25. $\frac{3 - 2x}{4} + \frac{x}{3} = 5$

$9 - 6x + 4x = 60$

$-2x = 51$

$x = -\frac{51}{2}$

26. $0.004x - 0.02 = 2.02$

$4x - 20 = 2020$

$4x = 2040$

$x = \mathbf{510}$

27. $\frac{3}{x} + \frac{2}{x + 2} + \frac{3x}{x^2 + 3x + 2}$

$= \frac{3(x + 1)(x + 2)}{x(x + 1)(x + 2)} + \frac{2x(x + 1)}{x(x + 1)(x + 2)}$

$+ \frac{3x^2}{x(x + 1)(x + 2)}$

$= \frac{3x^2 + 9x + 6 + 2x^2 + 2x + 3x^2}{x(x + 1)(x + 2)}$

$= \mathbf{\frac{8x^2 + 11x + 6}{x(x + 1)(x + 2)}}$

28. $\frac{x + 4x}{x} = \frac{x(1 + 4)}{x} = \mathbf{5}$

29. $\frac{x^{-2}y}{p}\left(\frac{x^2p}{y} - \frac{3x^2y}{p}\right) = \mathbf{1 - 3y^2p^{-2}}$

30. $x^2 - xy - x^3 = \left(\frac{1}{2}\right)^2 - \frac{1}{2}\left(\frac{1}{3}\right) - \left(\frac{1}{2}\right)^3$

$= \frac{1}{4} - \frac{1}{6} - \frac{1}{8} = \frac{6}{24} - \frac{4}{24} - \frac{3}{24} = \mathbf{-\frac{1}{24}}$

Problem Set 41

1. $N \quad N + 2 \quad N + 4 \quad N + 6$

$4(N + N + 6) = 3(N + 2 + N + 4) + 12$

$8N + 24 = 6N + 30$

$2N = 6$

$N = 3$

The desired integers are **3**, **5**, **7**, and **9**.

2. Chromium: $1 \times 52 = 52$

Chlorine: $3 \times 35 = 105$

Total: $= 157$

$\frac{105}{157} = \frac{Cl}{1256}$

$157Cl = 105(1256)$

$Cl = \mathbf{840\ grams}$

3. $\frac{284}{100} \times TR = 1136$

$TR = 1136 \cdot \frac{100}{284} = \mathbf{400\ tons}$

4. (a) $5N_N + 10N_D = 700$

(b) $N_N + N_D = 100$

Substitute $N_D = 100 - N_N$ into (a) and get:

(a') $5N_N + 10(100 - N_N) = 700$

$-5N_N = -300$

$N_N = \mathbf{60}$

(b) $N_D = 100 - (60) = \mathbf{40}$

5. $R_RT_R + R_WT_W = 76$; $R_R = 16$; $R_W = 4$; $T_R + T_W = 7$

$16(7 - T_W) + 4T_W = 76$

$-12T_W = -36$

$T_W = 3$

$T_R = 4$

$D_W = 4(3) = \mathbf{12\ miles}$

$D_R = 16(4) = \mathbf{64\ miles}$

6. $87\ ft^2 \times \frac{12\ in.}{1\ ft} \times \frac{12\ in.}{1\ ft} = \mathbf{87(12)(12)\ in.^2}$

7. $61\ yd^2 \times \frac{3\ ft}{1\ yd} \times \frac{3\ ft}{1\ yd} \times \frac{12\ in.}{1\ ft} \times \frac{12\ in.}{1\ ft}$

$= \mathbf{61(3)(3)(12)(12)\ in.^2}$

8. $32\ mi^3 \times \frac{5280\ ft}{1\ mi} \times \frac{5280\ ft}{1\ mi} \times \frac{5280\ ft}{1\ mi}$

$\times \frac{12\ in.}{1\ ft} \times \frac{12\ in.}{1\ ft} \times \frac{12\ in.}{1\ ft}$

$= \mathbf{32(5280)(5280)(5280)(12)(12)(12)\ in.^3}$

9. $\frac{x}{p} - \frac{k}{m} = c$

$mx - kp = cmp$

$mx = cmp + kp$

$\mathbf{\frac{mx}{cm + k} = p}$

10. $\frac{xy}{p} - \frac{k}{c} = m$

$cxy - kp = cmp$

$cxy = cmp + kp$

$\mathbf{\frac{cxy}{cm + k} = p}$

11. $\frac{4p}{x} - \frac{xk}{c} = \frac{y}{m}$

$4cmp - x^2km = cxy$

$4cmp - cxy = x^2km$

$\mathbf{c = \frac{x^2km}{4mp - xy}}$

Problem Set 41

12. $8 \times \overrightarrow{SF} = 12$

$\overrightarrow{SF} = \frac{3}{2}$

$17 \cdot \frac{3}{2} = m$

$\frac{51}{2} = m$

$8 \times \overrightarrow{SF} = 20$

$\overrightarrow{SF} = \frac{5}{2}$

$15 \times \frac{5}{2} = p$

$\frac{75}{2} = p$

13. $2X + 40 = 180$

$2X = 140$

$X = \mathbf{70}$

Since ΔDEF is equilateral: $Y = \mathbf{60}$

$K + 70 + 50 = 180$

$K = \mathbf{60}$

14. $16x = -x^3 + 10x^2$

$x^3 - 10x^2 + 16x = 0$

$x(x - 8)(x - 2) = 0$

$x = \mathbf{0, 2, 8}$

15. $4x^2 - 9x = 0$

$x(4x - 9) = 0$

$x = \mathbf{0, \frac{9}{4}}$

16.

$$\begin{array}{r} 2x^2 + 4x + 8 + \frac{15}{x-2} \\ x - 2 \overline{)\,2x^3 + 0x^2 + 0x - 1} \\ \underline{2x^3 - 4x^2} \\ 4x^2 + 0x \\ \underline{4x^2 - 8x} \\ 8x - 1 \\ \underline{8x - 16} \\ 15 \end{array}$$

17. $4^2 = H^2 + \left(\frac{3}{2}\right)^2$

$16 = H^2 + \frac{9}{4}$

$\frac{55}{4} = H^2$

$\frac{\sqrt{55}}{2} = H$

$\text{Area} = \frac{3 \times \frac{\sqrt{55}}{2}}{2} + \frac{\pi(2)^2}{2} = \mathbf{11.84\ units^2}$

18. $\frac{x(x + 5)(x + 3)}{(x - 2)(x - 2)} \cdot \frac{(x + 4)(x - 2)}{x(x + 4)(x + 3)}$

$= \mathbf{\frac{x + 5}{x - 2}}$

19. $32^{-2/5} = \frac{1}{32^{2/5}} = \frac{1}{(32^{1/5})^2} = \mathbf{\frac{1}{4}}$

20. $\frac{a^2x - \frac{a}{x}}{ax - \frac{4}{x}} = \frac{\frac{a^2x^2 - a}{x}}{\frac{ax^2 - 4}{x}} \cdot \frac{\frac{x}{ax^2 - 4}}{\frac{x}{ax^2 - 4}}$

$= \mathbf{\frac{a^2x^2 - a}{ax^2 - 4}}$

21. $\frac{(2.1 \times 10^{-38})(5 \times 10^5)}{1.5 \times 10^{-11}} = \frac{1.05 \times 10^{-32}}{1.5 \times 10^{-11}}$

$= \mathbf{7 \times 10^{-22}}$

22. $\frac{3\sqrt{5}}{\sqrt{7}}\frac{\sqrt{7}}{\sqrt{7}} - \frac{6\sqrt{7}}{\sqrt{5}}\frac{\sqrt{5}}{\sqrt{5}} = \frac{3\sqrt{35}}{7} - \frac{6\sqrt{35}}{5}$

$= \frac{15\sqrt{35}}{35} - \frac{42\sqrt{35}}{35} = \mathbf{-\frac{27\sqrt{35}}{35}}$

23. $4\sqrt{24}(2\sqrt{6} - 3\sqrt{2}) = 4\sqrt{2}\sqrt{2}\sqrt{2}\sqrt{3}(2\sqrt{2}\sqrt{3} - 3\sqrt{2})$

$= \mathbf{96 - 48\sqrt{3}}$

24. Write the equation of the given line in slope-intercept form.

$y = -\frac{1}{3}x - \frac{2}{3}$

Since the slopes of perpendicular lines are negative reciprocals of each other:

$y = 3x + b$

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

$1 = b$

$\mathbf{y = 3x + 1}$

25. $\frac{-3 - x}{2} - \frac{x}{2} = 7$

$-3 - x - x = 14$

$-2x = 17$

$x = \mathbf{-\frac{17}{2}}$

26. $2\frac{1}{3}x - \frac{1}{9} = -\frac{1}{18}$

$\frac{7}{3}x = -\frac{1}{18} + \frac{2}{18}$

$x = \frac{1}{18} \cdot \frac{3}{7}$

$x = \mathbf{\frac{1}{42}}$