y = -\frac{3}{7}x - \frac{7}{3}$

d. $y = -\frac{3}{7}x + \frac{3}{7}$

18. _____

19. Find the equation of the parabola with vertex at the origin that passes through the point $(4,16)$ and opens upward.

a. $x = y^2$

b. $y = -x^2$

c. $y = x^2$

d. $x = -y^2$

19. _____

20. If $f(x) = x^2 + 1$ and $g(x) = -6x$, find $f(g(x))$.

a. $-6x^2 + 1$

b. $-36x^2 + 1$

c. $-3x^2 + 1$

d. $36x^2 + 1$

20. _____

21. Determine the vertices and foci of the graph of $\frac{x^2}{64} - \frac{y^2}{25} = 1$.

a. Vertices: $(\pm 8, 0)$

Foci: $(\pm \sqrt{89}, 0)$

b. Vertices: $(0, \pm 8)$

Foci: $(0, \pm \sqrt{89})$

21. _____

c. Vertices: $\left(\pm \frac{64}{25}, 0\right)$

Foci: $(0, \pm \sqrt{89})$

d. Vertices: $\left(0, \pm \frac{64}{25}\right)$

Foci: $(\pm \sqrt{89}, 0)$

22. Find the right-hand and left-hand behavior of the polynomial function $f(x) = 2x^7 - 2x^2 - 6$.

a. Falls to the left and falls to the right.

b. Rises to the left and falls to the right.

c. Falls to the left and rises to the right.

d. Rises to the left and rises to the right.

22. _____

23. Solve $-\frac{4}{x} - \frac{2}{x-1} = 5$.

a. $x = \frac{9}{5}, 0$

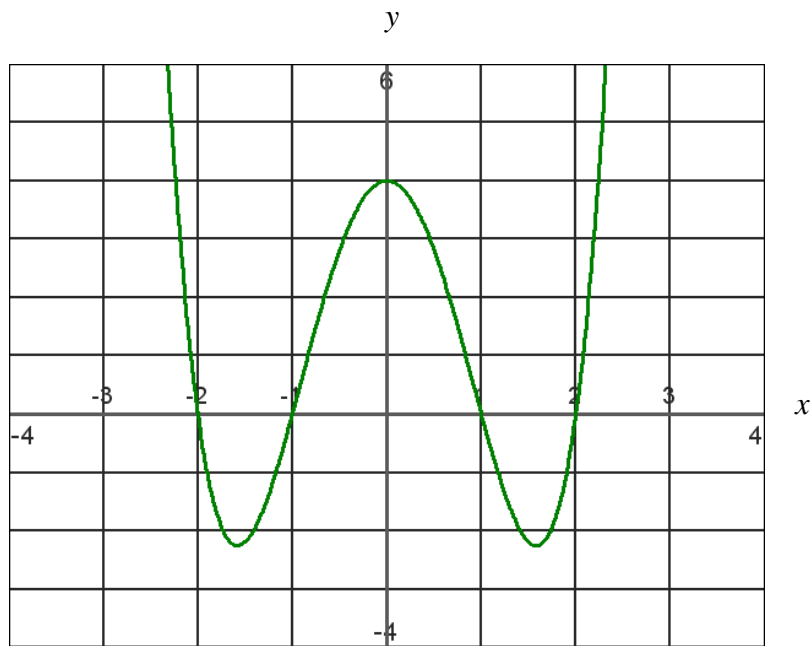
b. $x = \frac{4}{5}, -1$

c. $x = 0$

d. $x = -1$

23. _____

Use the graph below to answer questions 24-30. Put your answers on the line at the right.



24. True or false: The degree of this polynomial is even. _____
25. True or false: The y – intercept is at $(6,0)$. _____
26. Describe the end-behavior of the polynomial.
27. List all the roots of this polynomial.
28. On what intervals is the function increasing? Use interval notation and approximate where you need to.
29. True or false and WHY: The function is one-to-one.
30. Where is $f(x) < 0$? Use interval notation.

KEY Review for Final

1. d
2. a
3. c
4. a
5. b
6. c
7. d
8. c
9. d
10. c
11. b
12. c
13. a
14. b
15. a
16. a
17. b
18. d
19. c
20. d
21. a
22. c
23. b
24. T
25. F
26. rises to the left and to the right
(as $x \rightarrow \infty, f(x) \rightarrow \infty$ and as $x \rightarrow -\infty, f(x) \rightarrow \infty$)
27. $(-2, 0), (-1, 0), (1, 0), (2, 0)$
28. $(-1.5, 0), (1.5, \infty)$
29. No because it fails the horizontal line test.
30. $(-2, -1), (1, 2)$