Assignment 5 Solutions
MATH 171

Section 6.6

#18 $$\frac{a^2-a}{3a+9} \times \frac{a^2-9}{a^2-2a+1}$$

$$= \frac{a\cancel{(a-1)}\cancel{(a+3)}(a-3)}{3\cancel{(a+3)}\cancel{(a-1)}(a-1)}$$

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

#22 $$\frac{4R^2-36}{R^3-25R} \times \frac{7R-35}{3R^2+9R}$$

$$= \frac{(2R+6)(2R-6)7(R-5)}{R(R^2-25)3R(R+3)}$$

$$= \frac{2(R+3)2(R-3)7\cancel{(R-5)}}{R(R+5)\cancel{(R-5)}3R}$$

$$= \frac{28(R+3)(R-3)}{3R^2(R+5)}$$

#26 $$\frac{s^4-11s^2+28}{s^2+3} \div \frac{s^2-4}{2s^2+3}$$

$$= \frac{(s^2-7)\cancel{(s^2-4)}}{s^2+3} \times \frac{(2s^2+3)}{\cancel{(s^2-4)}}$$

$$= \frac{(s^2-7)(2s^2+3)}{s^2+3}$$

#30 $\dfrac{n^2+5n}{3n^2+8n+4} \times \dfrac{2n^2-8}{n^3+3n^2-10n}$

$= \dfrac{n(n+5)}{3n^2+6n+2n+4} \cdot \dfrac{2(n^2-4)}{n(n^2+3n-10)}$

$= \dfrac{n(n+5)}{3n(n+2)+2(n+2)} \cdot \dfrac{2(n-2)(n+2)}{n(n+5)(n-2)}$

$= \dfrac{\cancel{n}\cancel{(n+5)}\,2\cancel{(n-2)}\cancel{(n+2)}}{(3n+2)\cancel{(n+2)}\cancel{n}\cancel{(n+5)}\cancel{(n-2)}} = \dfrac{2}{3n+2}$

#36 $\dfrac{2x^2-5x-3}{x-4} \times \left(\dfrac{x^2-16}{x-3} \cdot \dfrac{3-x}{1}\right)$

$= \dfrac{2x^2-6x+x-3}{x-4} \cdot \left(\dfrac{(x+4)(x-4)}{x-3} \cdot \dfrac{-(x-3)}{1}\right)$

$= \dfrac{2x(x-3)+1(x-3)}{\cancel{x-4}} \left(\dfrac{(x+4)\cancel{(x-4)}}{\cancel{x-3}} \cdot \dfrac{-\cancel{(x-3)}}{1}\right)$

$= -(2x+1)(x-3)(x+4)$

#38 $\dfrac{2M^2+4M+2}{6M-6} \times \dfrac{M^2-1}{5M+5}$

$= \dfrac{2M^2+2M+2M+2}{6\cancel{(M-1)}} \cdot \dfrac{\cancel{(M+1)}\cancel{(M-1)}}{5\cancel{(M+1)}}$

$= \dfrac{2M(M+1)+2(M+1)}{30}$

$= \dfrac{(2M+2)(M+1)}{30} = \dfrac{2(M+1)^2}{30} = \dfrac{(M+1)^2}{15}$

Section 6.7

#26 $\dfrac{2}{x+2} - \dfrac{3-x}{x^2+2x} + \dfrac{1}{x}$

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

$= \dfrac{2x}{(x+2)x} + \dfrac{(x-3)}{x(x+2)} + \dfrac{x+2}{x(x+2)}$

$= \dfrac{2x+x-3+x+2}{x(x+2)} = \dfrac{4x-1}{x(x+2)}$

#28 $\dfrac{2}{n^2+4n+4} - \dfrac{3}{n+2}$

$= \dfrac{2}{(n+2)^2} - \dfrac{3(n+2)}{(n+2)^2} = \dfrac{2-3(n+2)}{(n+2)^2}$

$= \dfrac{2-3n-6}{(n+2)^2} = \dfrac{-3n-4}{(n+2)^2}$

#32 $\dfrac{N-1}{2N^3-4N^2} - \dfrac{5}{2-N}$

$= \dfrac{N-1}{2N^2(N-2)} - \dfrac{5}{-(N-2)}$

$= \dfrac{N-1}{2N^2(N-2)} + \dfrac{5(2N^2)}{2N^2(N-2)}$

$= \dfrac{N-1+10N^2}{2N^2(N-2)} = \dfrac{10N^2+N-1}{2N^2(N-2)}$

#36 $\dfrac{5}{2x^3-3x^2+x} - \dfrac{x}{x^4-x^2} + \dfrac{2-x}{2x^2+x-1}$

$= \dfrac{5}{x(2x^2-3x+1)} - \dfrac{x}{x^2(x^2-1)} + \dfrac{-(x-2)}{(2x-1)(x+1)}$

$= \dfrac{5}{x(2x-1)(x-1)} - \dfrac{x}{x^2(x+1)(x-1)} - \dfrac{(x-2)}{(2x-1)(x+1)}$

$= \dfrac{5}{x(2x-1)(x-1)} - \dfrac{1}{x(x+1)(x-1)} - \dfrac{x-2}{(2x-1)(x+1)}$

$$= \frac{5(x+1)}{x(2x-1)(x^2-1)} - \frac{(2x-1)}{x(2x-1)(x^2-1)} - \frac{(x-2)(x)(x-1)}{x(2x-1)(x^2-1)}$$

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

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

#42 $$\frac{\frac{V^2-9}{V}}{\frac{1}{V}-\frac{1}{3}}$$

$$= \frac{\frac{(V+3)(V-3)}{V}}{\frac{3}{3V}-\frac{V}{3V}} = \frac{\frac{(V+3)(V-3)}{V}}{\frac{3-V}{3V}}$$

$$= \frac{(V+3)(V-3)}{\cancel{V}} \cdot \frac{3\cancel{V}}{(3-V)}$$

$$= \frac{3(V+3)\cancel{(V-3)}}{-\cancel{(V-3)}} = -3(V+3)$$

#44 $$\frac{\frac{2}{a}-\frac{1}{4}-\frac{3}{4a-4b}}{\frac{1}{4a^2-4b^2}-\frac{2}{b}} = \frac{\frac{2}{a}-\frac{1}{4}-\frac{3}{4(a-b)}}{\frac{1}{4(a^2-b^2)}-\frac{2}{b}}$$

$$= \frac{\frac{2(4)(a-b)}{4a(a-b)} - \frac{(1)(a)(a-b)}{4a(a-b)} - \frac{3a}{4a(a-b)}}{\frac{b}{4b(a^2-b^2)} - \frac{2(4)(a^2-b^2)}{4b(a^2-b^2)}}$$

$$= \frac{\frac{8(a-b)-a(a-b)-3a}{4a(a-b)}}{\frac{b-8(a^2-b^2)}{4b(a^2-b^2)}}$$

$$= \frac{8(a-b)-a(a-b)-3a}{\cancel{4}a\cancel{(a-b)}} \cdot \frac{\cancel{4}b(a+b)\cancel{(a-b)}}{b-8(a^2-b^2)}$$

$$= \frac{(a-b)(8-a)-3a}{a(b-8(a^2-b^2))}$$

Section 6.8

#16 $\frac{1}{2R} - \frac{1}{3} = \frac{2}{3R}$

$\frac{3}{6R} - \frac{2R}{6R} = \frac{4}{6R}$

$3 - 2R = 4$

$2R = -1$

$R = -1/2$

#20 $\frac{5}{n+2} = \frac{3}{2n}$

$10n = 3n + 6$

$7n = 6$

$n = 6/7$

#22 $\frac{3}{4x-6} + \frac{1}{4} = \frac{5}{2x-3}$

$\frac{3}{2(2x-3)} + \frac{1}{4} = \frac{5}{(2x-3)}$

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

$6 + 2x - 3 = 20$

$2x = 17$

$x = 17/2$

26 $\frac{3}{t+3} - \frac{1}{t} = \frac{5}{2t+6}$

$$\frac{3}{t+3} - \frac{1}{t} = \frac{5}{2(t+3)}$$

$$\frac{3(2)t}{(t+3)t(2)} - \frac{2(t+3)}{2t(t+3)} = \frac{5t}{2t(t+3)}$$

$$6t - 2(t+3) = 5t$$

$$6t - 2t - 6 = 5t$$

$$4t - 6 = 5t$$

$$t = -6$$

30 $\frac{2}{x^2-1} - \frac{2}{x+1} = \frac{1}{x-1}$

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

$$2 - 2(x-1) = x+1$$

$$2 - 2x + 2 = x+1$$

$$3x = 3$$

$$x = 1$$

SECTION 7.1

#16 $x^2 - 11x + 30 = 0$

$(x-6)(x-5) = 0$

$x = 6$ or $x = 5$

#24 $4x^2 + 25 = 20x$

$4x^2 - 20x + 25 = 0$

$4x^2 - 10x - 10x + 25 = 0$

$2x(2x-5) - 5(2x-5) = 0$

$(2x-5)(2x-5) = 0$

$2x - 5 = 0$

$2x = 5$

$x = 5/2$

#40 $m = 135 - 6t - t^2$

WHEN $m = 0$ there is no fuel

$0 = -t^2 - 6t + 135$

$t^2 + 6t - 135 = 0$

$(t+15)(t-9) = 0$

$\cancel{t = -15}$ or $t = 9$

time is positive so the Answer is 9 SECONDS.