

3A

$$\begin{array}{rcl}
 1) & -5A + 3 + 8A - 4 = 9 + 3 - 1 \\
 & (-5A + 8A) + (3 - 4) = 11 \\
 & 3A + (-1) = 11 \\
 & \quad +1 \quad +1 \\
 \hline
 & 3A = 12 \\
 & \frac{3A}{3} = \frac{12}{3} \quad A = 4
 \end{array}$$

$$\begin{array}{l}
 \text{Check: } -5(4) + 3 + 8(4) - 4 = 9 + 3 - 1 \\
 -20 + 3 + 32 - 4 = 9 + 3 - 1 \\
 11 = 11
 \end{array}$$

Checks for #2 - #14 will not be shown.

$$\begin{array}{rcl}
 2) & 3B - B + 7 + 4B = 43 \\
 & 6B + 7 = 43 \\
 & \quad -7 \quad -7 \\
 \hline
 & 6B = 36 \\
 & \frac{6B}{6} = \frac{36}{6} \quad B = 6
 \end{array}$$

$$\begin{array}{rcl}
 3) & -4Y - 6 + 7Y + 3 + Y = 17 \\
 & 4Y - 3 = 17 \\
 & \quad +3 \quad +3 \\
 \hline
 & 4Y = 20 \\
 & \frac{4Y}{4} = \frac{20}{4} \quad Y = 5
 \end{array}$$

$$\begin{array}{rcl}
 4) & 5Q + 3Q - 6 + 2Q = (2 + 3) + 9 \\
 & 10Q - 6 = 14 \\
 & \quad +6 \quad +6 \\
 \hline
 & 10Q = 20 \\
 & \frac{10Q}{10} = \frac{20}{10} \quad Q = 2
 \end{array}$$

$$\begin{array}{rcl}
 5) & 6K - 5 + 4K - K + 2 = 12 \cdot 2 \\
 & 9K - 3 = 24 \\
 & \quad +3 \quad +3 \\
 \hline
 & 9K = 27 \\
 & \frac{9K}{9} = \frac{27}{9} \quad K = 3
 \end{array}$$

$$\begin{array}{rcl}
 6) & 5C - 2C - 8 + 7 - C = 3 \cdot 4 + 1 \\
 & 2C - 1 = 13 \\
 & \quad +1 \quad +1 \\
 \hline
 & 2C = 14 \\
 & \frac{2C}{2} = \frac{14}{2} \quad C = 7
 \end{array}$$

$$\begin{array}{rcl}
 7) & 4A + 6 = 2A + 12 \\
 & 4A - 2A = 12 - 6 \\
 & \frac{2A}{2} = \frac{6}{2} \quad A = 3
 \end{array}$$

$$\begin{array}{rcl}
 8) & 10B - 2B + 3 = 5B + 21 \\
 & 8B - 5B = 21 - 3 \\
 & \frac{3B}{3} = \frac{18}{3} \quad B = 6
 \end{array}$$

$$\begin{array}{rcl}
 9) & 6C - 8 + 3C = 7C - 2C + 12 \\
 & 9C - 5C = 12 + 8 \\
 & \frac{4C}{4} = \frac{20}{4} \quad C = 5
 \end{array}$$

$$\begin{array}{rcl}
 10) & 6D - 10 = -2D - 34 \\
 & 6D + 2D = -34 + 10 \\
 & \frac{8D}{8} = \frac{-24}{8} \quad D = -3
 \end{array}$$

$$\begin{array}{rcl}
 11) & -3A - 3 - 6A + 10A + 5 = 10 \\
 & A + 2 = 10 \\
 & \quad -2 \quad -2 \\
 \hline
 & A = 8 \quad A = 8
 \end{array}$$

$$\begin{array}{rcl}
 12) & -5B - B + 4 + 10B - 7 = 7 \cdot 11 \\
 & 4B - 3 = 77 \\
 & \quad +3 \quad +3 \\
 \hline
 & 4B = 80 \\
 & \frac{4B}{4} = \frac{80}{4} \quad B = 20
 \end{array}$$

$$\begin{array}{rcl}
 13) & -4R + 7R - 3 + 5R = 10^2 - 7 \\
 & 8R = 100 - 7 + 3 \\
 & \frac{8R}{8} = \frac{96}{8} \quad R = 12
 \end{array}$$

$$\begin{array}{rcl}
 14) & -7Q + 8 - 6 + 5Q = 3 \cdot 5 - 7 \\
 & -2Q + 2 = 8 \\
 & \quad -2 \quad -2 \\
 \hline
 & -2Q = 6 \\
 & \frac{-2Q}{-2} = \frac{6}{-2} \quad Q = -3
 \end{array}$$

3B

$$\begin{array}{rcl}
 1) & -3A - 5 + 4A - 6 + 2A = 19 \\
 & 3A - 11 = 19 \\
 & \quad +11 \quad +11 \\
 \hline
 & 3A = 30 \\
 & \frac{3A}{3} = \frac{30}{3} \quad A = 10
 \end{array}$$

$$\begin{array}{l}
 \text{Check: } -3(10) - 5 + 4(10) - 6 + 2(10) = 19 \\
 -30 - 5 + 40 - 6 + 20 = 19 \\
 19 = 19
 \end{array}$$

Checks for #2 - #14 will not be shown.

$$\begin{array}{rcl}
 2) & 8B - 6 + 5B - 3 - 3B = 41 \\
 & 10B - 9 = 41 \\
 & \quad +9 \quad +9 \\
 \hline
 & 10B = 50 \\
 & \frac{10B}{10} = \frac{50}{10} \quad B = 5
 \end{array}$$

$$\begin{array}{rcl}
 3) & -5Y + 3 - 6Y + 2Y + 4 = 13 \\
 & -9Y + 7 = 13 \\
 & \quad -7 \quad -7 \\
 \hline
 & -9Y = 6 \\
 & \frac{-9Y}{-9} = \frac{6}{-9} \quad Y = -2/3
 \end{array}$$

$$\begin{array}{rcl}
 4) & 8Q - Q + 7 - 4 - 3Q = 7 + 4 \times 10 \\
 & 4Q + 3 = 47 \\
 & \quad -3 \quad -3 \\
 \hline
 & 4Q = 44 \\
 & \frac{4Q}{4} = \frac{44}{4} \quad Q = 11
 \end{array}$$

$$\begin{array}{rcl}
 5) & 8M - 4M - 6 - 3 + 5M = 8^2 - 1 \\
 & 9M - 9 = 63 \\
 & \quad +9 \quad +9 \\
 \hline
 & 9M = 72 \\
 & \frac{9M}{9} = \frac{72}{9} \quad M = 8
 \end{array}$$

$$\begin{array}{rcl}
 6) & 7C - 4C + 5 - 8 + C = 5^2 + 4 \\
 & 4C - 3 = 29 \\
 & \quad +3 \quad +3 \\
 \hline
 & 4C = 32 \\
 & \frac{4C}{4} = \frac{32}{4} \quad C = 8
 \end{array}$$

$$\begin{array}{rcl}
 7) & 11A - 4A - 18 = 2A + A + 10 \\
 & 7A - 3A = 10 + 18 \\
 & \frac{4A}{4} = \frac{28}{4} \quad A = 7
 \end{array}$$

$$\begin{array}{rcl}
 8) & 2B - 10B - 15 + 5 = 8B - 40 - 4B - 6 \\
 & -8B - 10 = 4B - 46 \\
 & \quad -8B - 4B = -46 + 10 \\
 & \frac{-12B}{-12} = \frac{-36}{-12} \quad B = 3
 \end{array}$$

$$\begin{array}{rcl}
 9) & 3C - 6 + 2C = 10C - 2C + 6 \\
 & 5C - 6 = 8C + 6 \\
 & 5C - 8C = 6 + 6 \\
 & \frac{-3C}{-3} = \frac{12}{-3} \quad C = -4
 \end{array}$$

$$\begin{array}{rcl}
 10) & 2D - 8 - 5D = -3D - 2D + 6 \\
 & -3D - 8 = -5D + 6 \\
 & \quad -3D + 5D = 6 + 8 \\
 & \frac{2D}{2} = \frac{14}{2} \quad D = 7
 \end{array}$$

$$\begin{array}{rcl}
 11) & 8K - 6 + 3K - 2K + 3 = 4 \times 33 \\
 & 9K - 3 = 132 \\
 & \quad +3 \quad +3 \\
 \hline
 & 9K = 135 \\
 & \frac{9K}{9} = \frac{135}{9} \quad K = 15
 \end{array}$$

$$\begin{array}{rcl}
 12) & B + B + B + 6 = 6B + 5 - 2B + 9 \\
 & 3B + 6 = 4B + 14 \\
 & 6 - 14 = 4B - 3B \\
 & -8 = B \quad B = -8
 \end{array}$$

$$\begin{array}{rcl}
 13) & -2C + 12 = 2C - 6 + 6C - 12 \\
 & -2C + 12 = 8C - 18 \\
 & -2C - 8C = -18 - 12 \\
 & \frac{-10C}{-10} = \frac{-30}{-10} \quad C = 3
 \end{array}$$

$$\begin{array}{rcl}
 14) & 10X - 3X - 9 + 3 - X = 51 \div 3 + 1 \\
 & 6X - 6 = 18 \\
 & \quad +6 \quad +6 \\
 \hline
 & 6X = 24 \\
 & \frac{6X}{6} = \frac{24}{6} \quad X = 4
 \end{array}$$

3E

$$1) -2X + 7 + 3X - 4 = 10 - 1$$

$$X + 3 = 9$$

$$X = 6$$

$$2) 3Y + 8 - 2 - 2Y = 9 - 4 + 5$$

$$Y + 6 = 10$$

$$Y = 4$$

$$3) 2X - 2 + 7 + X - X = 6 + 6 - 1$$

$$2X + 5 = 11$$

$$2X = 6$$

$$X = 3$$

$$4) -2B + 3 + 5B + 1 = 2(3 + 2) + 9$$

$$3B + 4 = 2(5) + 9$$

$$3B = 19 - 4$$

$$3B = 15$$

$$B = 5$$

$$5) 3Q - 2 + Q = 3(2 + 2) - 2$$

$$4Q - 2 = 3(4) - 2$$

$$4Q = 12$$

$$Q = 3$$

$$6) 5X + 5 - X - 3 = 3X - X + 4(2)$$

$$4X + 2 = 2X + 8$$

$$2X = 6$$

$$X = 3$$

$$7) 2Y - 4 + Y + 9 = -2Y - 4 + 4Y + 11$$

$$3Y + 5 = 2Y + 7$$

$$3Y - 2Y = 7 - 5$$

$$Y = 2$$

$$8) -4Q + 2 + 5Q + 2 = 3Q - 6$$

$$Q + 4 = 3Q - 6$$

$$4 = 2Q - 6$$

$$10 = 2Q$$

$$5 = Q$$

$$9) (7 - 3)^2 \times |3 - 7| =$$

$$(4)^2 \times |-4| = 16 \times 4 = 64$$

$$10) 8 + (5 + 4)^2 \times 2 + 11^2 =$$

$$8 + 9^2 \times 2 + 121 = 8 + 81 \times 2 + 121 =$$

$$8 + 162 + 121 = 291$$

$$11) (4 \times 8 - 6 + 3^2) + (3 - 6 - 7^2 \times 3 + 4) =$$

$$(4 \times 8 - 6 + 9) + (3 - 6 - 49 \times 3 + 4) =$$

$$(32 - 6 + 9) + (3 - 6 - 147 + 4) =$$

$$35 + (-146) = -111$$

$$12) (15 - 6 + 8^2 + 3 \div 3) - (10 + 9^2 - 40 \div 8) =$$

$$(15 - 6 + 64 + 3 \div 3) - (10 + 81 - 40 \div 8) =$$

$$(15 - 6 + 64 + 1) - (10 + 81 - 5) =$$

$$74 - 86 = -12$$

$$13) \frac{3}{4} \times \frac{8}{3} \div \frac{2}{1} =$$

$$\frac{\cancel{3}}{\cancel{4}} \times \frac{\cancel{8}^2}{\cancel{3}} \times \frac{\cancel{1}}{\cancel{2}} = \frac{1}{1} = 1$$

$$14) \begin{array}{r} 1.7 \\ .8 \\ \hline 5 \\ 86 \\ \hline 1.36 \end{array}$$

(two decimal places in answer)

$$15) (-19)(6) = -114$$

$$16) -6^2 = -(6)(6) = -36$$

$$17) -[-(-6)] = -[+6] = -6$$

$$18) -7 - (-3) = -7 + 3 = -4$$

$$19) 3, 6 = 2 \times 3, 8 = 2 \times 2 \times 2,$$

$$\text{so LCM} = 2 \times 2 \times 2 \times 3 = 24$$

$$\frac{3}{(24)} \frac{7}{8} + \frac{8}{(24)} \frac{2}{3} \times = \frac{4}{(24)} \frac{1}{6}$$

$$21 + 16X = 4, 16X = -17, X = -1 \frac{1}{16}$$

$$20) 10 = 10, 100 = 10 \times 10$$

$$\text{LCM} = 10 \times 10 = 100$$

$$100(.03X) - 100(.6) = 100(.75)$$

$$3X - 60 = 75$$

$$3X = 135, X = 45$$

4A

$$1) 5(4 + 3) = 5(4) + 5(3)$$

$$2) 6(2 + 3 + 1) = 6(2) + 6(3) + 6(1)$$

$$3) 7(A + B) = 7A + 7B$$

$$4) 3(4C + 3B) = 3(4C) + 3(3B)$$

$$5) 5(2X + 3Y - 3 + 4X) =$$

$$5(2X) + 5(3Y) - 5(3) + 5(4X)$$

$$6) 8(A + 3B + 8 + 4A) =$$

$$8(A) + 8(3B) + 8(8) + 8(4A)$$

$$7) 6X + 6Y = 6(X + Y)$$

$$8) 8A + 16B = 8(A + 2B)$$

$$9) 14X + 21Y = 7(2X + 3Y)$$

$$10) -2M - 6N = -2(M + 3N)$$

$$11) 6B + 18C = 6(B + 3C)$$

$$12) 15X + 10A = 5(3X + 2A)$$

$$13) 5X + 15 = 45$$

$$5(X + 3) = 5(9)$$

$$X + 3 = 9, X = 6$$

$$14) 10X + 16 = 26$$

$$2(5X + 8) = 2(13)$$

$$5X + 8 = 13, 5X = 5, X = 1$$

$$15) 13Y - 26 + 39Y = 52$$

$$13(Y - 2 + 3Y) = 13(4)$$

$$4Y - 2 = 4$$

$$4Y = 6, Y = 1 \frac{1}{2}$$

$$16) 8A - 10 - 6A = 14$$

$$2(4A - 5 - 3A) = 2(7)$$

$$A - 5 = 7, A = 12$$

$$17) 12X + 21 = 30$$

$$3(4X + 7) = 3(10)$$

$$4X + 7 = 10$$

$$4X = 3, X = \frac{3}{4}$$

$$18) 8X - 28 = 12$$

$$4(2X - 7) = 4(3)$$

$$2X - 7 = 3$$

$$2X = 10, X = 5$$

4B

$$1) 8(5 + 2) = 8(5) + 8(2)$$

$$2) 5(4 - 3 + 2) = 5(4) - 5(3) + 5(2)$$

$$3) 9(C + D) = 9(C) + 9(D)$$

$$4) 5(2C + 4D) = 5(2C) + 5(4D)$$

$$5) 3(X + Y + 4X) = 3(X) + 3(Y) + 3(4X)$$

$$6) -2(3X + 2Y + Y) =$$

$$(-2)(3X) + (-2)(2Y) + (-2)(Y)$$

$$7) 8X + 12Y = 4(2X + 3Y)$$

$$8) -7X - 21Y = 7(-X - 3Y) \text{ or } -7(X + 3Y)$$

$$9) 18A + 24B = 6(3A + 4B)$$

$$10) 8X + 10 = 16$$

$$2(4X + 5) = 2(8)$$

$$11) 6A + 3 = 15$$

$$3(2A + 1) = 3(5)$$

$$12) 8A + 10 = 20$$

$$2(4A + 5) = 2(10)$$

$$13) 8X + 32 = 40$$

$$8(X + 4) = 8(5)$$

$$X + 4 = 5, X = 1$$

$$14) 18Y + 27 = 45$$

$$9(2Y + 3) = 9(5)$$

$$2Y + 3 = 5,$$

$$2Y = 2, Y = 1$$

$$15) 15X - 10 + 5X = 25$$

$$5(3X - 2 + X) = 5(5)$$

$$4X = 7, X = 1 \frac{3}{4}$$

$$16) 9C - 6 - 12C = 18$$

$$3(3C - 2 - 4C) = 3(6)$$

$$-C - 2 = 6, -C = 8, C = -8$$

$$17) 14M - 42 + 56M = 28$$

$$14(M - 3 + 4M) = 14(2)$$

$$5M - 3 = 2$$

$$5M = 5, M = 1$$

$$18) 6A - 16 - 4A = 20$$

$$2(3A - 8 - 2A) = 2(10)$$

$$A - 8 = 10, A = 18$$