

2) $4x + 9 = 8x$

a) $x = \frac{-7}{8}$

$4\left(\frac{-7}{8}\right) + 9 \stackrel{?}{=} 8\left(\frac{-7}{8}\right)$

$\frac{-7}{2} + 9 \stackrel{?}{=} -7$

$\frac{-7}{2} + \frac{18}{2} \stackrel{?}{=} -7$

$\frac{11}{2} \neq -7$

not a solution

b) $x = \frac{9}{4}$

$4\left(\frac{9}{4}\right) + 9 \stackrel{?}{=} 8\left(\frac{9}{4}\right)$

$9 + 9 \stackrel{?}{=} 2(9)$

$18 = 18$

yes, a solution

4) $9v - 2 = 3v$

a) $v = \frac{-1}{3}$

$9\left(\frac{-1}{3}\right) - 2 \stackrel{?}{=} 3\left(\frac{-1}{3}\right)$

$3(-1) - 2 \stackrel{?}{=} -1$

$-3 - 2 \stackrel{?}{=} -1$

$-5 \neq -1$

not a solution

b) $v = \frac{1}{3}$

$9\left(\frac{1}{3}\right) - 2 \stackrel{?}{=} 3\left(\frac{1}{3}\right)$

$3(1) - 2 \stackrel{?}{=} 1$

$3 - 2 \stackrel{?}{=} 1$

$1 = 1$

yes, a solution

$$6) \frac{-16(3n+4)}{-16} = \frac{32}{-16}$$

$$3n+4 = -2$$

$$\frac{-4}{-4} \quad \frac{-4}{-4}$$

$$\frac{3n}{3} = \frac{-6}{3}$$

$$\underline{\underline{n = -2}}$$

$$8) -(x-19) = 28$$

$$-x + 19 = 28$$

$$+x \quad -28 \quad -28 + x$$

$$\underline{\underline{-9 = x}}$$

$$10) -6 + 6(5-k) = 15$$

$$-6 + 30 - 6k = 15$$

$$24 - 6k = 15$$

$$\frac{-15 + 6k}{-15 + 6k} \quad \frac{-15 + 6k}{-15 + 6k}$$

$$\frac{9}{6} = \frac{6k}{6}$$

$$\frac{9}{6} = k$$

$$k = \frac{9}{6} = \underline{\underline{\frac{3}{2}}}$$

$$12) -2(11-7x) + 54 = 4$$

$$-22 + 14x + 54 = 4$$

$$14x + 32 = 4$$

$$\frac{-32}{-32} \quad \frac{-32}{-32}$$

$$\frac{14x}{14} = \frac{-28}{14}$$

$$x = \frac{-28}{14} = \frac{-14}{7} = \underline{\underline{-2}}$$

$$14) \frac{3}{5}(10x - 5) = 27$$

$$\frac{3}{5}(10x) - \frac{3}{5}(5) = 27$$

$$\begin{array}{r} 6x - 3 = 27 \\ +3 \quad +3 \end{array}$$

$$\frac{6x}{6} = \frac{30}{6}$$

$$\underline{\underline{x = 5}}$$

$$16) \frac{1}{4}(20d + 12) = d + 7$$

$$\frac{1}{4}(20d) + \frac{1}{4}(12) = d + 7$$

$$\begin{array}{r} 5d + 3 = d + 7 \\ -d \quad -3 \quad -d \quad -3 \end{array}$$

$$\frac{4d}{4} = \frac{4}{4}$$

$$\underline{\underline{d = 1}}$$

$$18) 9(2m - 3) - 8 = 4m + 7$$

$$9(2m) - 9(3) - 8 = 4m + 7$$

$$18m - 27 - 8 = 4m + 7$$

$$18m - 35 = 4m + 7$$

$$\begin{array}{r} -4m + 35 \quad -4m + 35 \end{array}$$

$$\frac{14m}{14} = \frac{42}{14}$$

$$m = \frac{42}{14} = \frac{21}{7} = \underline{\underline{3}}$$

$$20) -15 + 4(2 - 5y) = -7(y - 4) + 4$$

$$-15 + 4(2) - 4(5y) = (-7)(y) - (-7)(4) + 4$$

$$-15 + 8 - 20y = -7y + 28 + 4$$

$$-7 - 20y = -7y + 32$$

$$\begin{array}{r} -32 + 20y \quad +20y \quad -32 \end{array}$$

$$\frac{-39}{27} = \frac{27y}{27}$$

$$\frac{-39}{27} = y$$

$$y = \frac{-39}{27} = \underline{\underline{\frac{-13}{9}}}$$

$$22) -12 + 8(x-5) = -4 + 3(5x-2)$$

$$-12 + 8(x) - 8(5) = -4 + 3(5x) - 3(2)$$

$$-12 + 8x - 40 = -4 + 15x - 6$$

$$8x - 52 = 15x - 10$$

$$\begin{array}{r} -8x + 10 \\ -8x + 10 \end{array}$$

$$\frac{-42}{7} = \frac{7x}{7}$$

$$\frac{-42}{7} = \frac{7x}{7}$$

$$\underline{\underline{-6 = x}}$$

$$24) 3(a-2) - (a+6) = 4(a-1)$$

$$3a - 6 - a - 6 = 4a - 4$$

$$2a - 12 = 4a - 4$$

$$\begin{array}{r} -2a + 4 \\ -2a + 4 \end{array}$$

$$\frac{-8}{2} = \frac{2a}{2}$$

$$\underline{\underline{-4 = a}}$$

$$26) 5[9 - 2(6d-1)] = 11(4-10d) - 139$$

$$5[9 - 12d + 2] = 44 - 110d - 139$$

$$5[11 - 12d] = -110d - 95$$

$$55 - 60d = -110d - 95$$

$$\begin{array}{r} -55 + 110d \\ +110d - 55 \end{array}$$

$$\frac{50d}{50} = \frac{-150}{50}$$

$$\underline{\underline{d = -3}}$$

$$28) 3[-14 + 2(15k - 6)] = 8(3 - 5k) - 24$$

$$3[-14 + 30k - 12] = 24 - 40k - 24$$

$$3[30k - 26] = -40k$$

$$90k - 78 = -40k$$

$$+40k + 78 \quad +40k + 78$$

$$\frac{130k}{130} = \frac{78}{130}$$

$$k = \frac{78}{130} = \frac{39}{65}$$

$$30) 10[5(n+1) + 4(n-1)] = 11[7(5+n) - (25-3n)]$$

$$10[5n + 5 + 4n - 4] = 11[35 + 7n - 25 + 3n]$$

$$10[9n + 1] = 11[10n + 10]$$

$$90n + 10 = 110n + 110$$

$$-90n - 110 \quad -90n - 110$$

$$\frac{-100}{20} = \frac{20n}{20}$$

$$n = \frac{-100}{20} = \frac{-10}{2} = \underline{\underline{-5}}$$

$$\frac{-100}{20} = n$$

Exercise 31-42 skipped

$$44) \quad \frac{3}{4}x - \frac{1}{2} = \frac{1}{4}$$

$$4 = (2)^2 \quad 2 = (2)^1 \\ LCD = (2)^2 = 4$$

2.1 6

$$\left(\frac{4}{1}\right)\left(\frac{3}{4}x - \frac{1}{2}\right) = \left(\frac{1}{4}\right)\left(\frac{4}{1}\right)$$

$$\begin{array}{r} 3x - 2 = 1 \\ +2 \quad +2 \\ \hline 3x = 3 \\ \frac{3}{3} \quad \frac{3}{3} \\ \hline x = 1 \end{array}$$

$$46) \quad \begin{array}{l} 6 = (2)'(3)' \\ 3 = (3)' \end{array} \quad LCD = (2)'(3)' = 6$$

$$48) \quad \begin{array}{l} 8 = (2)^3 \\ 2 = (2)^1 \\ 4 = (2)^2 \end{array} \quad LCD = (2)^3 = 8$$

$$\frac{5}{6}y - \frac{1}{3} = \frac{-7}{6}$$

$$\left(\frac{6}{1}\right)\left(\frac{5}{6}y - \frac{1}{3}\right) = \left(\frac{-7}{6}\right)\left(\frac{6}{1}\right)$$

$$\begin{array}{r} 5y - 2 = -7 \\ +2 \quad +2 \\ \hline 5y = -5 \\ \frac{5}{5} \quad \frac{-5}{5} \end{array}$$

$$\underline{\underline{y = -1}}$$

$$\frac{5}{8}b + \frac{1}{2} = \frac{-3}{4}$$

$$\left(\frac{8}{1}\right)\left(\frac{5}{8}b + \frac{1}{2}\right) = \left(\frac{-3}{4}\right)\left(\frac{8}{1}\right)$$

$$\begin{array}{r} 5b + 4 = -6 \\ -4 \quad -4 \\ \hline 5b = -10 \end{array}$$

$$\frac{5b}{5} = \frac{-10}{5}$$

$$\underline{\underline{b = -2}}$$

50)

$$2 = \frac{3}{5}x - \frac{1}{3}x + \frac{2}{5}x$$

$$5 = (5)'$$

$$3 = (3)'$$

$$LCD = (3)'(5)' = 15$$

2.1 7

$$\left(\frac{15}{1}\right)\left(\frac{2}{1}\right) = \left(\frac{3}{5}x - \frac{1}{3}x + \frac{2}{5}x\right)\left(\frac{15}{1}\right)$$

$$30 = 9x - 5x + 6x$$

$$\frac{30}{10} = \frac{10x}{10}$$

$$\underline{\underline{3 = x}}$$

52)

$$2 = (2)'$$

$$4 = (2)^2$$

$$6 = (2)'(3)'$$

$$12 = (2)^2(3)'$$

$$LCD = (2)^2(3)' = 12$$

$$\frac{1}{2}a - \frac{1}{4} = \frac{1}{6}a + \frac{1}{12}$$

$$\left(\frac{12}{1}\right)\left(\frac{1}{2}a - \frac{1}{4}\right) = \left(\frac{1}{6}a + \frac{1}{12}\right)\left(\frac{12}{1}\right)$$

$$\begin{array}{r} 6a - 3 \\ -2a + 3 \\ \hline \end{array} = \begin{array}{r} 2a + 1 \\ -2a + 3 \\ \hline \end{array}$$

$$\frac{4a}{4} = \frac{4}{4}$$

$$\underline{\underline{a = 1}}$$

$$54) \quad 3 = (3)' \quad 5 = (5)' \quad LCD = (3)'(5)' = 15$$

$$2, 1 \overline{) 8}$$

$$\frac{1}{3}x + \frac{2}{5} = \frac{1}{5}x - \frac{2}{5}$$

$$\left(\frac{15}{1}\right)\left(\frac{1}{3}x + \frac{2}{5}\right) = \left(\frac{1}{5}x - \frac{2}{5}\right)\left(\frac{15}{1}\right)$$

$$\begin{array}{r} 5x + 6 = 3x - 6 \\ -3x \quad -6 \quad -3x \quad -6 \\ \hline \end{array}$$

$$\frac{2x}{2} = \frac{-12}{2}$$

$$\underline{\underline{x = -6}}$$

$$56) \quad \frac{1}{5}(q+3) = \frac{1}{2}(q-3)$$

$$5 = (5)'$$

$$2 = (2)'$$

$$LCD = (2)'(5)' = 10$$

$$\frac{1}{5}q + \frac{3}{5} = \frac{1}{2}q - \frac{3}{2}$$

$$\left(\frac{10}{1}\right)\left(\frac{1}{5}q + \frac{3}{5}\right) = \left(\frac{1}{2}q - \frac{3}{2}\right)\left(\frac{10}{1}\right)$$

$$2q + 6 = 5q - 15$$

$$\begin{array}{r} -2q + 15 \quad -2q + 15 \\ \hline \end{array}$$

$$\frac{21}{3} = \frac{3q}{3}$$

$$\underline{\underline{7 = q}}$$

$$58) \quad \frac{1}{3}(x+5) = \frac{5}{6}$$

$$\frac{1}{3}x + \frac{5}{3} = \frac{5}{6}$$

$$\left(\frac{6}{1}\right)\left(\frac{1}{3}x + \frac{5}{3}\right) = \left(\frac{5}{6}\right)\left(\frac{6}{1}\right)$$

$$2x + 10 = 5$$

$$\frac{-10 \quad -10}{\hline}$$

$$2x = -5$$

$$\underline{\underline{x = -\frac{5}{2}}}$$

$$3 = (3)'$$

$$6 = (2)'(3)' \quad LCD = (2)'(3)' = 6$$

$$60) \quad \frac{3p+6}{3} = \frac{p}{2}$$

$$2 = (2)'$$

$$LCD = (2)' = 2$$

$$\frac{3p}{3} + \frac{6}{3} = \frac{p}{2}$$

$$p + 2 = \frac{p}{2}$$

$$\left(\frac{2}{1}\right)\left(\frac{p}{1} + \frac{2}{1}\right) = \left(\frac{p}{2}\right)\left(\frac{2}{1}\right)$$

$$2p + 4 = p$$

$$\frac{-p \quad -4 \quad -p \quad -4}{\hline}$$

$$\underline{\underline{p = -4}}$$

2.1 10

$$62) \frac{10y-2}{3} + 3 = \frac{10y+1}{9}$$

$$3 = (3)^1$$

$$9 = (3)^2$$

$$LCD = (3)^2 = 9$$

$$\frac{10y}{3} - \frac{2}{3} + 3 = \frac{10y}{9} + \frac{1}{9}$$

$$\left(\frac{9}{1}\right) \left(\frac{10y}{3} - \frac{2}{3} + \frac{3}{1} \right) = \left(\frac{10y}{9} + \frac{1}{9} \right) \left(\frac{9}{1} \right)$$

$$30y - 6 + 27 = 10y + 1$$

$$30y + 21 = 10y + 1$$

$$\begin{array}{r} -10y \quad -21 \quad -10y \quad -21 \\ \hline \end{array}$$

$$\begin{array}{r} 20y = -20 \\ \hline 20 \quad 20 \end{array}$$

$$\underline{\underline{y = -1}}$$

$$64) \frac{3v-6}{2} + 5 = \frac{11v-4}{5}$$

$$2 = (2)^1$$

$$5 = (5)^1$$

$$LCD = (2)^1 (5)^1 = 10$$

$$\frac{3v}{2} - \frac{6}{2} + 5 = \frac{11v}{5} - \frac{4}{5}$$

$$\frac{3v}{2} - 3 + 5 = \frac{11v}{5} - \frac{4}{5}$$

$$\frac{3v}{2} + 2 = \frac{11v}{5} - \frac{4}{5}$$

$$\left(\frac{10}{1}\right) \left(\frac{3v}{2} + \frac{2}{1} \right) = \left(\frac{11v}{5} - \frac{4}{5} \right) \left(\frac{10}{1} \right)$$

$$15v + 20 = 22v - 8$$

$$\begin{array}{r} -15v \quad +8 \quad -15v \quad +8 \\ \hline \end{array}$$

$$\begin{array}{r} 28 = 7v \\ \hline 7 \quad 7 \end{array}$$

$$\underline{\underline{4 = v}}$$

$$66) 0.7x + 0.4 = 0.6x + 2.4$$

$$(10)(0.7x + 0.4) = (0.6x + 2.4)(10)$$

$$\begin{array}{r} 7x + 4 = 6x + 24 \\ -6x \quad -4 \quad -6x \quad -4 \\ \hline x = 20 \end{array}$$

$$68) 1.2x - 0.91 = 0.8x + 2.29$$

$$100(1.20x - 0.91) = (0.80x + 2.29)100$$

$$\begin{array}{r} 120x - 91 = 80x + 229 \\ -80x + 91 \quad -80x + 91 \\ \hline 40x = 320 \\ \frac{40x}{40} = \frac{320}{40} \\ x = \frac{320}{40} = \frac{32}{4} = \frac{16}{2} = \underline{\underline{8}} \end{array}$$

$$70) 0.05n + 0.10(n-7) = 3.55$$

$$0.05n + 0.10n - 0.70 = 3.55$$

$$100(0.05n + 0.10n - 0.70) = (3.55)100$$

$$5n + 10n - 70 = 355$$

$$\begin{array}{r} 15n - 70 = 355 \\ +70 \quad +70 \\ \hline 15n = 425 \end{array}$$

$$\frac{15n}{15} = \frac{425}{15}$$

$$n = \frac{425}{15} = \frac{85}{3} = \underline{\underline{28\frac{1}{3}}}$$

$$72) \quad 0.10d + 0.25(d + 7) = 5.25$$

$$0.10d + 0.25d + 0.25(7) = 5.25$$

$$100(0.10d + 0.25d + 0.25(7)) = (5.25)100$$

$$10d + 25d + 25(7) = 525$$

$$35d + 175 = 525$$

$$\begin{array}{r} -175 \quad -175 \\ \hline \end{array}$$

$$\begin{array}{r} 35d = 350 \\ \hline 35 \quad 35 \end{array}$$

$$\underline{\underline{d = 10}}$$