Directions: For questions 1 - 41, DO NOT USE A CALCULATOR. Please show all work.

Simplify.

1. $(-16)+(-42)+(-25)+(-19)$ — 1. -102

2. $-15-(-4)(6)+(-44)\div(-11)$ — 2. 13

Evaluate if $a=18$, $b=3$, $c=4$, and $d=5$.

3. $a-b\cdot c+d$ — 3. 11

4. $a-(b\cdot c+d)$ — 4. 1

5. $a-b\cdot(c+d)$ — 5. -9

6. $(a-b)\cdot c+d$ — 6. 65

Simplify.

7. $6x+7y+8x-2y$ — 7. $14x+5y$

8. $3m(n-2m)-2n(2m-3n)$ — 8. $-6m^2-mn+6n^2$

9. $(2a-5)-(4a+6)+(7-2a)$ — 9. $-4a-4$

10. $\frac{3a^2}{4}+\frac{2ab}{3}+ab-a^2$ — $\frac{-3a^2+20ab}{12}$ — 10. [illegible] or $\frac{-a^2}{4}+\frac{5ab}{3}$

11. $-\frac{10}{7}\div\left(-\frac{5}{9}\right)$ — 11. $\frac{18}{7}$ or $2\frac{4}{7}$

12. $-3\left(-\frac{7}{4}a+\frac{1}{6}\right)+\frac{5}{2}\left(3-\frac{a}{2}\right)$ — 12. $4a+7$

Solve.

13. $5a+2a-6=4a-5$ — 13. $a=\frac{1}{3}$

14. $x+5=\frac{1}{3}(6x-5)$ — 14. $x=\frac{20}{3}$

15. $\frac{8-5r}{6}=3$ — 15. $r=-2$

16. A year-end clearance sale is advertised as 30% off all prices as marked. What is the sale price of a sofa that is marked as $925?

16. $647.50

17. If a calculator costs $12.90 after a 25% discount, what is the original price of the calculator?

17. $17.20

18. Evaluate $|4-x|$, if $x = -2$. 18. 6

19. Evaluate $|a|-|2b|$, if $a = -5$ and $b = 1$ 19. 3

20. Evaluate $-|m+n|$, if $m = 3$ and $n = -12$ 20. -9

Write an expression or equation for each of the following.

21. The product of six less than a number and five more than the same number.

21. $(x-6)(x+5)$

22. The number c equals the cube of the sum of 2 and three times m.

22. $C = (2+3m)^3$

23. Twelve decreased by the square of a is equal to b.

23. $12 - a^2 = b$

Simplify.

24. $(2x^2-5x+7)-(3x^3+x^2+2)$ 24. $-3x^3+x^2-5x+5$

25. $(4x^2-3x+7)+(2x^2+4x)$ 25. $6x^2+x+7$

26. $y^3 \cdot y^4 \cdot y$ 26. y^8

27. $(-4a^2x)(-5a^3x^4)$ 27. $20a^6x^5$

28. $\dfrac{-16a^3b^2x^4y}{-48a^4bxy^3}$ 28. $\dfrac{4bx^3}{ay^2}$

29. $(-3x^3y)^2(4x)^3$ 29. $576x^9y^2$

30. Find p if $p = m^3 - 3mn - n^2$ and $m = -1, n = 2$ 30. $p = 1$

Find each product.

31. $(x-5)(x-4)$ — 31. $x^2-9x+20$

32. $(4n+3)(3n-4)$ — 32. $12n^2-7n-12$

33. $(a-4)(a^2+5a-7)$ — 33. $a^3+a^2-27a+28$

34. $(2x+9y)(3x-y)$ — 34. $6x^2+25xy-9y^2$

Factor.

35. $5a^2b^2c-15abc^2$ — 35. $5abc(ab-3c)$

36. x^2-7x+6 — 36. $(x-6)(x-1)$

37. b^2+5b-6 — 37. $(b+6)(b-1)$

38. $2r^2-3r-20$ — 38. $(2r+5)(r-4)$

39. $6x^2-5x-6$ — 39. $(3x+2)(2x-3)$

40. y^2-25 — 40. $(y+5)(y-5)$

41. The length of a rectangle is 3 feet less than twice the width. If the area of the rectangle is 54 ft^2, find the dimensions of the rectangle.

41. $l=9 \quad w=6$

Solve these quadratics.

42. $(x-8)(x-4)=0$ — 42. $x=8, \; x=4$

43. $x^2-8x-20=0$ — 43. $x=10, \; x=-2$

44. $9k^2-12k-1=0$ — 44. $k=1.4, \; k=-0.1$

45. Find the slope of a line that passes through the points (-6, 4) and (3, 5).

45. slope $= \frac{1}{9}$

46. X and Y are points on a number line with coordinates –12 and 14, respectively. Find the coordinates of the midpoint of segment $\overline{XY}$.

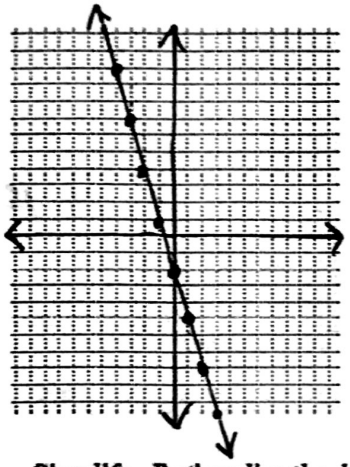
46. midpoint = 1

47. Point M(5, 2) is the midpoint of segment $\overline{XY}$. Point X has coordinates (-4, 6). Find the coordinates of point Y.

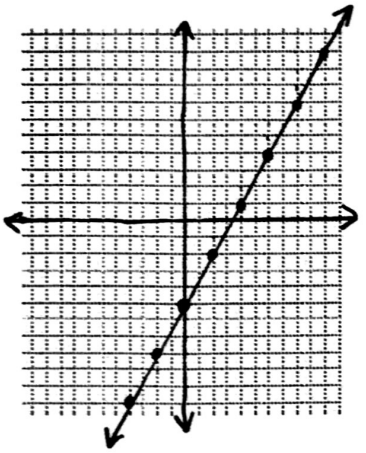
47. (14, -2)

Graph the linear equations.

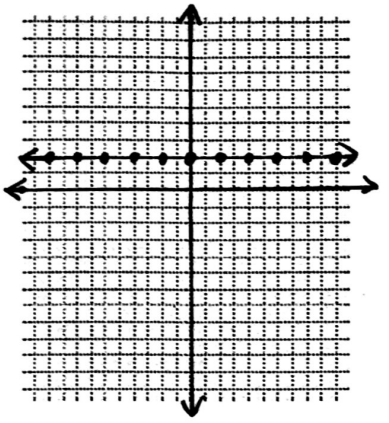
48. $y = -3x + 2$



49. $3x - 2y = 10$



50. $y = 2$



Simplify. Rationalize the denominator when necessary.

51. $\sqrt{144}$

51. 12

52. $\sqrt{24}$

52. $2\sqrt{6}$

53. $\sqrt{108}$

53. $6\sqrt{3}$

54. $\frac{2}{\sqrt{6}}$

54. $\frac{\sqrt{6}}{3}$

55. $\frac{3\sqrt{3}}{\sqrt{2}}$

55. $\frac{3\sqrt{6}}{2}$

56. $4\sqrt{27} + 8\sqrt{48}$

56. $44\sqrt{3}$

57. The points (4, 2) and (-1, y) are $\sqrt{74}$ units apart. What is the value of y?

57. $y = -5, y = 9$

Solve these systems of equations.

58. $\begin{cases} 2m + n = 1 \\ m - n = 8 \end{cases}$

58. $m = 3, n = -5$

59. $\begin{cases} 3x - 2y = -4 \\ 3x + y = 2 \end{cases}$

59. $x = 0, y = 2$

60. $3x - 1 = y$ and $4y = 3 - 2x$

60. $x = \frac{1}{2}$

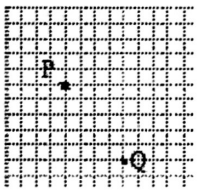
61. Westville has a population of 7200, which is decreasing at a rate of 80 people per year. Troy has a population of 5000 and is gaining 120 people per year. In how many years will the populations of Westville and Troy be the same?

61. 11 years

62. One evening, the candy counter at the Cineplex sold 532 buckets of popcorn for \$1489.50. A large bucket sells for \$2.25 and a jumbo buckets sells for \$3.75. How many jumbo buckets of popcorn were sold?

62. 195 jumbo

63. In the graph below, the axes and the origin are not shown. If point P has coordinates (4, 2), what are the coordinates of point Q?



63. (8, -3)

Solve.

64. $\frac{5}{6} = \frac{a-2}{4}$

64. $a = 5.\overline{3}$

65. $\frac{y+4}{y-1} = \frac{4}{3}$

65. $y = 16$

66. $\frac{6-z}{z} = \frac{z-6}{2}$

66. $z = 6, z = -2$

67. On the blue prints for a house, 2 inches represents 3 feet. If the width of a room on the plan is $6\frac{1}{2}$ inches, what is the actual width of the room?

67. $9\frac{3}{4}$ ft