

## Grade 9 Academic Math

## Unit 2 – Quiz 2 – Using Equations to Solve Problems

Mr. Nolfi

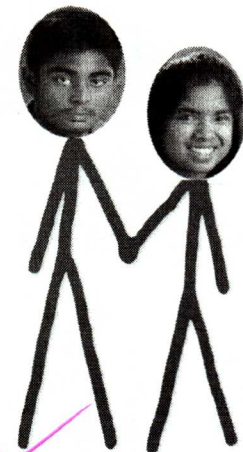
Victim:

Mr. Solutions

Brilliant deductions Mr. N!

APP	TIPS	COM
12/12	10/10	10/10

1. Abbinash and Thurkka were separated by a river that is 540 m wide. Suddenly, they spotted a bridge connecting one side of the river to the other. Because of their burning desire to be together, they darted across the bridge toward each other. After an agonizing sprint that lasted exactly sixty seconds, they finally embraced each other at a certain point on the bridge. Assuming that they started sprinting at exactly the same time and that Thurkka's speed was 3 m/s faster than Abbinash's, how fast was each of them running?

**Prediction (1 APP)**

Will they meet closer to Abbinash's side of the river or Thurkka's side of the river? Why?

They will meet closer to Abbinash's side because Thurkka runs faster, which means that she covers a greater distance in 60s than Abbinash does.

**Algebraic Model (4 APP)**

Represent the unknowns using only ONE variable! Time is known!! Speed and distance are not!

	Speed (m/s)	Distance (m)
Abbinash	$v$	$60v$
Thurkka	$v+3$	$60(v+3)$
Total		540

$$V = \frac{d}{t} \quad \left( \frac{\text{km}}{\text{h}}, \frac{\text{m}}{\text{s}} \right)$$

$$\therefore d = vt$$

**Equation in Words (1 APP)**

Write the equation relating the unknowns in words.

$$\left( \begin{array}{c} \text{Distance} \\ \text{Abbinash} \\ \text{Covered} \end{array} \right) + \left( \begin{array}{c} \text{Distance} \\ \text{Thurkka} \\ \text{Covered} \end{array} \right) = \left( \begin{array}{c} \text{Distance from one side} \\ \text{of bridge to the other side} \end{array} \right)$$

**Equation in Algebraic Form (2 APP)**

Write the equation relating the unknowns in algebraic form.

$$60v + 60(v+3) = 540$$

**Solve the Equation and State a Conclusion (4 APP)**

$$\therefore 60v + 60v + 180 = 540$$

$$\therefore 120v + 180 = 540$$

$$\therefore 120v + 180 - 180 = 540 - 180$$

$$\therefore 120v = 360$$

$$\therefore v = 3$$

Abbinash  
ran at 3 m/s  
and Thurkka  
ran at 6 m/s

2. After one year, the interest earned on a \$14000 investment exceeds the interest earned on a \$10000 investment by \$400. The annual interest rate for the \$14000 investment is 1.6% greater than the annual interest rate for the \$10000 investment. Find the interest rates for the two investments. (10 TIPS)

Remember!  $1.6\% = \frac{1.6}{100} = 0.016$

means +1.6% ✓  
NOT times 1.6% ✓

	Interest Rate	Interest Earned in 1 Year (\$)
\$10000 Investment	$r$	$10000r$
\$14000 Investment	$r + 0.016$	$14000(r + 0.016)$

Relationship?  
14000( $r + 0.016$ )  
is 400 more  
than 10000 $r$

(Interest Earned on \$14000 Investment) is 400 more than (Interest Earned on \$10000 Investment)

$$14000(r + 0.016) = 10000r + 400$$

$$\therefore 14000r + 224 = 10000r + 400$$

$$\therefore 14000r + 224 - 224 - 10000r = 10000r + 400 - 224 - 10000r$$

$$\therefore 4000r = 176$$

$$\therefore \frac{4000r}{4000} = \frac{176}{4000}$$

$$\therefore r = 0.044$$

$$\text{and } r + 0.016 = 0.044 + 0.016 = 0.06$$

The \$10000 investment earned interest at a rate of 4.4% while the \$14000 investment earned interest at a rate of 6%.

per annum