

Algebra 2 –3rd Quarter Review

Functions:

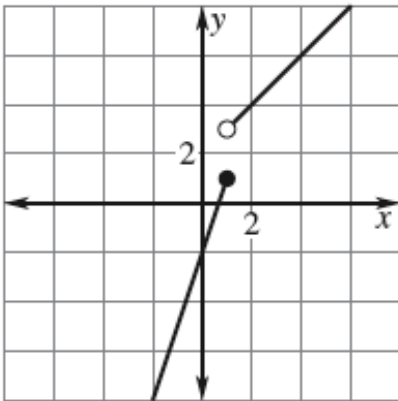
In 1& 2 Graph. State the vertex, domain & range.

1. $f(x) = |x + 2| - 2$

2. $f(x) = \frac{1}{2}|x - 3| + 1$

3. Graph $f(x) = \begin{cases} -x - 4, & \text{if } x < -1 \\ 2x + 1, & \text{if } x \geq -1 \end{cases}$

4. Write a piecewise function for the graph below



5. A cell phone company only charges you for your data use as shown below:

Data used	Rate per month
0 – 2 GB	\$20
Over 2 GB – 4 GB	\$40
Over 4 GB – 6 GB	\$60
Over 6 GB – 8 GB	\$80
Over 8 GB – 10 GB	\$100

Graph the data plan.

6. If $f(x) = x^2 - 3$ and $g(x) = 4\sqrt{x}$, find $f(g(x))$, and $f(f(x))$.

7. Let $f(x) = 4x + 1$ and $g(x) = x^2 - 5$. Find $f(g(x))$ and $g(f(x))$.

Find the inverse of the function.

8. $f(x) = -\frac{1}{3}x - 7$ Verify answer using composition

9. $f(x) = x^3 + 3$

10. $g(x) = \sqrt{4x - 9}$

11. $f(x) = \frac{x^2 + 2}{7}$ Verify answer using composition

12. Let $f(x) = 3x$. Find f^{-1} .

13. The table below lists coordinate pairs for points on the graph of a function $f(x)$. Find $f^{-1}(4)$?

x	y
-4	-11
1	4
4	13

14. The table below lists coordinate pairs for points on the graph of a function $f(x)$ & $g(x)$. Find $g(f(-1))$.

X	f(x)
-1	-9
0	-1
2	7

x	g(x)
-9	6
0	2
-1	2

Radicals:

In 15 – 17:

a. Describe how the parent function $f(x) = \sqrt{x}$ is transformed.

b. State the domain and range of the function

c. Sketch the graph.

15. $g(x) = -\frac{1}{2}\sqrt{x-3} - 2$

16. $g(x) = -3\sqrt{x-2} + 5$

17. $g(x) = 4\sqrt{x+5} - 3$

Radicals:

Solve.

18. $\sqrt{2x+2} - 10 = -4$

19. $x = \sqrt{20-x}$

20. $\sqrt{2x-8} = \sqrt{10-x}$

21. $-15\sqrt{4x+1} + 7 = 52$

Solve. Round to 3 decimals if needed.

22. $3(x+1)^6 + 5 = 98$

23. $8x^5 + 4 = -252$

24. $(3x-8)^7 = 25$

Simplify:

25. $\frac{\sqrt[3]{2}}{\sqrt[3]{54}}$

26. $\left(\frac{1}{16}\right)^{1/2}$

27. $\frac{\sqrt[5]{9} \cdot \sqrt[5]{81}}{\sqrt[5]{3}}$

28. $\left(\frac{r^{25}}{s^{10}}\right)^{2/5}$

29. $(5^{4/5} \cdot 5^{4/5})^{-10}$

30. $\frac{49^{5/6}}{49^{1/3}}$

31. $x^{1/3} \cdot x^{1/4}$

32. $\sqrt{64x^{12}}$

33. $\sqrt[4]{720x^5y^{10}z^{15}}$

Rational Functions:

Simplify the following expressions & state the domain restriction.

34. $\frac{n^2 + 8n + 15}{n^2 - 25}$

35. $\frac{x^3 + 4x^2}{x^2 - 16}$

Simplify the following expressions & state the domain restriction.

36. $\frac{2x^3 - 14x^2}{(x+1)^2} \cdot \frac{x^2 - 8x - 9}{6x^2 - 42x}$

37. $\frac{x^2 + 7x + 12}{x^2 - 9} \div \frac{x+4}{x-4}$

38. $\frac{5x^2 - 13x + 9}{x^3 - 5x^2 + 6x} - \frac{x^2 - 2x + 3}{x^3 - 5x^2 + 6x}$

39. $\frac{2x+7}{x^2+5x+4} - \frac{x+6}{x^2+5x+4}$

40. $\frac{4v+5}{18v^3+30v^2} + \frac{5v-5}{18v^3+30v^2}$

41. $\frac{3x+4}{x^2-16} - \frac{2}{x-4}$

42. $\frac{5}{x+9} + \frac{6}{x-9}$

A. $\frac{11x+9}{11}$ B. $\frac{11}{x^2-81}$ C. $\frac{11x+9}{x^2-81}$ D. $\frac{11}{x+9}$

43. $\frac{x+1}{x^2+6x+9} - \frac{1}{x^2-9}$

44. $3 + \frac{x-6}{3x^2+11x-4}$

Solve:

45. $\frac{x}{3} - \frac{x}{6} = 3$

46. $\frac{x^2}{x-5} = \frac{25}{x-5}$

47. $\frac{1}{x^2+3x} = 1 + \frac{3}{x^2+3x}$

48. $\frac{1}{x-4} = \frac{5}{x^2-10x+24} - \frac{1}{x-6}$

Solve. What is the sum of the solutions?

49. $\frac{m}{m-1} + \frac{m}{m-9} = 1$

Algebra 2 - Q3 Review Answers

1. $V(-2, -2)$
D: All Real Numbers
R: $\{y : y \geq -2\}$
[Graph]
2. $V(3, 1)$
D: All Real Numbers
R: $\{y : y \geq 1\}$
[Graph]
3. [Graph]
4. $f(x) = \begin{cases} 3x - 2, & \text{if } x \leq 1 \\ x + 2, & \text{if } x > -1 \end{cases}$
5. [Graph]
6. $f(g(x)) = 16x - 3$;
 $f(f(x)) = x^4 - 6x^2 + 6$
7. $f(g(x)) = 4x^2 - 19$;
 $g(f(x)) = 16x^2 + 8x - 4$
8. $f^{-1}(x) = -3(x + 7)$ or
 $f^{-1}(x) = -3x - 21$
Show $f^{-1}(f(x)) = x$ or
 $f(f^{-1}(x)) = x$
9. $f^{-1}(x) = \sqrt[3]{x - 3}$
10. $g^{-1}(x) = \frac{x^2 + 9}{4}$ or
 $g^{-1}(x) = \frac{1}{4}x^2 + \frac{9}{4}$
11. $f^{-1}(x) = \pm\sqrt{7x - 2}$
Show $f^{-1}(f(x)) = x$ or
 $f(f^{-1}(x)) = x$
12. $f^{-1}(x) = \frac{1}{3}x$ or $f^{-1}(x) = \frac{x}{3}$
13. 1
14. $g(f(-1)) = 6$
15. Reflected over the x-axis,
vertically compressed by a
factor of $\frac{1}{2}$, shifted 3 units
right; shifted 2 units down
D: $\{x : x \geq 3\}$
R: $\{y : y \leq -2\}$
[Graph]
16. Reflected over the x-axis,
vertically stretched by a
factor of 3, shifted 2 units
right; shifted 5 units up
D: $\{x : x \geq 2\}$
R: $\{y : y \leq 5\}$
[Graph]
17. No Reflection, vertically
stretched by a factor of 4,
shifted 5 units left; shifted 3
units down
D: $\{x : x \geq -5\}$
R: $\{y : y \geq -3\}$
[Graph]
18. $x = 17$
19. $x = 4$
20. $x = 6$
21. No Solution
22. $x = 0.772, -2.772$
23. $x = -2$
24. $x = 3.19$
25. $1/3$
26. $1/4$
27. 3
28. $\frac{r^{10}}{s^4}$
29. $\frac{1}{5^{16}}$
30. 7
31. $x^{7/12}$
32. $8x^6$
33. $2xy^2z^3\sqrt[4]{45xy^2z^3}$
34. $\frac{n+3}{n-5}$; $x \neq \pm 5$
35. $\frac{x^2}{x-4}$; $x \neq \pm 4$
36. $\frac{x(x-9)}{3(x+1)}$; $x \neq -1, 0, 7$
37. $\frac{x-4}{x-3}$; $x \neq \pm 3, \pm 4$
38. $\frac{4x-3}{x(x-3)}$; $x \neq 0, 2, 3$
39. $\frac{1}{x+4}$; $x \neq -1, -4$
40. $\frac{3}{2v(3v+5)}$; $v \neq 0, -\frac{5}{3}$
41. $\frac{1}{x+4}$; $x \neq \pm 4$
42. C; $x \neq \pm 9$
43. $\frac{x^2 - 3x - 6}{(x+3)^2(x-3)}$; $x \neq \pm 3$
44. $\frac{9x^2 + 34x - 18}{(3x-1)(x+4)}$; $x \neq \frac{1}{3}, -4$
45. $x = 18$
46. $x = -5$
47. $x = -1, -2$
48. $x = \frac{15}{2} = 7.5$
49. 0 (Sum)