

## Adding and Subtracting Rational Expressions

1. Add or subtract the fractions/rational expressions.

a)  $\frac{2}{3} + \frac{1}{4}$

b)  $\frac{3}{12} - \frac{5}{16}$

c)  $\frac{8}{b^3} - \frac{5}{b^3}$

d)  $\frac{2z}{4-z} - \frac{3z-4}{4-z}$

e)  $\frac{4}{4-n} + \frac{3}{2-n}$

f)  $\frac{x}{x+4} + \frac{x+1}{x}$

$$\text{g) } \frac{3n}{(4n-3)^2} - \frac{1}{4n-3}$$

$$\text{h) } \frac{2x}{x-5} + \frac{2x-1}{3x^2-16x+5}$$

$$\text{i) } \frac{3}{(x-1)(x-2)} + \frac{4x}{(x+1)(x-2)}$$

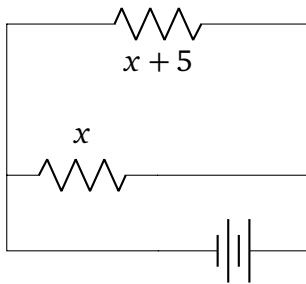
$$\text{j) } \frac{3}{x^2-2x+1} - \frac{1}{x^2-3x+2}$$

$$\text{k) } -\frac{1}{x-5} - 2$$

$$\text{l) } \frac{3}{x+1} + 2$$

2. You drove to Salem, 45 miles away, averaging a speed of  $x$  miles per hour. On the way back, your average speed was 5 miles per hour *slower*. Let  $T(x)$  be the total amount of time spent driving. Write a simplified formula for  $T(x)$ .
3. You and a partner will paint the siding of a house this summer. This house has 3000 square feet of siding. If you work alone, you could paint it all in  $x$  hours. If your partner works alone, they take 10 more hours than you do.
- a) What is the rate (in square feet per hour) that you paint at?
  - b) What is the rate (in square feet per hour) that your partner paints at?
  - c) If you work together, it makes sense to add your rates. Write a simplified expression for the rate that you paint the house when you work as a team.

4. Here is an electrical circuit where a battery is wired to power two lights in parallel. The lights are represented by the resistors. One has resistance  $x$  ohms, and the other's resistance is 5 ohms more.

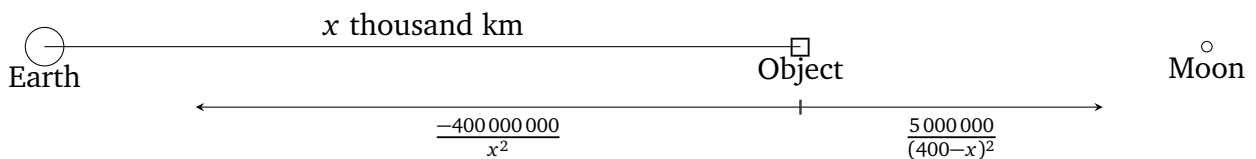


With parallel circuits, the overall resistance  $R$  satisfies this equation:

$$\frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2}$$

Find  $\frac{1}{R}$  for this circuit in terms of  $x$ .

5. Suppose a 1 kilogram object is in between the Earth and the Moon,  $x$  thousand kilometers from the center of the Earth. Gravity from Earth pulls the object to the left in the diagram, while gravity from the moon pulls the object to the right. (The numbers have been rounded a lot.)



The two forces are illustrated in the diagram. Add them together to get the net gravitational force on the object.