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## \* Boat & stream:

1. In water, the direction along the stream is called downstream. And the direction against the stream is called upstream.

2. If speed of a boat in still water is  $u$  kmph & speed of the stream is  $v$  kmph then :

i] Speed downstream  $= (u + v)$  kmph

ii] Speed upstream  $= (u - v)$  kmph.

3. If speed of downstream is  $a$  kmph and speed upstream is  $b$  kmph then

i] speed in still water  $= \frac{1}{2} (a + b)$  kmph.

ii] Rate of stream  $= \frac{1}{2} (a - b)$  kmph.

Q. The speed of a boat when travelling downstream is 32 kmph, whereas when travelling upstream it is 28 kmph. What is the speed of the boat in still water & the speed of the stream

→ Speed in still water  $= \frac{1}{2} (a + b) = \frac{1}{2} (32 + 28)$

$$= \frac{1}{2} \times 60 = \underline{\underline{30}}$$

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$$\text{speed of the stream} = \frac{1}{2}(a-b)$$

$$= \frac{1}{2}(38-28) = \underline{\underline{5}}$$

Q. A boat can travel with a speed of 13 kmph in still water if the speed of the stream is 4 kmph, find the time taken by the boat to go 68 km downstream.

$$\text{Downstream} = u + v$$

$$= 13 + 4$$

$$= 17 \text{ kmph}$$

$$\text{Time} = \frac{68}{17} = 4 \text{ hrs}$$

Q. A man's speed with the current is 15 kmph & the speed of the current is 2.5 kmph. The man's speed against the current is

$$\text{upstream} = 15 - 2.5$$

$$= \underline{\underline{12.5 \text{ kmph}}}$$

Q. In 1 hr, a boat goes 11 kmph along the stream & 5 kmph against the stream. The speed of a boat in still water (in kmph) is

$$\frac{1}{2} (a+b) = \frac{1}{2} (11+5) = \frac{1}{2} \times 16 = \underline{8 \text{ kmph.}}$$

Q. A boat running downstream covers a dist. of 16 km in 2 hrs, while for covering the same dist. upstream, it takes 4 hrs. What is the speed of the boat in still water

$$S = \frac{D}{T} = \frac{16}{2} = 8 \text{ kmph}$$

$$S = \frac{D}{T} = \frac{16}{4} = 4 \text{ kmph}$$

$$\therefore \frac{1}{2} (8+4) = \frac{1}{2} (12) = \underline{6 \text{ kmph.}}$$