

$$5x^5 - 15x^4 + 20x^3$$

$$= 5x^3(x^2 - 3x + 4)$$

Add 5 pts
to your test
score.

§6.1 #s 40, 53, 17

#40 $ax^2 + bx + c$ only factors if
 $b^2 - 4ac$ is a perfect square.

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

$$a=1, b=-3, c=9$$

$$b^2 - 4ac = (-3)^2 - 4(1)(9)$$

$$= 9 - 36$$

$$= -27$$

$\sqrt{-27}$ \neq a whole #
Doesn't factor

$$x^2 - 5x + 6$$

$$a=1, b=-5, c=6$$

$$b^2 - 4ac =$$

$$= (-5)^2 - 4(1)(6)$$

$$= 25 - 24$$

$$= 1 = 1^2$$

$$\sqrt{1} = 1 \quad \text{It factors}$$

$$x^3 + 27 = x^3 + 3^3 = (x+3)(x^2 - 3x + 9)$$

$$\frac{3x-x^2}{x^3-27} \cdot \frac{x}{x^2+3x+9}$$

$$= \frac{x(3-x)}{(x-3)(x^2+3x+9)} \cdot \frac{x^2+3x+9}{x}$$

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

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

$$\frac{9x-18}{7x-14} = \frac{9\cancel{(x-2)}}{7\cancel{(x-2)}} = \frac{9}{7}$$

SG.2 Adding & Subtracting Rational Expression

$$\frac{P}{Q} + \frac{R}{Q} = \frac{P+R}{Q}$$

$$\frac{2}{7} + \frac{3}{7} = \frac{2+3}{7} = \frac{5}{7}$$

$$\frac{3}{x-3} + \frac{7x}{x-3} = \frac{3+7x}{x-3}$$

$$\begin{array}{r} 2 \overline{)12} \\ 2 \overline{)6} \\ \hline 3 \end{array} \quad \begin{array}{r} 2 \overline{)20} \\ 2 \overline{)10} \\ \hline 5 \end{array}$$

$$\frac{1}{12} + \frac{3}{20}$$

LCD = 2 · 2 · 3 · 5
 Smallest # that's a multiple of 12 & 20.

$$= \frac{1}{2 \cdot 2 \cdot 3} \cdot \frac{5}{5} + \frac{3}{2 \cdot 2 \cdot 5} \cdot \frac{3}{3}$$

$$= \frac{1 \cdot 5}{2 \cdot 2 \cdot 3 \cdot 5} + \frac{3 \cdot 3}{2 \cdot 2 \cdot 3 \cdot 5} = \frac{5+9}{2 \cdot 2 \cdot 3 \cdot 5} = \frac{14}{2 \cdot 2 \cdot 3 \cdot 5} = \frac{\cancel{2} \cdot 7}{\cancel{2} \cdot 2 \cdot 3 \cdot 5}$$

$$= \frac{7}{30}$$

$$LCD = (x+2)(x-3)$$

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

Bread crumbs

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

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

$$= \frac{3x-9 + 5x^2 + 10x}{(x+2)(x-3)}$$

$$= \frac{5x^2 + 13x - 9}{(x+2)(x-3)}$$

169 - 4(5)(-9)
349 DNF

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

$$= \frac{3(x-3) + 5x(x+2)}{(x+2)(x-3)} = \frac{3x-9+5x^2+10x}{(x+2)(x-3)} \dots \text{etc.}$$

Shorten up even more? LCD = $(x+2)(x-3)$

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

$$= \frac{3(x-3) + 5x(x+2)}{\text{LCD}} = \dots \frac{5x^2 + 13x - 9}{(x-3)(x+2)}$$

At least write
it out last step ↴

(33)

$$\frac{x+1}{1-x} + \frac{1}{x-1}$$

$$1-x = -(x-1)$$

$$\frac{a}{-b} = -\frac{a}{b} = \frac{-a}{b}$$

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

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

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

Be careful with subtraction,

DISTRIBUTIVE LAW.



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$$\frac{x+2}{x^2-36} - \frac{x}{x^2+9x+18}$$

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

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

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

$$= \frac{x^2 + 5x + 6 - x^2 + 6x}{(x+6)(x-6)(x+3)}$$

$$= \frac{11x + 6}{(x+6)(x-6)(x+3)}$$

$$\begin{aligned} & \text{LCD} \\ & = (x+6)(x-6)(x+3) \end{aligned}$$

$$\begin{aligned} & x^2 + 6x + 3x + 18 \\ & = x(x+6) + 3(x+6) \\ & = (x+6)(x+3) \end{aligned}$$

$$\begin{aligned} & -x(x-6) \\ & = -x^2 + 6x \end{aligned}$$

$$\begin{aligned} & -x(x-6) \\ & = -(x^2 - 6x) \\ & = -x^2 + 6x \end{aligned}$$