

Algebra 2 Review

Name: Answer Key

Simplify the following expressions. All answers must have positive exponents.

1. $5x(x+6) - 9(x-1)$
 $5x^2 + 30x - 9x + 9$
 $5x^2 + 21x + 9$

2. $f^{-2} \cdot f^{-7} \cdot g^5$
 $\frac{g^5}{f^9}$

3. $\frac{5x^2y^{-4}}{15y^5}$
 $\frac{x^2}{3y^9}$

4. $-2(x^{-6}y^2)^2$
 $-2x^{-12}y^4$
 $-\frac{2y^4}{x^{12}}$

5. $(x-2)^3$
 $(x-2)(x^2-4x+4)$
 $x^3 - 6x^2 + 12x - 8$

6. $(x+5)(x-1)(x+2)$
 $(x^2+4x-5)(x+2)$
 $x^3 + 2x^2 + 4x^2 + 8x - 5x - 10$
 $x^3 + 6x^2 + 3x - 10$

7. $\log_3 243$
 $243 = 3^x$
 $x = 5$

8. $\log_{6/8} 36$
 $36 = \frac{1}{8}^x$
 $36 = 6^{-x}$
 $x = -2$

9. $\ln e^{-5}$
 -5

10. $\frac{5y^3}{2x^5y} \cdot \frac{4x^2}{15x}$
 $\frac{20x^2y^3}{30x^6y}$
 $\frac{2y^2}{3x^4}$

11. $\frac{x^3 - x}{8x^3 - 1} \div \frac{3x + 3}{2x - 1}$
 $\frac{x(x-1)(x+1)}{(2x-1)(4x^2+2x+1)} \cdot \frac{2x-1}{3(x+1)}$
 $\frac{x(x-1)}{4x^2+2x+1}$

12. $\sqrt[3]{-1024}$
 $-8\sqrt[3]{2}$

13. $\sqrt{5} \cdot \sqrt[3]{25}$
 $\sqrt{5} \sqrt[3]{5^2}$
 $5^{1/2} \cdot 5^{2/3}$
 $5^{7/6}$

14. $\sqrt[4]{16}$
 $2^{4/4}$
 $2^{2/3}$

15. $\sqrt[4]{272g^7h^3}$
 $\sqrt[4]{2^4 \cdot 17 \cdot g^7 \cdot h^3}$
 $2g \sqrt[4]{17g^3h^3}$

16. $\sqrt[5]{486m^{15}n^7}$
 $m^3n \sqrt[5]{486n^2}$
 $3m^3n \sqrt[5]{2n^2}$

17. $(32xy^5)^{3/5}$
 $8x^{3/5}y^3$

18. $\sqrt{80}$
 $4\sqrt{5}$

Solve the following equations. Write your answers in simplest form and check for extraneous solutions.

19. $\frac{7}{2}x - 1 = 2x + 5$

$7x - 2 = 4x + 10$
 $3x = 12$
 $x = 4$

20. $\frac{3}{4}\left(\frac{4}{5}x - 2\right) = \frac{11}{4}$

$15\left(\frac{4}{5}x - 2\right) = 55$
 $12x - 30 = 55$
 $12x = 85$
 $x = \frac{85}{12}$

21. $4(-3x + 1) = -10(x - 4) - 14x$
 $-12x + 4 = -10x + 40 - 14x$
 $-12x + 4 = -24x + 40$

$12x = 36$
 $x = 3$

22. $|2x - 7| = 11$

$2x - 7 = 11$ $2x - 7 = -11$
 $2x = 18$ $2x = -4$
 $x = 9$ $x = -2$

23. $|3x - 2| + 9 = 5$

$|3x - 2| = -4$
 NO solutions

24. $|7x - 11| - 5 = -2$

$7x - 11 = 3$ $7x - 11 = -3$
 $7x = 14$ $7x = 8$
 $x = 2$ $x = \frac{8}{7}$

25. $3x^2 - 6x = 11x + 6$

$3x^2 - 17x - 6 = 0$
 $(3x + 1)(x - 6) = 0$
 $x = \frac{-1}{3}, 6$

26. $x^4 + 4x^2 - 5 = 0$

$(x^2 - 1)(x^2 + 5) = 0$
 $x = \pm 1, \pm\sqrt{5}i$

27. $(x + 3)^2 + 5 = 1$

$(x + 3)^2 = -4$
 $x + 3 = \pm 2i$
 $x = -3 \pm 2i$

28. $(x - 7)^2 = 9$

$x - 7 = \pm 3$
 $x = 10, 4$

29. $6x^3 - 27x^2 + 27x = 0$

$3x(2x^2 - 9x + 9) = 0$
 $3x(2x - 3)(x + 3) = 0$
 $x = 0, \frac{3}{2}, 3$

30. $\sqrt{4x} + 5 = 11$

$\sqrt{4x} = 6$
 $4x = 36$
 $x = 9$

31. $\sqrt{3x} + 4 + 7 = 4$

$\sqrt{3x} + 11 = 4$
 $\sqrt{3x} = -7$
 NO solution

32. $x^{4/3} = 16$

$x = 16^{3/4}$
 $x = 8$

33. $\log_5(12x - 19) = 3$

$12x - 19 = 5^3$
 $12x = 144$
 $x = 12$

34. $\ln(x + 5) = -7$

$x + 5 = e^{-7}$
 $x = -5 + e^{-7}$

35. $4^{x+1} \cdot 16 = 2^x$

$4^{x+1} \cdot 4^2 = 2^x$
 $2^{2x+2} \cdot 2^4 = 2^x$
 $2x + 6 = x$
 $x = -6$

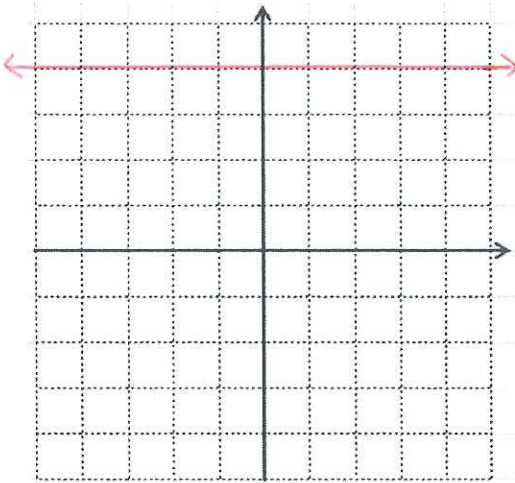
36. $125^{4x} = 25^{x-1}$

$5^{12x} = 5^{2x-2}$
 $12x = 2x - 2$
 $10x = -2$
 $x = -\frac{1}{5}$

Graph each of the functions. State the domain and range.

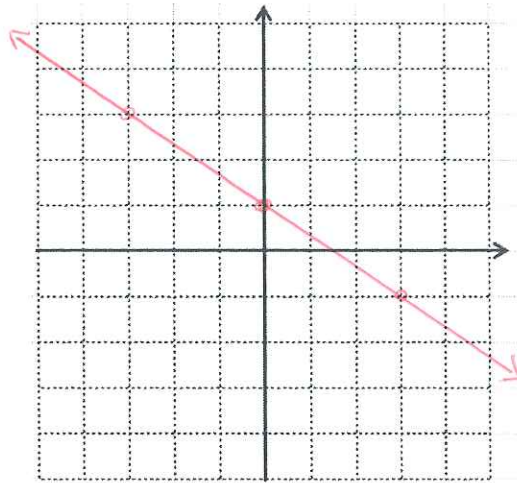
37. $y = 4$

$D: \mathbb{R}$ $R: y = 4$



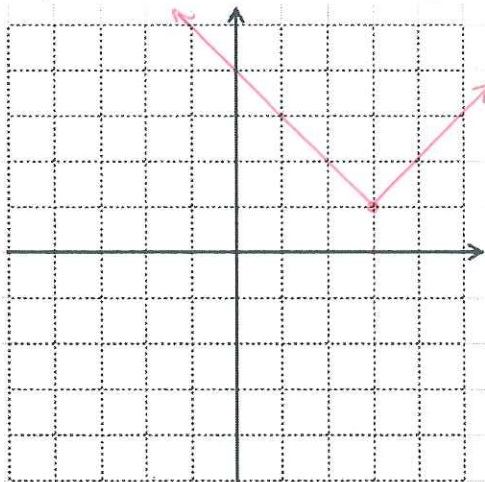
38. $y = -\frac{2}{3}x + 1$

$D: \mathbb{R}$ $R: \mathbb{R}$



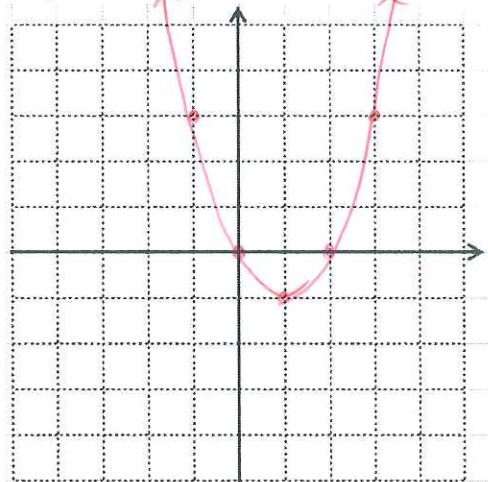
39. $y = |x - 3| + 1$

$D: \mathbb{R}$ $R: y \geq 1$



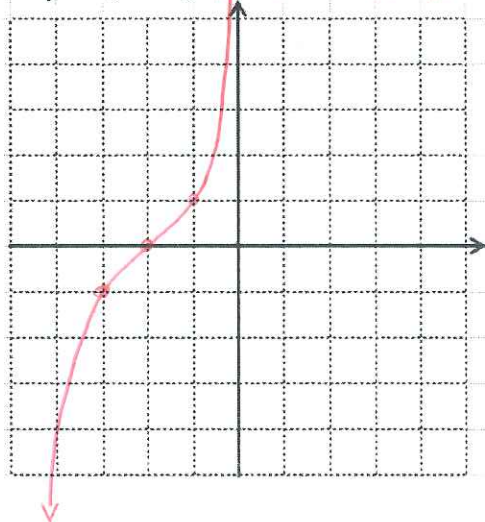
40. $y = x^2 - 2x$

$D: \mathbb{R}$ $R: y \geq -1$



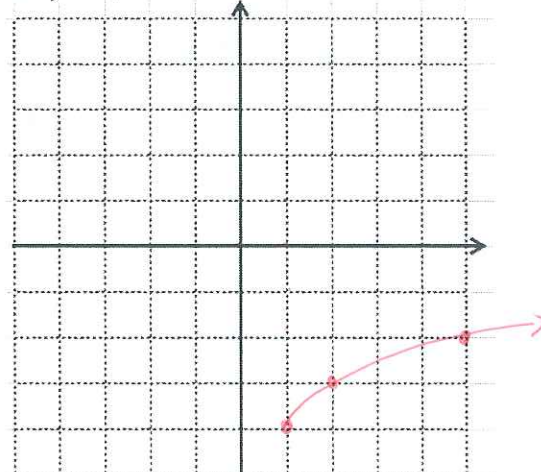
41. $y = (x + 2)^3$

$D: \mathbb{R}$ $R: \mathbb{R}$



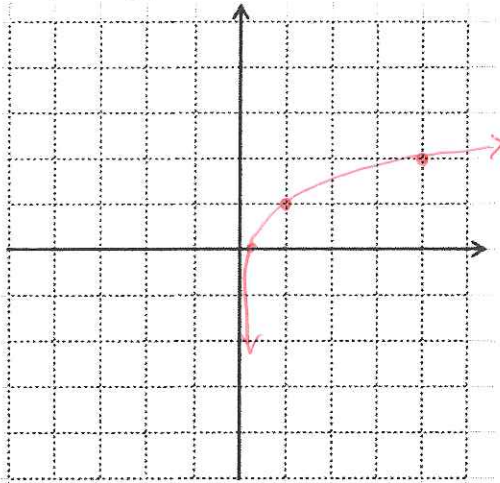
42. $y = \sqrt{x - 1} - 4$

$D: x \geq 1$ $R: y \geq -4$



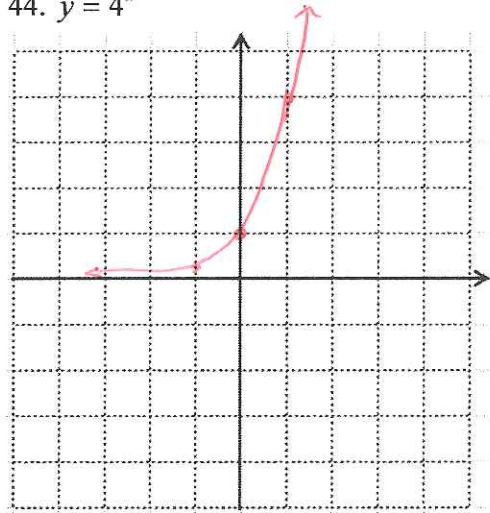
43. $y = \log_4 x + 1$

$x = 4^{y-1}$



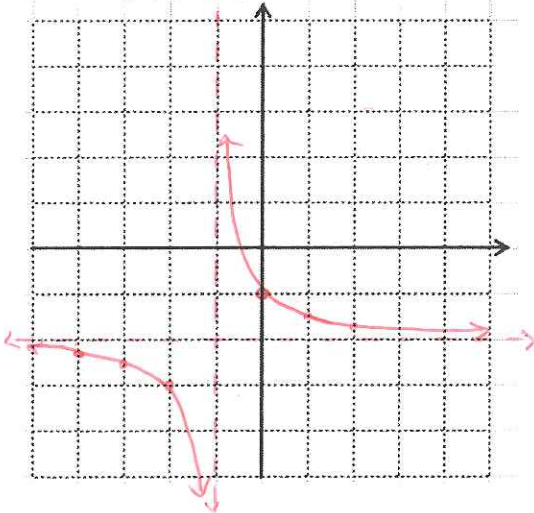
D: $x > 0$ R: \mathbb{R}

44. $y = 4^x$



D: \mathbb{R} R: $y > 0$

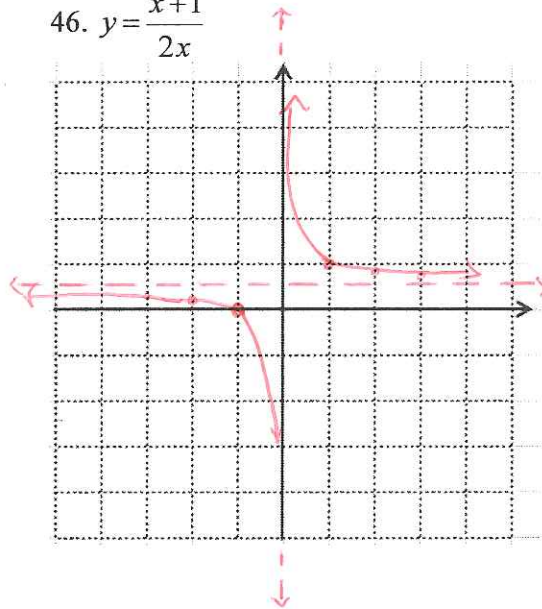
45. $y = \frac{1}{x+1} - 2$



D: $(-\infty, -1) \cup (-1, +\infty)$

R: $(-\infty, -2) \cup (-2, +\infty)$

46. $y = \frac{x+1}{2x}$



D: $(-\infty, 0) \cup (0, +\infty)$

R: $(-\infty, 1/2) \cup (1/2, +\infty)$

Write an equation of a line, in slope-intercept form, that has the given properties.

47. $m = -\frac{1}{3}$; through $(0, 6)$ and $(-1, -2)$

$y = -\frac{1}{3}x + 6$

48. Parallel to $y = -\frac{1}{2}x + 7$, passes through $(-5, -3)$

$y + 3 = -\frac{1}{2}(x + 5)$

$y + 3 = -\frac{1}{2}x - \frac{5}{2}$

$y = -\frac{1}{2}x - \frac{11}{2}$

Solve each problem. Label each answer with the appropriate label.

49. 331 students went on a field trip. Six buses were filled and 7 students traveled in cars. How many students were in each bus?

$$6x + 7 = 331$$

$$6x = 324$$

$$x = 54$$

54 students
per bus

50. The sum of 4 consecutive even numbers is 252. What are the four numbers?

$$n + n + 2 + n + 4 + n + 6 = 252$$

$$4n + 12 = 252$$

$$4n = 240$$

$$n = 60$$

60, 62, 64, 66