Examples

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Ex A boat running downstream covers a distance of 30 km in 2 hours. ~~While coming back the same distance~~. If the speed of current is half that of the boat what is the speed of boat in km/hr?

→ Let speed of boat = B_s

speed of water = $\frac{B_s}{2}$

$$\frac{30}{B_s + \frac{B_s}{2}} = 2 \Rightarrow \frac{2 \times 30}{3B_s} = 2$$

$$\Rightarrow B_s = \frac{30}{3} = 10 \text{ km/hr}.$$

Ex A boat running at the certain speed. downstream covers a distance of 6.4 km in 8 minutes. The same boat running upstream covers the same distance in 9 minutes

find the speed of current }

→ Speed of boat = B_s

speed of current = C_s

$$D_s = B_s + C_s = \frac{4.8}{\frac{8}{60}} = \frac{48 \times 60}{10 \times 8} = 36 \text{ km/hr}$$

$$U_s = B_s - C_s = \frac{4.8}{\frac{9}{60}} = \frac{48 \times 60}{10 \times 9} = 32 \text{ km/hr}$$

$$C_s = \frac{D_s - U_p}{2} = \frac{36 - 32}{2} = 2 \text{ km/hr}$$

Ex The speed of a boat in still water is 8km/hr and the current is 3 km/hr. The boat start from point A and goes to point B and comes back to point A. It takes 12 hours during the journey. find the distance betn A to B }

→ Downstream = $B_s + C_s = 6 + 3 = 9$ km/hr.

Up stream $= B_s - C_s = 6 - 3 = 3$ km/hr

If the distance required $= x$ km

$$\frac{x}{9} + \frac{x}{3} = 12 \Rightarrow \frac{x + 3x}{9} = 12$$

$$\Rightarrow 4x = 9 \times 12$$

$$\Rightarrow x = 9 \times 3 = 27 \text{ km} //$$

Ex The speed of a boat in still water is 17.5 km/hr and that of current is 2.5 km/hr. The boat goes from x to y in downstream and returns to point z. The whole journey takes 4 hrs 29 minutes. If the distance between z and y is $\frac{2}{5}$ of the distance between x and y. find the total distance covered by boat. (Approximate to the nearest integer)

→ Downstream speed $= B_s + C_s = 17.5 + 2.5 = 20$ km/hr

Up stream speed $= B_s - C_s = 17.5 - 2.5 = 15$ km/hr.

Distance between x to y = a km

Distance between y to z = $\frac{2}{5}a$ km

Total time = 429 minutes = $7\frac{9}{60} = 7\frac{3}{20}$ hrs

$= \frac{143}{20}$ hrs.

$$\frac{a}{20} + \frac{2a}{5 \times 15} = \frac{143}{20}$$

$$\frac{15a + 8a}{60} = \frac{143}{4} \Rightarrow 23a = 143 \times 15$$

$\Rightarrow a \approx 93$ km //

$$a + \frac{2a}{5} = \frac{93 + 2 \times 93}{5} = \frac{74}{5} \approx \frac{7 \times 93}{5}$$

≈ 130 km

Ex// The distance between two points is 36 km. A boat sows in still water at 6 km/hr. It takes 8 hrs less to cover this distance in downstream in [illegible]

less to cover this distance in downstream in comparison to that in upstream. The rate of stream is _____.

→ Speed of boat B_s = 6 km/hr

" Current C_s = C_s km/hr

Downstream speed = $6 + C_s$ km/hr

Upstream speed = $6 - C_s$ km/hr

$T_1 - T_2 = 8$

Distance / speed

$$\Rightarrow \frac{36}{6 - C_s} - \frac{36}{6 + C_s} = 8$$

$$\Rightarrow \frac{36[6 + C_s - 6 + C_s]}{(6 - C_s)(6 + C_s)} = 8$$

$$\Rightarrow \frac{36 \times 2C_s}{(6 - C_s)(6 + C_s)} = 1 \Rightarrow C_s^2 + 9C_s - 36 = 0$$

$$\Rightarrow (C_s + 12)(C_s - 3) = 0$$

$$\Rightarrow \boxed{C_s = -12} \text{ or } \boxed{C_s = +3}$$

$\Rightarrow$ $c_5 = -12$ or $c_5 = +3$

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