

Day 17

9.5 Add and Subtract Rational Expressions

$$\frac{2 \cdot 5}{2 \cdot 19} + \frac{7}{38} = \frac{10}{38} + \frac{7}{38} = \frac{17}{38}$$

Find the LCD. Add/Subtract Tops.
Bottom stays the same.

$$\frac{3 \cdot 7}{3 \cdot 24} - \frac{5 \cdot 2}{36 \cdot 2} = \frac{21}{72} - \frac{10}{72} = \frac{11}{72}$$

p. 514 The lens equation

$$\frac{1}{f} = \frac{1}{d_i} + \frac{1}{d_o}$$

Focal length of the lens \rightarrow f
 distance from the lens to the film \rightarrow d_i
 distance from the lens to object \leftarrow d_o

(ex) object is 15cm from lens = d_o
 lens is 10cm from the film = d_i

$$\frac{1}{f} = \frac{1 \cdot 3}{10 \cdot 3} + \frac{1 \cdot 2}{15 \cdot 2}$$

$15 \cdot 2 \cdot 3 = 90$
 $10 \cdot 2 = 20$
 $10 \cdot 3 = 30$
 40

$$\frac{1}{f} = \frac{3}{30} + \frac{2}{30} = \frac{5}{30} = \frac{1}{6}$$

$$\frac{1}{f} = \frac{1}{6}$$

$F = 6$
Focal length of the lens is 6cm.

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Quick v # 1

object is 20cm from lens = d_o

lens is 5cm from the film = d_i

$$\frac{1}{f} = \frac{1}{20} + \frac{1}{5.4}$$

$$\frac{1}{20} + \frac{4}{20}$$

$$\frac{1}{f} = \frac{5}{20} = \frac{1}{4}$$

$$f = 4\text{cm}$$

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

bottom stays the same!

② $\frac{4}{3x} + \frac{2}{3x} = \frac{6}{3x} = \frac{2}{x}$

always reduce last!

③ $\frac{3c}{2c-1} + \frac{5c+1}{2c-1} = \frac{8c+1}{2c-1}$

Find the LCM (Least Common Multiple)
(the smallest #, both terms go into)
(the least amount of letters they have in common)

① Find LCM. $4x^2 - 36$ and $6x^2 + 36x + 54$
Factor. $4(x^2 - 9)$ $6(x^2 + 6x + 9)$
 $4(x-3)(x+3)$ $6(x+3)(x+3)$
 $2 \cdot 2 \cdot 3$ $2 \cdot 3 \cdot 2$

$$\text{LCM} = 12(x+3)^2(x-3)$$

$$\textcircled{1} \frac{1}{x^2 - 4x - 12} + \frac{3x}{4x + 8}$$

1st:
Factor
Both
denominators
2nd:
Find LCD

$$4. \frac{1}{4(x+2)(x-6)} + \frac{3x \cdot (x-6)}{4(x+2)(x-6)}$$

$$\frac{4 + 3x^2 - 18x}{4(x+2)(x-6)} = \boxed{\frac{3x^2 - 18x + 4}{4(x+2)(x-6)}}$$

$$\textcircled{2} \frac{2x^2 - 2}{3x^2 + 36x + 105} + \frac{-3x(x+7)}{6x + 30}$$

$$2 \cdot 3(x+7)(x+5) \quad 6(x+5)(x+7)$$

when
subtracting
1st - distribute
the minus sign
to numerator,
then Factor
bottom

$$\frac{-4 + -3x^2 - 21x}{6(x+7)(x+5)}$$

$$= \frac{-3x^2 - 21x - 4}{6(x+5)(x+7)}$$

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

$$3(x^2 - 3x + 2) \quad 3(x^2 + x - 2)$$

$$3(x-2)(x-1)(x+2) \quad 3(x-1)(x+2)(x-2)$$

top: $x^2 + 2x - 2x^2 + 4x - 1x + 2$
Simplify top:

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