

## Algebra Practice Questions

Please work on the following problems without a calculator

### Fractions and Decimals:

1.  $\frac{1}{4} + \frac{2}{3} =$

2.  $\frac{3}{4} + \frac{4}{5} + \frac{3}{8} =$

3.  $\frac{7}{8} - \frac{5}{6} =$

4.  $\frac{2}{3} \times 1\frac{3}{4} =$

5.  $7\frac{1}{2} \div \frac{3}{5} =$

6.  $\frac{3+4-2}{2+1-5} =$

7.  $0.02 \times 0.01 =$

8.  $0.025 + 4.12 =$

### Solving Proportions:

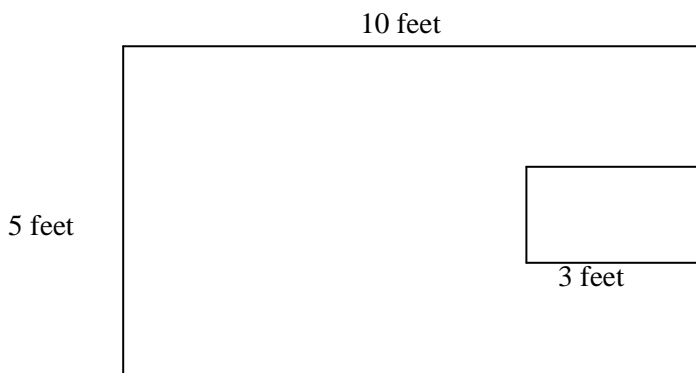
9. Find  $x$  if  $\frac{6}{x} = \frac{5}{7}$

10. Find  $x$  if  $\frac{x-2}{4} = \frac{5}{2}$

11. Find  $x$  if  $\frac{x}{7} = \frac{5}{9}$

### Perimeters, Areas and Volumes:

12. Find the perimeter of the right-angled figure below:



13. What is the volume of a box whose length is 8 feet, width is 5 feet and height is 3 feet?

14. If a table-top has an area of 18 square feet and a length of 6 feet, what is its width?

15. What is the area of a circular mirror, if the measurement from edge to edge through the center of the mirror is 10 inches?

**Operations with Signed Numbers and Order of Operations:**

16.  $23 + 3 - 4(3 - 1) =$

17.  $-2(5 - 2) - 5(3^2 - 17) =$

18.  $15 - 2[(3 - 9) + 2] =$

19.  $|7 - 8| =$

20.  $[(3 + 2)(4 - 6)]^3 =$

**Exponents and Simplifying and evaluating algebraic expressions:**

21. *Simplify:*  $2x^2 + 3x + 4x^2 - 5x$

22. *Simplify:*  $(-3m^3n^6)(-5m^2n^5)$

23. *Simplify:*  $(-4mn^3)^2(m^2n^2)$

24.  $-4x^0 =$

25.  $\left(\frac{3m^{-2}}{5n^2}\right)^{-1} =$

26.  $(3 \times 2)^3 =$

27. Evaluate the expression  $-x^2 + 2y - z$  when  $x = 3, y = 2, z = 1$ .

28. Evaluate the expression  $|-x^2 + 2y - z|$  when  $x = 3, y = 2, z = -1$ .

**Solving first degree equations and inequalities:**

29. Solve for  $x$ :  $3x + 5 = 2$

30. Solve for  $x$ :  $5x + 7 = 3x + 4$

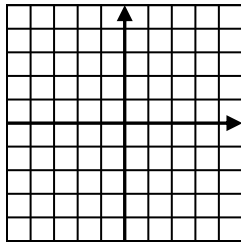
31. Solve for  $x$ :  $2x + 5 < 3x - 15$

32. Solve for  $x$ :  $x + 3 - (2x - 4) = 5(x - 5)$

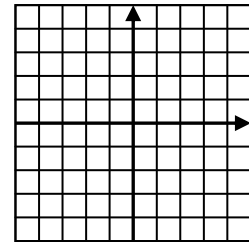
33. Solve for  $x$ :  $4x + 3 > 5x - 9$

**Graphing linear equations:**

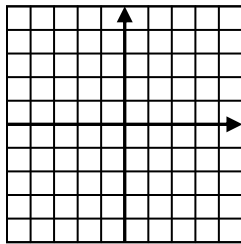
34. Graph:  $y = \frac{1}{2}x - 3$



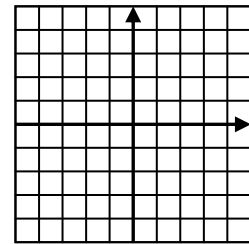
35. Graph:  $y = -x + 3$



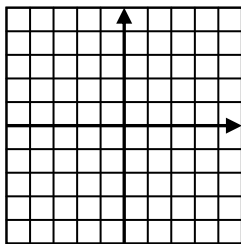
36. Graph:  $y = 2x + 3$



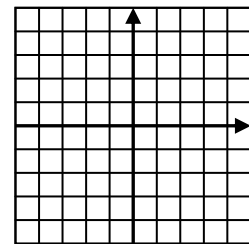
37. Graph:  $y = -3x + 2$



38. Graph:  $y = 4$



39. Graph:  $x = -2$



40. Find the slope and  $y$ -intercept of the line whose equation is:  $4y = 12x - 32$

41. Find the  $x$ - and  $y$ - intercepts of the line whose equation is:  $y + 2x = 4$

42. Find the slope and  $y$ -intercept of the line whose equation is:  $3y - 2x + 6 = 0$

43. Find the  $y$ -intercept of the line that passes through the point  $(-6,4)$  with slope  $=1/3$

44. Does the line with the equation  $y=3x+6$  pass through the point  $(-3,3)$ ?

**Systems of linear equations:**

45. Solve the system of equations:  $2x + 3y = 5$   
 $5x - y = 4$

46. Solve the system of equations:  $2x + 3y = 2$   
 $4x - 3y = 1$

47. Solve the system of equations:  $3x + 4y = 4$   
 $2x + 3y = 5$

48. Solve the system of equations:  $4x + 7y = 5$   
 $14x - 14y = 34$

**Polynomials, sums and products:**

49.  $(4x^2 + 7x - 11) + (-x^2 + 6) =$

50.  $(5m^2 + 5) - (m^2 - 2m + 9) =$

51. Multiply:  $(x + 5)(x - 3)$

52. Multiply:  $(x + 3)(x - 3)$

53. Simplify:  $(x - 3)^2 + (x + 5)^2$

54. Simplify:  $(x + 4)^2 - (x - 2)^2$

**Rational expressions, sums and products:**

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

56.  $\frac{x}{x^2 - 25} + \frac{1}{x + 5} =$

**Quadratic Equations:**

57. Solve for  $x$ :  $x^2 + x - 2 = 0$

58. Solve for  $x$ :  $x^2 - 16 = 0$

59. Solve for  $x$ :  $x^2 - x - 12 = 0$

60. Solve for  $x$ :  $x^2 - 7x - 18 = 0$

**Radicals:**

61. Simplify:  $\frac{3\sqrt{48}}{\sqrt{12}}$

62.  $3\sqrt{5} + 2\sqrt{20} =$

63. Simplify:  $\frac{\sqrt{45}}{\sqrt{80}}$

64.  $4\sqrt{7} + 6\sqrt{8} + \sqrt{49} =$

65. Simplify:  $\frac{3\sqrt{3}}{\sqrt{5}}$

66. Simplify:  $\frac{x}{\sqrt{2x}}$

**Function notation:**

67. If  $f(x) = 5x^2 + 3$ , and  $g(x) = 2x$ , find  $f(g(1))$ .

68. If  $f(x) = 2x^2 + 3x + 1$ , and  $g(x) = x - 3$ , find  $f(g(2))$ .

**Word Problems:**

69. Eric has 5 coins in his pocket that total \$0.95. The coins are all either quarters or dimes. How many of each type of coin does he have in his pocket?

70. A particular brand of fruit juice contains 2 gallons of orange juice for every 7 gallons of pineapple juice. The company that makes this fruit juice has 82 gallons of pineapple juice. How many gallons of orange juice does the company need to make a batch of this juice?

71. The tickets to a play cost 9 dollars for adults and 5 dollars for children. If the show sold 180 tickets and earned \$1380, how many of each type of ticket were sold?

72. Katie has done 6 more than twice the number of math problems Tommy has done. Together, they have done 72 math problems. How many math problems has each student done?

**Algebra Practice Solutions**

1.  $\frac{11}{12}$

2.  $\frac{77}{40}$  or  $1\frac{37}{40}$

3.  $\frac{1}{24}$

4.  $\frac{7}{6}$  or  $1\frac{1}{6}$

5.  $\frac{25}{2}$  or  $12\frac{1}{2}$

6.  $-\frac{5}{2}$  or  $-2\frac{1}{2}$

7. 0.0002

8. 4.145

9.  $\frac{42}{5}$  or  $8\frac{2}{5}$

10. 12

11.  $\frac{35}{9}$

12. 36 feet

13. 120 cubic feet

14. 3 feet

15.  $25\pi$  square inches

16. 18

17. 34

18. 23

19. 1

20. -1000

21.  $6x^2 - 2x$

22.  $15m^5n^{11}$

23.  $16m^4n^8$

24. -4

25.  $\frac{5m^2n^2}{3}$

26. 216

27. -6

28. 4

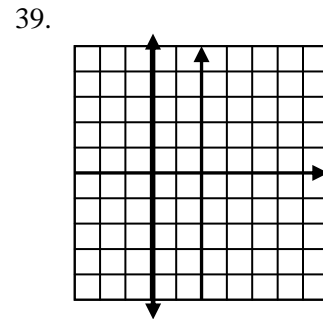
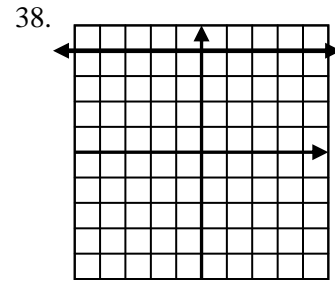
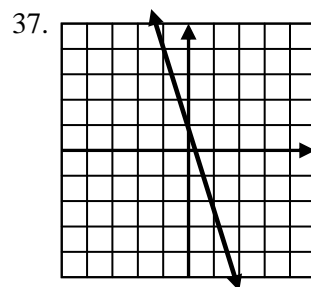
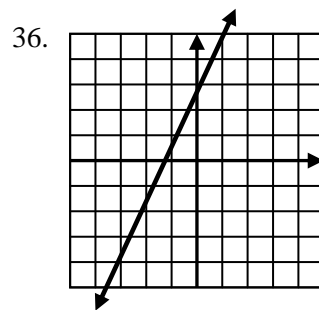
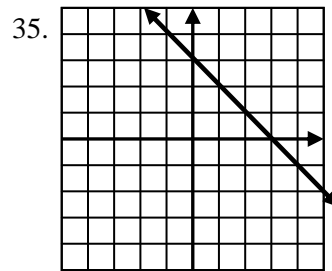
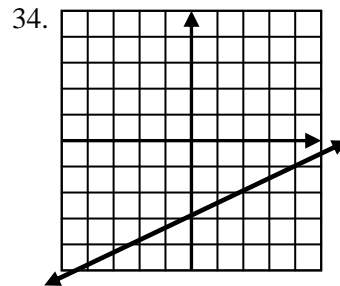
29. -1

30.  $-\frac{3}{2}$  or  $-1\frac{1}{2}$

31.  $x > 20$

32.  $5\frac{1}{3}$

33.  $x < 12$



40. slope = 3

y-intercept = -8

41. x-intercept = 2

y-intercept = 4

42. slope =  $\frac{2}{3}$

y-intercept = -2

43. y-intercept = 6

44. No

45. (1,1)

46.  $(\frac{1}{2}, \frac{1}{3})$

47. (-8, 7)

48.  $(2, -\frac{3}{7})$

49.  $3x^2 + 7x - 5$

50.  $4m^2 + 2m - 4$

51.  $x^2 + 2x - 15$

52.  $x^2 - 9$

53.  $2x^2 + 4x + 34$

54.  $12x - 12$

55.  $\frac{1}{2+3x}$

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

57.  $x = -2$  or  $1$

58.  $x = 4$  or  $-4$

59.  $x = -3$  or  $4$

60.  $x = -2$  or  $9$

61.  $6$

62.  $7\sqrt{5}$

63.  $\frac{3}{4}$

64.  $16\sqrt{7} + 7$

65.  $\frac{3\sqrt{15}}{5}$

66.  $\frac{\sqrt{2x}}{2}$

67.  $23$

68.  $0$

69.  $3$  quarters

$2$  dimes

70.  $23\frac{3}{7}$  gallons of orange

juice

71.  $120$  adult tickets

$60$  child tickets

72. Katie =  $50$  problems

Tommy =  $22$  problems