

# Solving Rational Equations - Word Problems

12. On the 42-km go-cart course at Sportsworld, Arshia drives 0.4 km/h faster than Sarah, but she has engine trouble part way around the course and has to stop to get the go-cart fixed. This stop costs Arshia one-half hour, and so she arrives 15 min after Sarah at the end of the course. How fast did each girl drive and how long did each girl take to finish the course? Answer to one decimal place.
13. Rowing at 8 km/h, in still water, Rima and Bhanu take 16 h to row 39 km down a river and 39 km back. Find the speed of the current to two decimal places.
14. A river flows at 2 km/h, and John takes 6 h to row 16 km up the river and 16 km back. How fast did he row?
15. **Application:** Jaime bought a case of concert T-shirts for \$450. She kept two for herself and sold the rest for \$560, making a profit of \$10 on each shirt. How many shirts were in the case?
16. Stuart agrees to a house-painting job for \$900. He takes 4 days longer than expected, and he has earned \$18.75 less per day than expected. In how many days did he expect to complete the house?
17. A grade 11 class, on a field trip to Montreal, had lunch in a restaurant. The bill came to \$239.25. Four students had birthdays that day, and it was agreed that these four should not have to pay for lunch. The other students had to pay \$1 more than if all the students had paid. How many students had lunch?

9. (e)  $\frac{(x+4)(x-2)}{(x-3)(2x-3)}, x \neq \frac{3}{2}, \pm 3, -\frac{1}{2}$   
 (f)  $\frac{a^2-3a-14}{2(2a+1)(a+5)}, a \neq 0, \frac{5}{3}, -\frac{1}{2}, -5$

10. (a)  $x=0$  or  $x=-\frac{2}{3}$  (b)  $x=\frac{3}{2}$  or  $x=-\frac{2}{3}$

11. (a) 1 (b)  $-\frac{3}{2}$  (c)  $\frac{1}{3}$   
 (d)  $-2$  or  $\frac{2}{3}$  (e) 8 (f) 3 or  $\frac{3}{2}$

18. **Check Your Understanding:** Explain the steps for adding or subtracting rational expressions. Use  $\frac{x-2}{x^2-4x-32} - \frac{x-1}{x^2-2x-48}$  as an example and explain each step fully.

19. **Thinking, Inquiry, Problem Solving:** Find  $A$  and  $B$  such that  $\frac{2x-1}{(x+1)(3x+2)} = \frac{A}{x+1} + \frac{B}{3x+2}$ .

20. Find  $A$ ,  $B$ , and  $C$  such that  $\frac{(x-1)}{(x+1)(x-2)^2} = \frac{A}{x+1} + \frac{B}{x-2} + \frac{C}{(x-2)^2}$ .

21. It takes Paulina  $x$  hours to travel  $a$  kilometres. If she increases her speed by  $b$  kilometres per hour, the journey will take her  $c$  hours less time. Find  $x$ .

12. Arshia's speed: 8.0 km/h; Sarah's speed: 8.4 km/h; Arshia's time: 5.5 h; Sarah's time: 5.25 h

13. ~~6.67~~ km/h **5 km/h**

14. ~~3.24~~ h **6 km/h**

15. 18 tickets

16. 12 days

17. 33 students

18. (1) Factor the numerators and denominators for both expressions.

(2) Express the sum or difference of the expressions with a common denominator. (3) Simplify. Explanations of steps may vary.

19.  $A = 3, B = -7$

20.  $A = -\frac{2}{9}, B = \frac{2}{9}, C = \frac{1}{3}$

21.  $x = \frac{bc \pm \sqrt{b^2c^2 + 4abc}}{2b}$