

$$\frac{(y+5)(y+5)}{3(y-4)}$$

Finding Common Denominators (CD)

1. $x^2 + 6x + 5$ & $x^2 + 8x + 7$

$$(x+5)(x+1) \quad \& \quad (x+7)(x+1)$$

↑ overlap ↑

CD: $(x+1)(x+7)(x+5)$

Adding & Subtracting

① factor denom.

② CD: all the factors written w/o repeating overlaps

2. $x^2(x-2)$ & $(x+2)(x+2)$

CD: $x^2(x+2)(x-2)(x+2)$

Add/Subtract

3.

$$\frac{x+6}{x-1} - \frac{2x+7}{x-1}$$

CD: $x-1$

$$\frac{x+6-2x-7}{x-1}$$

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

~~$$\frac{x(x+y)}{x-1}$$~~

4.

$$\frac{(x-7)}{(x-7)} \frac{7x}{x+1} + \frac{8}{x-7} \frac{(x+1)}{(x+1)}$$

CD: $(x+1)(x-7)$

$$\frac{7x^2 - 49x + 8x + 8}{(x+1)(x-7)}$$

$$\frac{7x^2 - 41x + 8}{(x+1)(x-7)}$$

5.

$$\left(\frac{x-3}{x-3}\right) \frac{x+1}{x^2+6x+9} + \frac{x+4}{x^2-9} \left(\frac{x+3}{x+3}\right) \quad \text{CD: } (x+3)(x+3)(x-3)$$

$$\left(\frac{x-3}{x-3}\right) \frac{x-4}{x^2+4x+3} - \frac{x-1}{x^2-9} \left(\frac{x+1}{x+1}\right) \quad \text{CD: } (x+3)(x-3)(x+1)$$

$$\frac{x^2-3x+x-3+x^2+4x+3x+12}{(x+3)(x+3)(x-3)}$$

$$\frac{x^2-3x-4x+12 - (x^2-x+x-1)}{(x-3)(x+3)(x+1)}$$

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

$$\boxed{\frac{-x + 13}{(x-3)(x+3)(x+1)}}$$

$t = \frac{D}{r} \leftrightarrow D = r \cdot t$ Rational Function Word Problems

1. On the way to work Nick carpools with a coworker and then takes the city bus back home in the evening. The average speed of the 20-mile trip is 5 miles per hour faster than the carpool. Write an expression that represents the total travel time.

	D	r	t
to	20	x	$\frac{20}{x}$
from	20	x+5	$\frac{20}{x+5}$

$$T = \frac{20}{x} + \frac{20}{x+5} \left(\frac{x}{x}\right) \quad \text{CD: } x(x+5)$$

$$T = \frac{20x + 100 + 20x}{x(x+5)}$$

$$\boxed{T = \frac{40x + 100}{x(x+5)}}$$

2. Mrs. Brown drives her car to the mechanic, then she takes the commuter rail train back to her neighborhood. The average speed for the 10 mile trip is 15 miles per hour faster on the train. Find an expression for Mrs. Brown's total travel time.

	D	r	t
car	10	x	$\frac{10}{x}$
train	10	x+15	$\frac{10}{x+15}$

$$T = \frac{10}{x} + \frac{10}{x+15} \left(\frac{x}{x}\right) \quad \text{CD: } x(x+15)$$

$$T = \frac{10x + 150 + 10x}{x(x+15)}$$

$$\boxed{T = \frac{20x + 150}{x(x+15)}}$$

B. If she drove 30 mph, how long did this take?

$x = 30 \text{ mph}$

$$T = \frac{20(30) + 150}{30(30 + 15)} = \frac{750}{1350} = \boxed{0.56 \text{ hrs}}$$