

Mixed Review—Chapters 1–12

Simplify. Assume that no denominator equals zero. Each variable represents a positive real number.

1. $(3t - 2)(2t^2 + 5t + 4)$ _____

2. $\sqrt{x^2 + 10x + 25}$ _____

3. $(4x^2y)^3(-x^5y)^2$ _____

5. $\frac{b-3}{b+1} - \frac{8}{b}$ _____

6. $\sqrt{\frac{48}{147}}$ _____

7. $\sqrt{180}$ _____

8. $\sqrt{144s^2t^5}$ _____

9. $\sqrt{175}$ _____

10. $\sqrt{\frac{36x^7}{25x}}$ _____

11. Alice is three times as old as Archie. If Archie's present age is x , represent each person's age 7 years from now. _____

12. The width of a rectangle is 24 cm less than the length. The perimeter is less than 172 cm. Find the maximum dimensions of the rectangle if each dimension, in centimeters, is an integer. _____

Factor completely, if possible. If the expression is not factorable, write "prime."

13. $3x^2 + x - 2$ _____

14. $y^2 - 5y - 40$ _____

15. $4n^2 + 24n + 9$ _____

16. $x^2 - 18x + 36$ _____

17. $-48y^2 + 29y + 15$ _____

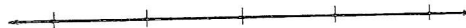
18. $3c^2 - 5cd - 12d^2$ _____

20. At noon, two trains leave stations at opposite ends of the line on parallel tracks. One train is traveling at 90 km/h and the other at 96 km/h. If the stations are 651 km apart, how long will it be before the trains meet? _____

21. Express $\frac{x-1}{3}$, $\frac{x}{4}$, and $\frac{1}{2}$ with their LCD. _____

Solve and graph the solution set.

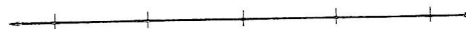
22. $-2x < 6$ _____



23. $-3 \leq x + 1 \leq 1$ _____



24. $3z - 2 > 7$ or $2z + 1 < 5$ _____



25. $|t - 5| < 1$ _____



(continued)

Mixed Review—Chapters 1–12 (continued)

27. The hypotenuse of a right triangle and one leg have lengths of 12 and 7 respectively. Find the length of the other leg to the nearest tenth. _____

28. The numerator of a fraction is 10 less than the denominator. If 4 is added to each, the value of the resulting fraction is $\frac{3}{5}$. Find the original fraction. _____

Solve each equation or inequality.

29. $\frac{4}{x+6} = \frac{8}{3x+5}$ _____

30. $\sqrt{\frac{3x-1}{2}} = 4$ _____

31. $\sqrt{y} = \frac{2}{3}$ _____

32. $\frac{1}{3} < 2 - \frac{3}{4}y$ _____

33. $5t^2 - 80 = 0$ _____

34. $3t + 2 = 2t - 1$ _____

35. $3t + 2 < 5t - 3$ _____

36. $(x + 3)^2 = 16$ _____

Solve each system.

37. $x + y = 7$
 $2x + 3y = 4$ _____

38. $5x - 4y = 9$
 $3x + 2y = 1$ _____

40. The sum of two consecutive even integers is less than 84. Find the pair with the greatest sum. _____

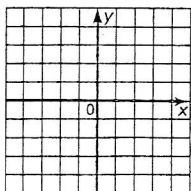
Use the discriminant to determine how many real-number roots the equation has. Do not solve the equation.

41. $x^2 - 3x + 5 = 0$ _____

42. $4k^2 - 12k + 9 = 0$ _____

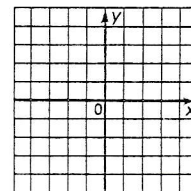
43. When 3 times a number is increased by 7, the square root of the result is 7. Find the number. _____

47. Graph: $2x + y < 3$



48. Graph the solution set of this system.

$$\begin{aligned} x + y &\geq 2 \\ x - y &\geq 1 \end{aligned}$$



(continued)

Mixed Review—Chapters 1–12 (continued)

Express in simplest form.

49. $(5\sqrt{7} - 2\sqrt{5})(4\sqrt{7} + 3\sqrt{5})$ _____

50. $3\sqrt{3}(4\sqrt{27} - 5\sqrt{12})$ _____

51. $(2\sqrt{5} - 5\sqrt{2})^2$ _____

52. $\sqrt{\frac{2}{3}} \cdot \sqrt{\frac{8}{12}}$ _____

53. $6\sqrt{48} - 5\sqrt{18}$ _____

54. $\sqrt{3}\sqrt{15}$ _____

55. Write an equation in standard form for the line with slope -1 that passes through $(-6, 4)$. _____

Solve _____ Leave irrational answers in simplest radical form.

56. $3t^2 + 5t + 2 = 0$ _____

57. $z^2 - 7z + 4 = 0$ _____

59. Find the equation of the line with given values $f(-3)=5$ and $f(-4)=7$. _____60. Find the greatest common monomial factor: $18a^3b^4c^2$, $54a^2bc^5$, $27a^7x^2c^3$ _____61. Evaluate: $\frac{3^{-2} \cdot 3^5}{3^{-3}}$ _____

62. The sum of two numbers is 12 and the sum of their squares is 78. Find the numbers. _____