

Solutions Manual for Business Mathematics In Canada 11th Jerome

SOLUTIONS MANUAL SAMPLE PREVIEW

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RESOURCE TYPE

Solutions Manual

2 Review and Applications of Algebra

Exercise 2.1

a. $(-p) + (-3p) + (4p) = -p - 3p + 4p = \underline{0}$

b. $5s - 2t - 2s - 4t = 5s - 2s - 2t - 4t = \underline{3s - 6t}$

c. $4x^2y - 3x^2y + (-5x^2y) = 4x^2y - 3x^2y - 5x^2y = \underline{-4x^2y}$

d. $(5s - 2t) - (2s - 4t) = 5s - 2t - 2s + 4t = \underline{3s + 2t}$

e. $4x^2y + (-3x^2y) - (-5x^2y) = 4x^2y - 3x^2y + 5x^2y = \underline{6x^2y}$

f. $1 - (7e^2 - 5 + 3e - e^3) = 1 - 7e^2 + 5 - 3e + e^3 = \underline{e^3 - 7e^2 - 3e + 6}$

g. $(6x^2 - 3xy + 4y^2) - (8y^2 - 10xy - x^2) = 6x^2 - 3xy + 4y^2 - 8y^2 + 10xy + x^2$
 $= \underline{7x^2 + 7xy - 4y^2}$

h. $(7m^3 - m - 6m^2 + 10) - (5m^3 - 9 + 3m - 2m^2)$
 $= 7m^3 - m - 6m^2 + 10 - 5m^3 + 9 - 3m + 2m^2$
 $= \underline{2m^3 - 4m^2 - 4m + 19}$

i. $2(7x - 3y) - 3(2x - 3y) = 14x - 6y - 6x + 9y = \underline{8x + 3y}$

j. $4(a^2 - 3a - 4) - 2(5a^2 - a - 6) = 4a^2 - 12a - 16 - 10a^2 + 2a + 12$
 $= \underline{-6a^2 - 10a - 4}$

k. $15x - [4 - 5x - 6] = 15x - 4 + 5x + 6 = \underline{20x + 2}$

l. $6a - [3a - 2b - a] = 6a - 3a + 2b + a = \underline{4a + 2b}$

m. $15x - [4 - 2(5x - 6)] = 15x - 4 + 10x - 12 = \underline{25x - 16}$

n. $6a - [3a - 2(2b - a)] = 6a - 3a + 4b - 2a = \underline{a + 4b}$

o. $4a(3ab - 5a + 6b) = \underline{12a^2b - 20a^2 + 24ab}$

p. $9k(4 - 8k + 7k^2) = \underline{36k - 72k^2 + 63k^3}$

q. $-5xy(2x^2 - xy - 3y^2) = \underline{-10x^3y + 5x^2y^2 + 15xy^3}$

r. $-(p^2 - 4pq - 5p)\left(\frac{2q}{p}\right) = \underline{-2pq + 8q^2 + 10q}$

s. $(4r - 3t)(2t + 5r) = 8rt + 20r^2 - 6t^2 - 15rt = \underline{20r^2 - 7rt - 6t^2}$

t. $(3p^2 - 5p)(-4p + 2) = -12p^3 + 6p^2 + 20p^2 - 10p = \underline{-12p^3 + 26p^2 - 10p}$

u. $(4r - 3t) - (2t + 5r) = 4r - 3t - 2t - 5r = \underline{-r - 5t}$

v. $(3p^2 - 5p) + (-4p + 2) = 3p^2 - 5p - 4p + 2 = \underline{3p^2 - 9p + 2}$

w. $3(a - 2)(4a + 1) - 5(2a + 3)(a - 7) = 3(4a^2 + a - 8a - 2) - 5(2a^2 - 14a + 3a - 21)$
 $= 12a^2 + 3a - 24a - 6 - 10a^2 + 70a - 15a + 105$
 $= \underline{2a^2 + 34a + 99}$

$$\begin{aligned} \text{x. } 5(2x - y)(y + 3x) - 6x(x - 5y) &= 5(2xy + 6x^2 - y^2 - 3xy) - 6x^2 + 30xy \\ &= 10xy + 30x^2 - 5y^2 - 15xy - 6x^2 + 30xy \\ &= \underline{\underline{24x^2 + 25xy - 5y^2}} \end{aligned}$$

$$\text{y. } \frac{18x^2}{3x} = \underline{\underline{6x}}$$

$$\text{z. } \frac{6a^2b}{-2ab^2} = \underline{\underline{-3\frac{a}{b}}}$$

$$\text{aa. } \frac{x^2y - xy^2}{xy} = \underline{\underline{x - y}}$$

$$\text{bb. } \frac{-4x + 10x^2 - 6x^3}{-0.5x} = \underline{\underline{8 - 20x + 12x^2}}$$

$$\text{cc. } \frac{12x^3 - 24x^2 + 36x}{48x} = \underline{\underline{\frac{x^2 - 2x + 3}{4}}}$$

$$\text{dd. } \frac{32a^2b - 8ab + 14ab^2}{2ab} = \underline{\underline{16a - 4 + 7b}}$$

$$\text{ee. } \frac{4a^2b^3 - 6a^3b^2}{2ab^2} = \underline{\underline{2ab - 3a^2}}$$

$$\text{ff. } \frac{120(1+i)^2 + 180(1+i)^3}{360(1+i)} = \underline{\underline{\frac{2(1+i) + 3(1+i)^2}{6}}}$$

$$\text{gg. } \frac{4a^2b^3 - 6ab^2 + 2ab^3}{2ab^3} = \underline{\underline{\frac{2ab - 3 + b}{b}}}$$

$$\text{hh. } \frac{12(1+i) + 18(1+i)^2}{36(1+i)^2} = \underline{\underline{\frac{2 + 3(1+i)}{6(1+i)}}}$$

$$\begin{aligned} 1. \quad 3d^2 - 4d + \$15 &= 3(\$2.50)^2 - 4(\$2.50) + \$15 \\ &= \$18.75 - \$10 + \$15 \\ &= \underline{\underline{\$23.75}} \end{aligned}$$

$$2. \quad 15g - 9h + \$3 = 15(\$14) - 9(\$15) + \$3 = \underline{\underline{\$78}}$$

$$3. \quad 7x(4y - \$8) = 7(\$3.20)(4 \times \$1.50 - \$8) = \$22.4(\$6 - \$8) = \underline{\underline{-\$44.80}}$$

$$4. \quad I \div Pr = \frac{\$13.75}{\$500 \times 0.11} = \underline{\underline{0.25}}$$

$$5. \quad \frac{I}{rt} = \frac{\$23.21}{0.095 \times \frac{283}{365}} = \frac{\$23.21}{0.0736575} = \underline{\underline{\$315.10}}$$

$$6. \quad \frac{N}{1-d} = \frac{\$89.10}{1-0.10} = \underline{\underline{\$99.00}}$$

$$7. \quad L(1-d_1)(1-d_2)(1-d_3) = \$490(1-0.125)(1-0.15)(1-0.05) = \underline{\underline{\$346.22}}$$

$$8. \quad P(1+rt) = \$770 \left(1 + 0.013 \times \frac{223}{365} \right) = \$770(1.0079425) = \underline{\underline{\$776.12}}$$

$$9. \frac{S}{1+rt} = \frac{\$2500}{1+0.085 \times \frac{123}{365}} = \frac{\$2500}{1.028644} = \underline{\underline{\$2430.38}}$$

$$10. \frac{S}{(1+i)^n} = \frac{\$850}{(1+0.0075)^6} = \frac{\$850}{1.045852} = \underline{\underline{\$812.73}}$$

$$11. P(1+i)^n = \$1280(1+0.025)^3 = \underline{\underline{\$1378.42}}$$

$$12. \frac{x}{2} - x^2 + \frac{4}{5} - 0.2x^2 - \frac{4}{5}x + \frac{1}{2} = 0.5x - x^2 + 0.8 - 0.2x^2 - 0.8x + 0.5 \\ = \underline{\underline{-1.2x^2 - 0.3x + 1.3}}$$

$$13. \frac{2x+9}{4} - 1.2(x-1) = 0.5x + 2.25 - 1.2x + 1.2 = \underline{\underline{-0.7x + 3.45}}$$

$$14. \frac{2x}{1.045} - \frac{2.016x}{3} + \frac{x}{2} = 1.91388x - 0.6720x + 0.5x = \underline{\underline{1.7419x}}$$

$$15. \frac{8x}{0.5} + \frac{5.5x}{11} + 0.5(4.6x - 17) = 16x + 0.5x + 2.3x - 8.5 = \underline{\underline{18.8x - 8.5}}$$

$$16. y\left(1 - 0.125 \times \frac{213}{365}\right) + \frac{2y}{1 + 0.125 \times \frac{88}{365}} = 0.927055y + 1.94149y = \underline{\underline{2.8685y}}$$

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$$17. \frac{P}{1 + 0.095 \times \frac{5}{12}} + 2P\left(1 + 0.095 \times \frac{171}{365}\right) = 0.961924P + 2.08901P = \underline{\underline{3.0509P}}$$

$$18. \frac{h}{(1+0.055)^2} - 3h(1+0.055)^3 = 0.898452h - 3.52272h = \underline{\underline{-2.6243h}}$$

$$19. k(1+0.04)^2 + \frac{2k}{(1+0.04)^2} = 1.08160k + 1.84911k = \underline{\underline{2.9307k}}$$

$$20. (1+i)^m - 1 = (1+0.0225)^4 - 1 = \underline{\underline{0.093083}}$$

$$21. R\left[\frac{(1+i)^n - 1}{i}\right] = \$550\left(\frac{1.085^3 - 1}{0.085}\right) = \$550\left(\frac{0.2772891}{0.085}\right) = \underline{\underline{\$1794.22}}$$

$$22. R\left[\frac{(1+i)^n - 1}{i}\right](1+i) = \$910\left(\frac{1.1038129^4 - 1}{0.1038129}\right)(1.1038129) \\ = \$910\left(\frac{0.4845057}{0.1038129}\right)(1.1038129) \\ = \underline{\underline{\$4687.97}}$$

$$23. \frac{R}{i}\left[1 - \frac{1}{(1+i)^n}\right] = \frac{\$630}{0.115}\left(1 - \frac{1}{1.115^2}\right) = \underline{\underline{\$1071.77}}$$

$$\begin{aligned}
 24. \quad P(1 + rt_1) + \frac{S}{1 + rt_2} &= \$470 \left(1 + 0.075 \times \frac{104}{365} \right) + \frac{\$390}{1 + 0.075 \times \frac{73}{365}} \\
 &= \$470(1.021370) + \frac{\$390}{1.01500} \\
 &= \$480.044 + \$384.236 \\
 &= \underline{\underline{\$864.28}}
 \end{aligned}$$

Exercise 2.2

$$a. a^2 \times a^3 = \underline{a^5}$$

$$b. (x^6)(x^{-4}) = \underline{x^2}$$

$$c. b^{10} \div b^6 = b^{10-6} = \underline{b^4}$$

$$d. h^7 \div h^{-4} = h^{7-(-4)} = \underline{h^{11}}$$

$$e. (1+i)^4 \times (1+i)^9 = \underline{(1+i)^{13}}$$

$$f. (1+i) \times (1+i)^n = \underline{(1+i)^{n+1}}$$

$$g. (x^4)^7 = x^{4 \times 7} = \underline{x^{28}}$$

$$h. (y^3)^3 = \underline{y^9}$$

$$i. (t^6)^{\frac{1}{3}} = \underline{t^2}$$

$$j. (n^{0.5})^8 = \underline{n^4}$$

$$k. \frac{(x^5)(x^6)}{x^9} = x^{5+6-9} = \underline{x^2}$$

$$l. \frac{(x^5)^6}{x^9} = x^{5 \times 6 - 9} = \underline{x^{21}}$$

$$m. [2(1+i)]^2 = \underline{4(1+i)^2}$$

$$n. \left(\frac{1+i}{3i} \right)^3 = \underline{\frac{(1+i)^3}{27i^3}}$$

$$o. \frac{4r^5t^6}{(2r^2t)^3} = \frac{4r^5t^6}{8r^6t^3} = \frac{r^{5-6}t^{6-3}}{2} = \frac{r^{-1}t^3}{2} = \underline{\frac{t^3}{2r}}$$

$$p. \frac{(-r^3)(2r)^4}{(2r^{-2})^2} = \frac{-r^3(16r^4)}{4r^{-4}} = -4r^{3+4-(-4)} = \underline{-4r^{11}}$$

$$1. 8^{\frac{4}{3}} = \left(8^{\frac{1}{3}} \right)^4 = 2^4 = \underline{16.0000}$$

$$2. -27^{\frac{2}{3}} = -\left(27^{\frac{1}{3}} \right)^2 = \underline{-9.00000}$$

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$$3. 7^{\frac{3}{2}} = 7^{1.5} = \underline{\underline{18.5203}}$$

$$4. 5^{-\frac{3}{4}} = 5^{-0.75} = \underline{\underline{0.299070}}$$

$$5. (0.001)^{-2} = \underline{\underline{1,000,000}}$$

$$6. 0.893^{-\frac{1}{2}} = 0.893^{-0.5} = \underline{\underline{1.05822}}$$

$$7. (1.0085)^5(1.0085)^3 = 1.0085^8 = \underline{\underline{1.07006}}$$

$$8. (1.005)^3(1.005)^{-6} = 1.005^{-3} = \underline{\underline{0.985149}}$$

$$9. \sqrt[3]{1.03} = 1.03^{0.\bar{3}} = \underline{\underline{1.00990}}$$

$$10. \sqrt[6]{1.05} = 1.05^{0.\bar{16}} = \underline{\underline{1.00816}}$$

$$11. (4^4)(3^{-3})\left(-\frac{3}{4}\right)^3 = \frac{4^4}{3^3}\left(-\frac{3^3}{4^3}\right) = \underline{\underline{-4.00000}}$$

$$12. \left[\left(-\frac{3}{4}\right)^2\right]^{-2} = \left(-\frac{3}{4}\right)^{-4} = \left(-\frac{4}{3}\right)^4 = \frac{256}{81} = \underline{\underline{3.16049}}$$

$$13. \left(\frac{2}{3}\right)^3\left(-\frac{3}{2}\right)^2\left(-\frac{3}{2}\right)^{-3} = \left(\frac{2}{3}\right)^3\left(\frac{3}{2}\right)^2\left(-\frac{2}{3}\right)^3 = \frac{2}{3}\left(-\frac{2}{3}\right)^3 = -\frac{16}{81} = \underline{\underline{-0.197531}}$$

$$14. \frac{2}{3} \div \frac{3}{2} = \frac{\left(\frac{2}{3}\right)^3}{\left(\frac{2}{3}\right)^2} = \frac{2}{3} = \underline{\underline{0.666667}}$$

$$15. \frac{1.03^{16} - 1}{0.03} = \underline{\underline{20.1569}}$$

$$16. \frac{(1.008\bar{3})^{30} - 1}{0.008\bar{3}} = \frac{0.2826960}{0.008333333} = \underline{\underline{33.9235}}$$

$$17. \frac{1 - 1.0225^{-20}}{0.0225} = \frac{0.3591835}{0.0225} = \underline{\underline{15.9637}}$$

$$18. \frac{1 - (1.00\bar{6})^{-32}}{0.00\bar{6}} = \frac{0.1915410}{0.00\bar{6}} = \underline{\underline{28.7312}}$$

$$19. (1 + 0.0275)^{1/3} = \underline{\underline{1.00908}}$$

$$20. (1 + 0.055)^{1/6} - 1 = \underline{\underline{0.00896339}}$$

Exercise 2.3

$$2a - 9 = a + 1$$

$$2a - a = 1 + 9$$

$$a = \underline{\underline{10}}$$

$$a. \quad 5 + 3x = 20$$

$$3x = 20 - 5$$

$$3x = 15$$

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

$$\begin{aligned} \text{b. } 6(y - 4) &= 0 \\ 6y - 24 &= 0 \\ 6y &= 24 \\ y &= \underline{4} \end{aligned}$$

$$\begin{aligned} \text{c. } \frac{b}{3} - 1 &= 5 \\ \frac{b}{3} &= 6 \\ b &= \underline{18} \end{aligned}$$

$$\begin{aligned} \text{d. } -7x - 10 &= 11 \\ -7x &= 21 \\ x &= \underline{-3} \end{aligned}$$

$$\begin{aligned} \text{e. } 4 &= \frac{10-m}{3} \\ 12 &= 10 - m \\ m &= 10 - 12 \\ m &= \underline{-2} \end{aligned}$$

$$\begin{aligned} \text{f. } 12 - 3x - 8 &= -10x - 10 \\ 4 - 3x &= -10x - 10 \\ -3x + 10x &= -10 - 4 \\ 7x &= -14 \\ x &= \underline{-2} \end{aligned}$$

$$\begin{aligned} \text{g. } 2(4x - 5) &= x - 3 \\ 8x - 10 &= x - 3 \\ 8x - x &= -3 + 10 \\ 7x &= 7 \\ x &= \underline{1} \end{aligned}$$

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$$\begin{aligned} \text{h. } \frac{x+2}{x-1} &= 4 \\ x + 2 &= 4(x - 1) \\ x + 2 &= 4x - 4 \\ x - 4x &= -4 - 2 \\ -3x &= -6 \\ x &= \underline{2} \end{aligned}$$

$$\begin{aligned} \text{i. } \frac{15p}{2} &= 7p + 4 \\ 15p &= 2(7p + 4) \\ 15p &= 14p + 8 \\ 15p - 14p &= 8 \\ p &= \underline{8} \end{aligned}$$

$$\begin{aligned} 1. \quad 10a + 10 &= 12 + 9a \\ 10a - 9a &= 12 - 10 \\ a &= \underline{2} \end{aligned}$$

$$\begin{aligned} 2. \quad 29 - 4y &= 2y - 7 \\ 36 &= 6y \\ y &= \underline{6} \end{aligned}$$

$$\begin{aligned}
 3. \quad 0.5(x - 3) &= 20 \\
 x - 3 &= 40 \\
 x &= \underline{\underline{43}}
 \end{aligned}$$

$$\begin{aligned}
 4. \quad \frac{1}{3}(x - 2) &= 4 \\
 x - 2 &= 12 \\
 x &= \underline{\underline{14}}
 \end{aligned}$$

$$\begin{aligned}
 5. \quad y &= 192 + 0.04y \\
 y - 0.04y &= 192 \\
 y &= \frac{192}{0.96} = \underline{\underline{200}}
 \end{aligned}$$

$$\begin{aligned}
 6. \quad x - 0.025x &= 341.25 \\
 0.975x &= 341.25 \\
 x &= \frac{341.25}{0.975} = \underline{\underline{350}}
 \end{aligned}$$

$$\begin{aligned}
 7. \quad 12x - 4(2x - 1) &= 6(x + 1) - 3 \\
 12x - 8x + 4 &= 6x + 6 - 3 \\
 -2x &= -1 \\
 x &= \underline{\underline{0.5}}
 \end{aligned}$$

$$\begin{aligned}
 8. \quad 3y - 4 &= 3(y + 6) - 2(y + 3) \\
 3y - 4 &= 3y + 18 - 2y - 6 \\
 2y &= 16 \\
 y &= \underline{\underline{8}}
 \end{aligned}$$

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$$\begin{aligned}
 9. \quad 8 - 0.5(x + 3) &= 0.25(x - 1) \\
 8 - 0.5x - 1.5 &= 0.25x - 0.25 \\
 -0.75x &= -6.75 \\
 x &= \underline{\underline{9}}
 \end{aligned}$$

$$\begin{aligned}
 10. \quad 5(2 - c) &= 10(2c - 4) - 6(3c + 1) \\
 10 - 5c &= 20c - 40 - 18c - 6 \\
 -7c &= -56 \\
 c &= \underline{\underline{8}}
 \end{aligned}$$

$$\begin{aligned}
 11. \quad 3.1t + 145 &= 10 + 7.6t \\
 -4.5t &= -135 \\
 t &= \underline{\underline{30}}
 \end{aligned}$$

$$\begin{aligned}
 12. \quad 1.25y - 20.5 &= 0.5y - 11.5 \\
 0.75y &= 9 \\
 y &= \underline{\underline{12}}
 \end{aligned}$$

$$\begin{aligned}
 13. \quad \frac{x+2}{5} &= x + 0.8 \\
 x + 2 &= 5(x + 0.8) \\
 x + 2 &= 5x + 4 \\
 x - 5x &= 4 - 2 \\
 -4x &= 2 \\
 x &= \underline{\underline{-0.5}}
 \end{aligned}$$

$$14. \frac{3.5}{x-1} = 2.5$$

$$\begin{aligned} 3.5 &= 2.5(x-1) \\ 3.5 &= 2.5x - 2.5 \\ -2.5x &= -2.5 - 3.5 \\ -2.5x &= -6 \\ x &= \underline{2.4} \end{aligned}$$

$$15. \frac{10a}{2.2} + (2.2)^2 = 6 + a(2.2)^3$$

$$\begin{aligned} 4.54a + 4.84 &= 6 + 10.648a \\ 4.54a - 10.648a &= 6 - 4.84 \\ -6.1025a &= 1.16 \\ a &= \underline{-0.19} \end{aligned}$$

$$\begin{aligned} 16. 21 - \frac{b}{1.45} &= 5.5b - 9 \\ 21 - 0.6897b &= 5.5b - 9 \\ -0.6897b - 5.5b &= -9 - 21 \\ -6.1897b &= -30 \\ b &= \underline{4.85} \end{aligned}$$

$$\begin{aligned} 17. (1.065)^2x - \frac{x}{1.065} &= \$35 \\ 1.134225x - 0.938967x &= \$35 \\ 0.195258x &= \$35 \\ x &= \underline{\$179.25} \end{aligned}$$

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$$\begin{aligned} 18. 12x - 4x(1.06)^4 &= \$1800 \\ 12x - 5.04991x &= \$1800 \\ 6.95009x &= \$1800 \\ x &= \underline{\$258.99} \end{aligned}$$

$$\begin{aligned} 19. \frac{x}{1.1^2} + 2x(1.1)^3 &= \$1000 \\ 0.8264463x + 2.662x &= \$1000 \\ 3.488446x &= \$1000 \\ x &= \underline{\$286.66} \end{aligned}$$

$$\begin{aligned} 20. \frac{3x}{1.025^6} + x(1.025)^8 &= \$2641.35 \\ 2.586891x + 1.218403x &= \$2641.35 \\ x &= \underline{\$694.13} \end{aligned}$$

$$\begin{aligned} 21. \frac{2x}{1.03^7} + x + x(1.03)^{10} &= \$1000 + \frac{\$2000}{1.03^4} \\ 1.626183x + x + 1.343916x &= \$1000 + \$1776.974 \\ 3.970099x &= \$2776.974 \\ x &= \underline{\$699.47} \end{aligned}$$

$$22. \quad x(1.05)^3 + \$1000 + \frac{x}{1.05^7} = \frac{\$5000}{1.05^2}$$

$$1.157625x + 0.7106813x = \$4535.147 - \$1000$$

$$x = \underline{\$1892.17}$$

$$23. \quad x\left(1 + 0.095 \times \frac{84}{365}\right) + \frac{2x}{1 + 0.095 \times \frac{108}{365}} = \$1160.20$$

$$1.021863x + 1.945318x = \$1160.20$$

$$2.967181x = \$1160.20$$

$$x = \underline{\$391.01}$$

$$24. \quad \frac{x}{1 + 0.115 \times \frac{78}{365}} + 3x\left(1 + 0.115 \times \frac{121}{365}\right) = \$1000\left(1 + 0.115 \times \frac{43}{365}\right)$$

$$0.9760141x + 3.114370x = \$1013.548$$

$$x = \underline{\$247.79}$$

Exercise 2.4

$$1. \quad I = Prt$$

$$\$6.25 = P(0.05)0.25$$

$$\$6.25 = 0.0125P$$

$$P = \frac{\$6.25}{0.0125} = \underline{\$500.00}$$

$$2. \quad PV = \frac{PMT}{i}$$

$$\$150,000 = \frac{\$900}{i}$$

$$\$150,000i = \$900$$

$$i = \frac{\$900}{\$150,000} = \underline{0.006}$$

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$$3. \quad S = P(1 + rt)$$

$$\$3626 = P(1 + 0.004 \times 9)$$

$$\$3626 = 1.036P$$

$$P = \frac{\$3626}{1.036} = \underline{\$3500.00}$$

$$4. \quad N = L(1 - d)$$

$$\$891 = L(1 - 0.10)$$

$$\$891 = 0.90L$$

$$L = \frac{\$891}{0.90} = \underline{\$990.00}$$

$$5. \quad N = L(1 - d)$$

$$\$410.85 = \$498(1 - d)$$

$$\frac{\$410.85}{\$498} = 1 - d$$

$$0.825 = 1 - d$$

$$d = 1 - 0.825 = \underline{0.175}$$

$$6. S = P(1 + rt)$$

$$\$5100 = \$5000(1 + 0.0025t)$$

$$\$5100 = \$5000 + \$12.5t$$

$$\$5100 - \$5000 = \$12.5t$$

$$t = \frac{\$100}{\$12.5} = \underline{8}$$

$$7. NI = (CM)X - FC$$

$$\$15,000 = CM(5000) - \$60,000$$

$$\$15,000 + \$60,000 = 5000CM$$

$$CM = \frac{\$75,000}{5000} = \underline{\$15.00}$$

$$8. NI = (CM)X - FC$$

$$- \$542.50 = (\$13.50)X - \$18,970$$

$$\$18,970 - \$542.50 = (\$13.50)X$$

$$X = \frac{\$18,427.50}{\$13.50} = \underline{1365}$$

$$9. N = L(1 - d_1)(1 - d_2)(1 - d_3)$$

$$\$1468.80 = L(1 - 0.20)(1 - 0.15)(1 - 0.10)$$

$$\$1468.80 = L(0.80)(0.85)(0.90)$$

$$L = \frac{\$1468.80}{0.6120} = \underline{\$2400.00}$$

$$10. N = L(1 - d_1)(1 - d_2)(1 - d_3)$$

$$\$70.29 = \$99.99(1 - 0.20)(1 - d_2)(1 - 0.05)$$

$$\$70.29 = \$75.9924(1 - d_2)$$

$$\frac{\$70.29}{\$75.9924} = (1 - d_2)$$

$$d_2 = 1 - 0.92496 = \underline{0.0750}$$

$$11. FV = PV(1 + i_1)(1 + i_2)(1 + i_3)$$

$$\$1094.83 = \$1000(1 + i_1)(1 + 0.03)(1 + 0.035)$$

$$\$1094.83 = \$1066.05(1 + i_1)$$

$$\frac{\$1094.83}{\$1066.05} = 1 + i_1$$

$$i_1 = 1.02700 - 1 = \underline{0.0270}$$

$$12. FV = PMT \left[\frac{(1 + i)^n - 1}{i} \right]$$

$$\$1508.54 = PMT \left[\frac{(1 + 0.05)^4 - 1}{0.05} \right]$$

$$\$1508.54 = PMT \left(\frac{1.21550625 - 1}{0.05} \right)$$

$$\$1508.54 = PMT(4.310125)$$

$$PMT = \frac{\$1508.54}{4.310125} = \underline{\$350.00}$$

$$13. \quad PV = PMT \left[\frac{1 - (1+i)^{-n}}{i} \right]$$

$$\$6595.20 = PMT \left[\frac{1 - (1+0.06)^{-20}}{0.06} \right]$$

$$\$6595.20 = PMT \left[\frac{1 - 0.31180473}{0.06} \right]$$

$$\$6595.20 = PMT(11.46992117)$$

$$PMT = \frac{\$6595.20}{11.46992117} = \underline{\underline{\$575.00}}$$

$$14. \quad I = Prt$$

$$\frac{I}{Pr} = \frac{Prt}{Pr}$$

$$t = \frac{I}{Pr}$$

$$16. \quad N = L(1 - d)$$

$$\frac{N}{L} = 1 - d$$

$$d = 1 - \frac{N}{L}$$

$$18. \quad \begin{aligned} NI &= (CM)X - FC \\ NI + FC &= (CM)X \\ X &= \frac{NI + FC}{CM} \end{aligned}$$

$$20. \quad S = P(1 + rt)$$

$$S = P + Prt$$

$$S - P = Prt$$

$$t = (S - P) / Pr$$

$$22. \quad N = L(1 - d_1)(1 - d_2)(1 - d_3)$$

$$\frac{N}{L(1 - d_1)(1 - d_2)} = (1 - d_3)$$

$$d_3 = 1 - \frac{N}{L(1 - d_1)(1 - d_2)}$$

$$23. \quad FV = PV(1 + i)^n$$

$$\frac{FV}{(1 + i)^n} = PV$$

$$PV = FV(1 + i)^{-n}$$

$$15. \quad PV = \frac{PMT}{i}$$

$$i(PV) = PMT$$

$$i = \frac{PMT}{PV}$$

$$17. \quad NI = (CM)X - FC$$

$$NI + FC = (CM)X$$

$$CM = \frac{NI + FC}{X}$$

$$19. \quad \begin{aligned} S &= P(1 + rt) \\ S &= P + Prt \end{aligned}$$

$$S - P = Prt$$

$$r = (S - P) / Pt$$

$$21. \quad N = L(1 - d_1)(1 - d_2)(1 - d_3)$$

$$\frac{N}{L(1 - d_2)(1 - d_3)} = (1 - d_1)$$

$$d_1 = 1 - \frac{N}{L(1 - d_2)(1 - d_3)}$$

$$\begin{aligned}
 24. \quad FV &= PV(1+i)^n \\
 \$9321.91 &= \$2000(1+i)^{20} \\
 \left(\frac{\$9321.91}{\$2000}\right)^{\frac{1}{20}} &= 1+i \\
 1.0800 &= 1+i \\
 i &= 1.0800 - 1 = \underline{0.08}
 \end{aligned}$$

$$\begin{aligned}
 25. \quad PV &= FV(1+i)^{-n} \\
 \$5167.20 &= \$10,000(1+i)^{-15} \\
 \frac{\$5167.20}{\$10,000} &= \frac{1}{(1+i)^{15}} \\
 (1+i)^{15} &= \frac{\$10,000}{\$5167.20} \\
 1+i &= (1.935284)^{\frac{1}{15}} = 1.0450 \\
 i &= \underline{0.045}
 \end{aligned}$$

$$26. \quad FV = PV(1+i)^n$$

$$\left(\frac{FV}{PV}\right)^{\frac{1}{n}} = (1+i)$$

$$i = \left(\frac{FV}{PV}\right)^{\frac{1}{n}} - 1$$

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Exercise 2.5

- a. Step 2: Students on 4 buses = 177 less 9 in cars

Let number of students per bus be x.

Step 3: 4 buses x students per bus = students on buses less students in cars

Step 4: $4x = 177 - 9$

Step 5: $4x = 168$

$$x = 42$$

Each bus holds 42 students.

- b. Step 2: Cost of binder = \$9.50, Purchased 4 pencils

Let the cost of one pencil be p.

Step 3: Cost of order = cost of binder + cost of 4 pencils

Step 4: $\$12.50 = \$9.50 + 4p$

Step 5: $4p = \$12.50 - \9.50

$$4p = \$3.00$$

$$p = \$0.75$$

Each pencil cost \$0.75.

- c. Step 2: Weekly earnings = \$600 plus 2% commission on sales, Weekly salary = \$400

Let s represent weekly sales.

Step 3: Weekly earnings = weekly salary + 2% commission on sales

Step 4: $\$600 = \$400 + 0.02s$

Step 5: $0.02s = \$600 - \400

$$0.02s = \$200$$

$$s = \$10,000$$

The salesperson's weekly sales were \$10,000.

- d. Step 2: Samuel's winnings = \$600 after sharing \$200 with each sibling.

Let s be the number of siblings.

Step 3: Total winnings = Samuel's winnings + siblings winnings

Step 4: $\$2000 = \$600 + \$200s$

Step 5: $\$200s = \$2000 - \$600$

$$\$200s = \$1400$$

$$s = 7$$

Samuel has 7 brothers and sisters.

- e. Step 2: Money in pocket = \$170 after $\frac{1}{2}$ used to pay bill plus an extra \$50.

Let c be the amount of her pay cheque.

Step 3: Money in pocket = $\frac{1}{2}$ pay cheque + extra money earned

Step 4: $\$170 = 0.5c + \50

$$0.5c = \$170 - \$50$$

$$0.5c = \$120$$

$$c = \$240$$

Josie's weekly pay cheque is \$240.

1. Step 2: Hits last month = 2655 after the $\frac{2}{7}$ increase.

Let the number of hits 1 year ago be n .

Step 3: Hits last month = Hits 1 year ago + $\frac{2}{7}$ (Hits 1 year ago)

Step 4: $2655 = n + \frac{2}{7}n$

Step 5: $2655 = \frac{9}{7}n$

Multiply both sides by $\frac{7}{9}$.

$$n = 2655 \times \frac{7}{9} = 2065$$

The Web site had 2065 hits in the same month 1 year ago.

2. Step 2: Retail price = \$712; Markup = 60% of wholesale cost.

Let the wholesale cost be C .

Step 3: Retail price = Cost + 0.60(Cost)

Step 4: $\$712 = C + 0.6C$

Step 5: $\$712 = 1.6C$

$$C = \frac{\$712}{1.6} = \underline{\underline{\$445.00}}. \text{ The wholesale cost is } \$445.00.$$

3. Step 2: Tag price = \$39.55 (including 13% HST). Let the plant's pretax price be P .

Step 3: Tag price = Pre-tax price + HST

Step 4: $\$39.55 = P + 0.13P$

Step 5: $\$39.55 = 1.13P$

$$P = \frac{\$39.55}{1.13} = \$35.00$$

The amount of HST is $\$39.55 - \$35.00 = \underline{\underline{\$4.55}}$

4. Step 2: Commission rate = 2.5% on the first \$5000 and 1.5% on the remainder
Commission amount = \$227. Let the transaction amount be x .

Step 3: Commission amount = $0.025(\$5000) + 0.015(\text{Remainder})$

Step 4: $\$227 = \$125.00 + 0.015(x - \$5000)$

Step 5: $\$102 = 0.015x - \75.00

$$\$102 + \$75 = 0.015x$$

$$x = \frac{\$177}{0.015} = \underline{\$11,800.00}$$

The amount of the transaction was \$11,800.00.

5. Step 2: Let the basic price be P . First 20 meals at P .
Next 20 meals at $P - \$2$. Additional meals at $P - \$3$.

Step 3: Total price for 73 meals = \$1686

Step 4: $20P + 20(P - \$2) + (73 - 40)(P - \$3) = \$1686$

Step 5: $20P + 20P - \$40 + 33P - \$99 = \$1686$

$$73P = \$1686 + \$99 + \$40$$

$$P = \frac{\$1825}{73} = \underline{\$25.00}$$

The basic price per meal is \$25.00.

6. Step 2: Rental Plan 1: \$295 per week + $\$0.15 \times (\text{Distance in excess of 1000 km})$
Rental Plan 2: \$389 per week
Let d represent the distance at which the costs of both plans are equal.

Step 3: Cost of Plan 1 = Cost of Plan 2

Step 4: $\$295 + \$0.15(d - 1000) = \$389$

Step 5: $\$295 + \$0.15d - \$150 = \389

$$\$0.15d = \$244$$

$$d = \underline{1627 \text{ km}}$$

The unlimited driving plan will be cheaper if you drive more than 1626.7 km in the one-week interval.

7. Step 2: Tax rate = 38%; Overtime hourly rate = $1.5(\$23.50) = \35.25
Cost of canoe = \$2750
Let h represent the hours of overtime Alicia must work.

Step 3: Gross overtime earnings – Income tax = Cost of the canoe

Step 4: $\$35.25h - 0.38(\$35.25h) = \$2750$

Step 5: $\$21.855h = \2750

$$h = 125.83 \text{ hours}$$

Rounded to the nearest quarter hour, Alicia must work $125\frac{3}{4}$ hours of overtime to earn enough money to buy the canoe.

8. Step 2: Number of two-bedroom homes = $0.4(\text{Number of three-bedroom homes})$
Number of two-bedroom homes = $2(\text{Number of four-bedroom homes})$
Total number of homes = 96
Let h represent the number of two-bedroom homes

Step 3: # 2-bedroom homes + # 3-bedroom homes + # 4-bedroom homes = 96

Step 4: $h + \frac{h}{0.4} + \frac{h}{2} = 96$

$$\begin{aligned}\text{Step 5: } h + 2.5h + 0.5h &= 96 \\ 4h &= 96 \\ h &= 24\end{aligned}$$

There should be 24 two-bedroom homes, $2.5(24) = \underline{60 \text{ three-bedroom homes}}$, and $0.5(24) = \underline{12 \text{ four-bedroom homes}}$.

9. Step 2: Cost of radio advertising = $0.5(\text{Cost of newspaper advertising})$
 Cost of TV advertising = $0.6(\text{Cost of radio advertising})$
 Total advertising budget = \$160,000
 Let r represent the amount allocated to radio advertising

Step 3: Radio advertising + TV advertising + Newspaper advertising = \$160,000

$$\text{Step 4: } r + 0.6r + \frac{r}{0.5} = \$160,000$$

$$\begin{aligned}\text{Step 5: } 3.6r &= \$160,000 \\ r &= \$44,444.44\end{aligned}$$

Rounded to the nearest dollar, the advertising budget allocations should be:

\$44,444 to radio advertising,
 $0.6(\$44,444.44) = \underline{\$26,667}$ to TV advertising, and
 $2(\$44,444.44) = \underline{\$88,889}$ to newspaper advertising.

10. Step 2: By-laws require: 5 parking spaces per 100 square meters,
 4% of spaces for physically handicapped
 In remaining 96%, # regular spaces = $1.4(\# \text{ small car spaces})$
 Total area = 27,500 square meters

Let s represent the number of small car spaces.

Step 3: Total # spaces = # spaces for handicapped + # regular spaces + # small spaces

$$\text{Step 4: } \frac{27,500}{100} \times 5 = 0.04 \times \frac{27,500}{100} \times 5 + s + 1.4s$$

$$\begin{aligned}\text{Step 5: } 1375 &= 55 + 2.4s \\ s &= 550\end{aligned}$$

The shopping centre must have 55 parking spaces for the physically handicapped,
550 small-car spaces, and 770 regular parking spaces.

11. Step 2: Overall portfolio's rate return = 1.1%, equity fund's rate of return = -3.3% ,
 bond fund's rate of return = 7.7% .
 Let e represent the fraction of the portfolio initially invested in the equity fund.

Step 3: Overall rate of return = Weighted average rate of return
 $= (\text{Equity fraction})(\text{Equity return}) + (\text{Bond fraction})(\text{Bond return})$

$$\text{Step 4: } 1.1\% = e(-3.3\%) + (1 - e)(7.7\%)$$

$$\begin{aligned}\text{Step 5: } 1.1\% &= -3.3\%e + 7.7\% - 7.7\%e \\ -6.6\% &= -11.0\%e \\ e &= 0.600\end{aligned}$$

Therefore, 60.0% of Erin's original portfolio was invested in the equity fund.

12. Step 2: Pile A steel is 5.25% nickel; pile B steel is 2.84% nickel.
 We want a 32.5-tonne mixture from A and B averaging 4.15% nickel.
 Let A represent the tonnes of steel required from pile A.

Step 3: Wt. of nickel in 32.5 tonnes of mixture
 $= \text{Wt. of nickel in steel from pile A} + \text{Wt. of nickel in steel from pile B}$
 $= (\% \text{ nickel in pile A})(\text{Amount from A}) + (\% \text{ nickel in pile B})(\text{Amount from B})$

$$\text{Step 4: } 0.0415(32.5) = 0.0525A + 0.0284(32.5 - A)$$

Step 5: $1.34875 = 0.0525A + 0.9230 - 0.0284A$
 $0.42575 = 0.0241A$
 $A = 17.67 \text{ tonnes}$
 $B = 32.5 - 17.67 = 14.83 \text{ tonnes}$

The recycling company should mix 17.67 tonnes from pile A with 14.83 tonnes from pile B.

13. Step 2: Total options = 100,000
 # of options to an executive = 2000 + # of options to a scientist or engineer
 # of options to a scientist or engineer = 1.5(# of options to a technician)
 There are 3 executives, 8 scientists and engineers, and 14 technicians.
 Let t represent the number of options to each technician.

Step 3: Total options = Total options to scientists and engineers
 + Total options to technicians + Total options to executives

Step 4: $100,000 = 8(1.5t) + 14t + 3(2000 + 1.5t)$

Step 5: $= 12t + 14t + 6000 + 4.5t$

$94,000 = 30.5t$

$t = 3082 \text{ options}$

Rounded to the nearest whole numbers, each technician will receive 3082 options,
 each scientist and engineer will receive $1.5(3082) = \underline{4623 \text{ options}}$,
 and each executive will receive $2000 + 4623 = \underline{6623 \text{ options}}$.

14. Step 2: Plan X: 6.5 cents/minute (in business hours) and 4.5 cents/minute (at other times)
 Plan Y: 5.3 cents/minute any time
 Let b represent the fraction of business-hour usage at which costs are equal.

Step 3: Cost of Plan X = Cost of plan Y

Step 4: Pick any amount of usage in a month—say 1000 minutes.

$b(1000)\$0.065 + (1 - b)(1000)\$0.045 = 1000(\$0.053)$

Step 5: $\$65b + \$45 - \$45b = \53

$\$20b = \8

$b = 0.40$

If business-hour usage exceeds 40% of overall usage, plan Y will be cheaper.

15. Step 2: Raisins cost \$3.75 per kg; peanuts cost \$2.89 per kg.
 Cost per kg of ingredients in 50 kg of “trail mix” is to be \$3.20.
 Let p represent the weight of peanuts in the mixture.

Step 3: Cost of 50 kg of trail mix = Cost of p kg peanuts + Cost of $(50 - p)$ kg of raisins

Step 4: $50(\$3.20) = p(\$2.89) + (50 - p)(\$3.75)$

Step 5: $\$160.00 = \$2.89p + \$187.50 - \$3.75p$

$-\$27.50 = -\$0.86p$

$p = 31.98 \text{ kg peanuts}$

$(50 - p) = 50 - 31.98 = 18.0 \text{ kg raisins}$

32.0 kg of peanuts should be mixed with 18.0 kg of raisins.

16. Step 2: Total bill = \$3310. Total hours = 41.
 Hourly rate = \$120 for CGA
 = \$50 for technician.
 Let x represent the CGA's hours.
 Step 3: Total bill = (CGA hours x CGA rate) + (Technician hours x Technician rate)
 Step 4: $\$3310 = x(\$120) + (41 - x)\$50$

Step 5: $\$3310 = \$120x + \$2050 - \$50x$

$$1260 = 70x$$

$$x = 18$$

The CGA worked 18 hours and the technician worked $41 - 18 = \underline{23 \text{ hours}}$.

17. Step 2: Total investment = \$32,760

$$\text{Sue's investment} = 1.2(\text{Joan's investment})$$

$$\text{Joan's investment} = 1.2(\text{Stella's investment})$$

Let L represent Stella's investment.

Step 3: Sue's investment + Joan's investment + Stella's investment = Total investment

Step 4: Joan's investment = 1.2L

$$\text{Sue's investment} = 1.2(1.2L) = 1.44L$$

$$1.44L + 1.2L + L = \$32,760$$

Step 5: $3.64L = \$32,760$

$$L = \frac{\$32,760}{3.64} = \$9000$$

Stella will invest \$9000, Joan will invest $1.2(\$9000) = \underline{\$10,800}$, and

Sue will invest $1.2(\$10,800) = \underline{\$12,960}$

18. Step 2: Sven receives 30% less than George (or 70% of George's share).

$$\text{Robert receives 25\% more than George (or 1.25 times George's share).}$$

$$\text{Net income} = \$88,880$$

Let G represent George's share.

Step 3: George's share + Robert's share + Sven's share = Net income

Step 4: $G + 1.25G + 0.7G = \$88,880$

Step 5: $2.95G = \$88,880$

$$G = \$30,128.81$$

George's share is \$30,128.81, Robert's share is $1.25(\$30,128.81) = \underline{\$37,661.02}$,
and Sven's share is $0.7(\$30,128.81) = \underline{\$21,090.17}$.

19. Step 2: Time to make X is 20 minutes.

$$\text{Time to make Y is 30 minutes.}$$

$$\text{Total time is 47 hours. Total units} = 120. \text{ Let Y represent the number of units of Y.}$$

Step 3: Total time = (Number of X) $\times$ (Time for X) + (Number of Y) $\times$ (Time for Y)

Step 4: $47 \times 60 = (120 - Y)20 + Y(30)$

Step 5: $2820 = 2400 - 20Y + 30Y$

$$420 = 10Y$$

$$Y = \underline{42}$$

Forty-two units of product Y were manufactured.

20. Step 2: Price of blue ticket = \$19.00. Price of red ticket = \$25.50.

$$\text{Total tickets} = 4460. \text{ Total revenue} = \$93,450.$$

Let the number of tickets in the red section be R.

Step 3: Total revenue = (Number of red $\times$ Price of red) + (Number of blue $\times$ Price of blue)

Step 4: $\$93,450 = R(\$25.50) + (4460 - R)\$19.00$

Step 5: $93,450 = 25.5R + 84,740 - 19R$

$$6.5R = 8710$$

$$R = 1340$$

1340 seats were sold in the red section and $4460 - 1340 = \underline{3120 \text{ seats}}$ were sold in the blue section.

21. Step 2: Each of 4 children receive 0.5 (Wife's share).

Each of 13 grandchildren receive $0.\bar{3}$ (Child's share).

Total distribution = \$759,000. Let w represent the wife's share.

Step 3: Total amount = Wife's share + 4(Child's share) + 13(Grandchild's share)

Step 4: $\$759,000 = w + 4(0.5w) + 13(0.\bar{3})(0.5w)$

Step 5: $\$759,000 = w + 2w + 2.1\bar{6}w$

$$= 5.1\bar{6}w$$

$$w = \$146,903.23$$

Each child will receive $0.5(\$146,903.23) = \underline{\$73,451.62}$

and each grandchild will receive $0.\bar{3}(\$73,451.62) = \underline{\$24,483.87}$.

22. Step 2: Stage B workers = 1.6 (Stage A workers)

Stage C workers = 0.75 (Stage B workers)

Total workers = 114. Let A represent the number of Stage A workers.

Step 3: Total workers = A workers + B workers + C workers

Step 4: $114 = A + 1.6A + 0.75(1.6A)$

Step 5: $114 = 3.8A$

$$A = 30$$

30 workers should be allocated to Stage A, $1.6(30) = \underline{48}$ workers to Stage B, and $114 - 30 - 48 = \underline{36}$ workers to Stage C.

23. Step 2: Hillside charge = 2 (Barnett charge) – \$1000

Westside charge = Hillside charge + \$2000

Total charges = \$27,600. Let B represent the Barnett charge.

Step 3: Total charges = Barnett charge + Hillside charge + Westside charge

Step 4: $\$27,600 = B + 2B - \$1000 + 2B - \$1000 + \2000

Step 5: $\$27,600 = 5B$

$$B = \$5520$$

Hence, the Westside charge is $2(\$5520) - \$1000 + \$2000 = \underline{\$12,040}$

24. Step 2: There are 3 managers and 26 production workers. Total distribution = \$100,000.

Manager's share = 1.2 (Production worker's share).

Let p represent a production worker's share.

Step 3: $3(\text{Manager's share}) + 26(\text{Production worker's share}) = \$100,000$

Step 4: $3(1.2p) + 26p = \$100,000$

Step 5: $29.6p = \$100,000$

$$p = \$3378.38$$

Each production worker will receive \$3378.38 and each manager will receive $1.2(\$3378.38) = \underline{\$4054.06}$.

Review Problems

- $$4(3a + 2b) - 5a(2 - b) = 12a + 8b - 10a + 5ab$$

$$= \underline{2a + 5ab + 8b}$$
- $$4(3a + 2b)(2b - a) - (2a - b)(a + 3b) = 4(6ab - 3a^2 + 4b^2 - 2ab) - (2a^2 + 6ab - ab - 3b^2)$$

$$= 4(-3a^2 + 4ab + 4b^2) - (2a^2 + 5ab - 3b^2)$$

$$= -12a^2 + 16ab + 16b^2 - 2a^2 - 5ab + 3b^2$$

$$= \underline{-14a^2 + 11ab + 19b^2}$$
- $$a. \frac{9y - 7}{3} - 2.3(y - 2) = 3y - 2.\bar{3} - 2.3y + 4.6 = \underline{0.7y + 2.2\bar{6}}$$

$$b. P\left(1 + 0.095 \times \frac{135}{365}\right) + \frac{2P}{1 + 0.095 \times \frac{75}{365}} = 1.035137P + 1.961706P = \underline{2.996843P}$$
- $$a. 6(4y - 3)(2 - 3y) - 3(5 - y)(1 + 4y) = 6(8y - 12y^2 - 6 + 9y) - 3(5 + 20y - y - 4y^2)$$

$$= 6(-12y^2 + 17y - 6) - 3(-4y^2 + 19y + 5)$$

$$= -72y^2 + 102y - 36 + 12y^2 - 57y - 15$$

$$= \underline{-60y^2 + 45y - 51}$$

$$b. \frac{5b - 4}{4} - \frac{25 - b}{1.25} + \frac{7}{8}b = 1.25b - 1 - 20 + 0.8b + 0.875b = \underline{2.925b - 21}$$

$$c. \frac{x}{1 + 0.085 \times \frac{63}{365}} + 2x\left(1 + 0.085 \times \frac{151}{365}\right) = 0.985541x + 2.070329x = \underline{3.05587x}$$

$$d. \frac{96nm^2}{48n^2m} - \frac{72n^2m^2}{2n} = \frac{4m}{2n} - \frac{3nm}{1} = \underline{\frac{4m}{2n} - 3nm}$$
- $$P(1 + i)^n + \frac{S}{1 + rt} = \$2500(1.1025)^2 + \frac{\$1500}{1 + 0.09 \times \frac{93}{365}} = \$3038.766 + \$1466.374 = \underline{\$4505.14}$$
- $$a. L(1 - d_1)(1 - d_2)(1 - d_3) = \$340(1 - 0.15)(1 - 0.08)(1 - 0.05) = \underline{\$252.59}$$

$$b. \frac{R}{i} \left[1 - \frac{1}{(1 + i)^n} \right] = \frac{\$575}{0.085} \left[1 - \frac{1}{(1 + 0.085)^3} \right] = \$6764.706(1 - 0.7829081) = \underline{\$1468.56}$$
- $$a. \frac{(-3x^2)^3(2x^{-2})}{6x^5} = \frac{(-27x^6)(2x^{-2})}{6x^5} = \underline{-\frac{9}{x}}$$

$$b. \frac{(-2a^3)^{-2}(4b^4)^{3/2}}{(-2b^3)(0.5a)^3} = \frac{\left(\frac{1}{4a^6}\right)(8b^6)}{(-2b^3)(0.125a^3)} = \frac{0.25a^{-6}(8b^6)}{-0.25b^3a^3} = \frac{2a^{-6}b^6}{-0.25b^3a^3} = -\frac{8b^{(6-3)}}{a^{(3+6)}} = \underline{-\frac{8b^3}{a^9}}$$
- $$\left(-\frac{2x^2}{3}\right)^{-2} \left(\frac{5^2}{6x^3}\right) \left(-\frac{15}{x^5}\right)^{-1} = \left(-\frac{3}{2x^2}\right)^2 \left(\frac{25}{6x^3}\right) \left(-\frac{x^5}{15}\right) = \left(\frac{9}{4x^4}\right) \left(\frac{25}{6x^3}\right) \left(-\frac{x^5}{15}\right) = -\frac{225x^5}{360x^7} = \underline{-\frac{5}{8x^2}}$$
- $$a. (1.0075)^{24} = \underline{1.19641}$$

$$b. (1.05)^{1/6} - 1 = \underline{0.00816485}$$

$$c. \frac{(1 + 0.0075)^{36} - 1}{0.0075} = \underline{41.1527}$$

$$d. \frac{1 - (1 + 0.045)^{-12}}{0.045} = \underline{\underline{9.11858}}$$

$$10. a. \frac{(1.006)^{240} - 1}{0.006} = \frac{4.926802 - 1}{0.006} = \underline{\underline{589.020}}$$

$$b. (1 + 0.025)^{1/3} - 1 = \underline{\underline{0.00826484}}$$

$$11. a. \frac{2x}{1 + 0.13 \times \frac{92}{365}} + x \left(1 + 0.13 \times \frac{59}{365} \right) = \$831$$

$$1.936545x + 1.021014x = \$831$$

$$2.957559x = \$831$$

$$x = \underline{\underline{\$280.97}}$$

$$b. 3x(1.03^5) + \frac{x}{1.03^3} + x = \frac{\$2500}{1.03^2}$$

$$3.47782x + 0.915142x + x = \$2356.49$$

$$x = \underline{\underline{\$436.96}}$$

$$12. a. \frac{x}{1.08^3} + \frac{x}{2}(1.08)^4 = \$850$$

$$0.793832x + 0.680244x = \$850$$

$$x = \underline{\underline{\$576.63}}$$

$$\text{Check: } \frac{\$576.63}{1.08^3} + \frac{\$576.63}{2}(1.08)^4 = \$457.747 + \$392.249 = \$850.00$$

$$b. 2x \left(1 + 0.085 \times \frac{77}{365} \right) + \frac{x}{1 + 0.085 \times \frac{132}{365}} = \$1565.70$$

$$2.03586x + 0.970177x = \$1565.70$$

$$x = \underline{\underline{\$520.85}}$$

Check:

$$2(\$520.85) \left(1 + 0.085 \times \frac{77}{365} \right) + \frac{\$520.85}{1 + 0.085 \times \frac{132}{365}} = \$1060.379 + \$505.317 = \$1565.70$$

$$13. N = L(1 - d_1)(1 - d_2)(1 - d_3)$$

$$\$324.30 = \$498(1 - 0.20)(1 - d_2)(1 - 0.075)$$

$$\$324.30 = \$368.52(1 - d_2)$$

$$\frac{\$324.30}{\$368.52} = (1 - d_2)$$

$$d_2 = 1 - 0.8800 = \underline{\underline{0.120}} = \underline{\underline{12.0\%}}$$

$$14. V_f = V_i(1 + c_1)(1 + c_2)(1 + c_3)$$

$$\$586.64 = \$500(1 + 0.17)(1 + c_2)(1 + 0.09)$$

$$\$586.64 = \$637.65(1 + c_2)$$

$$1 + c_2 = \frac{\$586.64}{\$637.65}$$

$$c_2 = 0.9200 - 1 = \underline{\underline{-0.0800}} = \underline{\underline{-8.00\%}}$$

$$15. FV = PV(1 + i_1)(1 + i_2)$$

$$\frac{FV}{PV(1 + i_2)} = (1 + i_1)$$

$$\underline{\underline{i_1 = \frac{FV}{PV(1 + i_2)} - 1}}$$

$$16. NI = (CM)X - FC$$

$$NI + FC = (CM)X$$

$$\underline{\underline{CM = \frac{NI + FC}{X}}}$$

$$17. \text{ Given: Mint} = \$0.202/\text{gram}; \text{ Camomile} = \$0.158/\text{gram}; \text{ Blend} = \$0.179/\text{gram}; \text{ Total Weight of Blend} = 2\text{kg}$$

Let M represent grams of Mint tea used in the blend

Total cost of Mint tea + Total cost of Camomile tea = Price for 2kg of the blend

$$\$0.202M + \$0.158(2000 - M) = \$0.179 \times 2000$$

$$\$0.202M + \$316 - \$0.158M = \$358$$

$$\$0.044M = \$42$$

$$M = \underline{\underline{954.55 \text{ grams}}}$$

Norman's tea blend should contain 954.55 grams of Mint tea

$$18. \text{ Given: Ken's share} = 0.80(\text{Hugh's share}) + \$15,000; \text{ Total distribution} = \$98,430$$

Let H represent Hugh's share. Then

Hugh's share + Ken's share = Total distribution

$$H + 0.8H + \$15,000 = \$98,430$$

$$1.8H = \$83,430$$

$$H = \$46,350$$

Hugh should receive \$46,350 and Ken should receive \$98,430 - \$46,350 = \$52,080.

$$19. \text{ Given: Grace's share} = 1.2(\text{Kajsa's share}); \text{ Mary Anne's share} = \frac{5}{8} (\text{Grace's share})$$

Total allocated = \$36,000

Let K represent Kajsa's share.

(Kajsa's share) + (Grace's share) + (Mary Anne's share) = \$36,000

$$K + 1.2K + \frac{5}{8}(1.2K) = \$36,000$$

$$2.95 K = \$36,000$$

$$K = \$12,203.39$$

Kajsa's should receive \$12,203.39. Grace should receive $1.2K = \$14,644.07$.

Mary Anne should receive $\frac{5}{8} (\$14,644.07) = \9152.54 .

20. Given: Class A shares = \$9 per share; Class B shares = \$5 per share; Class C shares = \$2 per share; Total value for 20,000 shares = \$142,500.

Let x represent number of Class C shares

Value Class A shares + Value Class B shares + Value Class C shares = \$142,500

$$\$9(5x) + \$5(20,000 - 6x) + \$2x = \$142,500$$

$$\$45x + \$100,000 - \$30x + \$2x = \$142,500$$

$$\$17x = \$42,500$$

$$x = 2500$$

They issued 2500 Class C shares, $5 \times 2500 = 12,500$ Class A shares and

$20,000 - 2500 - 12,500 = 5000$ Class B shares

21. Given: Beef = \$17.05 per kg; Pork = \$12.10 per kg, Total kg sold = 150.

Total sales = \$2022.90

Let x represent number of kg of beef sold.

$$\$17.05x + \$12.10(150 - x) = \$2022.90$$

$$\$17.05x + \$1815 - \$12.10x = \$2022.90$$

$$\$4.95x = \$207.90$$

$$x = 42$$

They sold 42 kg of beef sausage and $150 - 42 = 108$ kg of pork sausage