

$$\textcircled{1} \left( \frac{27x^2y}{9xyz} \right)^{-2} = \left( \frac{3x}{z} \right)^{-2} = \frac{z^2}{9x^2}$$

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

$$\frac{-x^2 - 5x + 2}{-4x + 5} = \frac{x^2 + 5x - 2}{4x - 5}$$

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

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

$$\left( \frac{-2x^3 y^{-2}}{x^{-3} y^{-1}} \right)^2 = \left( \frac{-2x^6}{y} \right)^2$$

$$= \frac{4x^{12}}{y^2}$$

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

$$\begin{aligned}
 \textcircled{5} \quad & \frac{a^2 + 2a - 24}{(a+1)} \cdot \frac{a^2 - a - 12}{(a+1)^2} \\
 & = \frac{(a+6)\cancel{(a-4)}(a+1)\cancel{(a+1)}}{(a+1)\cancel{(a-4)}(a+3)} \\
 & = \frac{(a+6)(a+1)}{(a+3)} = \frac{a^2 + 7a + 6}{a+3}
 \end{aligned}$$

$$\textcircled{6} \quad \left( \frac{\frac{3}{2w} + \frac{4}{3w}}{\frac{1}{4w} - \frac{5}{9w}} \right) \left( \frac{36w}{36w} \right) = \frac{\frac{3 \cdot 36w}{2w} + \frac{4 \cdot 36w}{3w}}{\frac{36w}{4w} - \frac{5 \cdot 36w}{9w}} = \frac{54 + 48}{9 - 20} = -\frac{102}{11}$$

$$\begin{aligned} \textcircled{7} \quad \frac{2x}{x^2-9} + \frac{3x}{x^2+4x+3} &= \frac{2x}{(x+3)(x-3)} + \frac{3x}{(x+3)(x+1)} \\ &= \frac{2x(x+1) + 3x(x-3)}{(x+3)(x-3)(x+1)} = \frac{2x^2 + 2x + 3x^2 - 9x}{(x+3)(x-3)(x+1)} \\ &= \frac{5x^2 - 7x}{x^3 + x^2 - 9x - 9} \end{aligned}$$

$$\textcircled{8} \quad \frac{16a+8}{5a^2+5} \times \frac{4x^2+4x+1}{6x+3} = \frac{8(2a+1)(2x+1)\cancel{(2x+1)}}{5(a^2+1)3\cancel{(2x+1)}}$$

$$= \frac{8(2a+1)(2x+1)}{15(a^2+1)} = \frac{32ax + 16a + 16x + 8}{15a^2+15}$$

$$\textcircled{9} \quad \frac{3}{2a-2} - \frac{2}{1-a} = \frac{3}{2(a-1)} + \frac{2}{(a-1)} = \frac{3+4}{2(a-1)} = \frac{7}{2(a-1)}$$

$$1-a = -(a-1)$$

$$\textcircled{10} \quad \frac{a^2+2a+1}{3} \cdot \frac{a^2-1}{a} = \frac{(a+1)\cancel{(a+1)}a}{3\cancel{(a+1)}(a-1)} = \frac{a(a+1)}{3(a-1)} = \frac{a^2+a}{3a-3}$$

$$\textcircled{11} (2x^2 + 19x - 10) - (x^3 - 1)$$

$$2x^2 + 19x - 10 - x^3 + 1$$

$$-x^3 + 2x^2 + 19x - 9$$

⑫

$$x^4 - 2x^3 + 7x^2 - 14x + 27 \quad R: -51$$

$x + 2$

$$\begin{array}{r} x^5 + 0x^4 + 3x^3 + 0x^2 - x + 3 \\ - (x^5 + 2x^4) \quad \downarrow \\ \hline -2x^4 + 3x^3 \\ - (-2x^4 - 4x^3) \quad \downarrow \\ \hline 7x^3 + 0x^2 \\ - (7x^3 + 14x^2) \quad \downarrow \\ \hline -14x^2 - x \\ - (-14x^2 - 28x) \quad \downarrow \\ \hline 27x + 3 \\ - (27x + 54) \\ \hline -51 \end{array}$$

$$\textcircled{13} \left[ \frac{3}{x+1} - \frac{1}{1-x} = \frac{10}{x^2-1} \right] (x+1)(x-1)$$

$$3(x-1) + (x+1) = 10$$

$$3x - 3 + x + 1 = 10$$

$$4x - 2 = 10$$

$$\begin{array}{r} 4x - 2 = 10 \\ \quad \quad \quad \downarrow \\ \quad \quad \quad + 2 \\ \hline 4x = 12 \end{array} \quad x = 3$$



(17)

$$\begin{array}{cc} S_m & L \\ \frac{1}{4} & \frac{1}{2} \end{array}$$

$$W = RT$$

$$1 = \left(\frac{1}{4} + \frac{1}{2}\right)t$$

$$4 \left[ \frac{t}{4} + \frac{t}{2} = 1 \right]$$

$$t + 2t = 4$$

$$\frac{3t}{3} = \frac{4}{3}$$

$$t = \frac{4}{3} \text{ hr}$$

1 hr., 20 min.

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	D	=	R	×	T
PAT	70		x		$\frac{70}{x}$
BOB	75		x+5		$\frac{75}{x+5}$

$$2x(x+5) \left[ \frac{70}{x} = \frac{75}{x+5} + \frac{1}{2} \right]$$

$$140(x+5) = 150x + x(x+5)$$

$$140x + 700 = 150x + x^2 + 5x$$

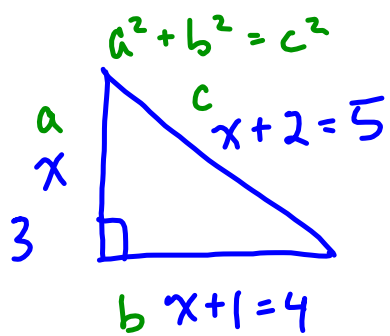
$$0 = x^2 + 15x - 700$$

$$= (x+35)(x-20)$$

$$x = -35 \quad x = 20$$

PAT: 20 mph

BOB: 25 mph



$$P = 3 + 4 + 5 = 12$$

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

$$x^2 + x^2 + 2x + 1 = x^2 + 4x + 4$$

$$\underline{-x^2 - 4x - 4} \quad \underline{-x^2 - 4x - 4}$$

$$x^2 - 2x - 3 = 0$$

$$(x-3)(x+1) = 0$$

$$x = 3 \quad x = -1$$