B. <u>Evaluation of an expression by substitution</u>:

example: Find the value of $7 - 4x$, if $x = 3$:

$7 - 4x = 7 - 4 \bullet 3 = 7 - 12 = -5$

example: If $a = -7$ and $b = -1$, then

$a^2 b = (-7)^2 (-1) = 49(-1) = -49$

example: If $x = -2$, then $3x^2 + x - 5$

$= 3(-2)^2 + (-2) - 5 = 3 \bullet 4 - 2 - 5$

$= 12 - 2 - 5 = 5$

example: $8 - c = 12$ Add c to each, giving

$8 - c + c = 12 + c$, or $8 = 12 + c$.

Then subtract 12, to get $-4 = c$, or $c = -4$.

example: $\frac{a}{5} = \frac{4}{3}$ Multiply each by the lowest common

denominator 15: $\frac{a}{5} \bullet 15 = \frac{4}{3} \bullet 15$, or $a \bullet 3 = 4 \bullet 5$

Then divide by 3: $\frac{a \bullet 3}{3} = \frac{20}{3}$, so $a = \frac{20}{3}$

Problems 36-46: Given $x = -1, y = 3$ and $z = -3$, find the value:

36. $2x =$

37. $-z =$

38. $xz =$

39. $y + z =$

40. $z + 3 =$

41. $y^2 + z^2 =$

42. $2x + 4y =$

43. $2x^2 - x - 1 =$

44. $(x + z)^2 =$

45. $x^2 + z^2 =$

46. $-x^2 z =$

Problems 47-54: Find the value, given $a = -1, \ b = 2, \ c = 0, \ x = -3, \ y = 1$, and $z = 2$:

47. $\frac{6}{b} =$

48. $\frac{x}{a} =$

49. $\frac{x}{3} =$

50. $\frac{a-y}{b} =$

51. $\frac{4x-3y}{3y-2x} =$

52. $\frac{b}{c} =$

53. $-\frac{b}{z} =$

54. $\frac{c}{z} =$

Answers

36. –2   18
37. 3
38. 3
39. 0
40. 0
41. 18
42. 10
43. 2
44. 16
45. 10

46. 3
47. 3
48. 3
49. –1
50. –1
51. $-\frac{5}{3}$
52. no value (undefined)
53. –1
54. 0

C. <u>Solving a linear equation in one variable</u>:

Add or subtract the same thing on each side of the equation and/or multiply or divide each side by the same thing, with the goal of getting the variable alone on one side. If there are fractions, you can eliminate them by multiplying both sides of the equation by a common denominator. If the equation is a proportion, you may wish to cross-multiply.

example: $3x = 10$ Divide both sides by 3, to get $1x : \frac{3x}{3} = \frac{10}{3}$, or $x = \frac{10}{3}$

example: $5 + a = 3$ Subtract 5 from each side, to get $1a$ (which is a): $5 + a - 5 = 3 - 5$ or $a = -2$

example: $\frac{y}{3} = 12$ Multiplying both sides by 3, to get $y : \frac{y}{3} \bullet 3 = 12 \bullet 3$, which gives $y = 36$.

example: $b - 4 = 7$ Add 4, to get $1b$: $b - 4 + 4 = 7 + 4$, or $b = 11$

Problems 55-65: Solve:

55. $2x = 94$

56. $3 = \frac{6x}{5}$

57. $3x + 7 = 6$

58. $\frac{x}{3} = \frac{5}{4}$

59. $5 - x = 9$

60. $x = \frac{2x}{5} + 1$

61. $4x - 6 = x$

62. $x - 4 = \frac{x}{2} + 1$

63. $6 - 4x = x$

64. $7x - 5 = 2x + 10$

65. $4x + 5 = 3 - 2x$

Problems 66-70: Substitute the given value, then solve for the other variable:

example: If $n = r + 3$ and $r = 5$ find the value of n: Replacing r with 5 gives $n = 5 + 3 = 8$.

66. $n = r + 3,\ n = 5$

67. $n = r + 3,\ n = 1$

68. $\frac{a}{2} = b,\ b = 6$

69. $5x = y - 3,\ x = 4$

70. $5x = y - 3,\ y = 3$

Answers

55. $x = 47$

56. $x = \frac{5}{2}$

57. $x = -\frac{1}{3}$

58. $x = \frac{15}{4}$

59. $x = -4$

60. $x = \frac{5}{3}$

61. $x = 2$

62. $x = 10$

63. $x = \frac{6}{5}$

64. $x = 3$

65. $x = -\frac{1}{3}$

66. $5 = r + 3; \ r = 2$

67. $1 = r + 3; \ r = -2$

68. $\frac{a}{2} = 6; \ a = 12$

69. $5 \bullet 4 = y - 3; y = 23$

70. $5x = 3 - 3; \ x = 0$