Boats & streams

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- You need to know 4 basic quantities
- Then you can solve any problem

- 1. Speed of boat in still water(u)
- 2. Speed of stream(v)
- 3. Boats downstream speed (u+v)
- 4. Boats upstream speed (u-v)

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- Downstream Speed = u + v
- upstream Speed = u −v

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- A boat can travel with a speed of 13 km/hr in still water. If the speed of the stream is 4 km/hr, find the time taken by the boat to go 68 km downstream

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- A man's speed with the current is 15 km/hr and the speed of the current is 2.5 km/hr. The man's speed against the current is?

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Speed of a boat in standing water is 9 kmph and the speed of the stream is 1.5 kmph. A man rows to a place at a distance of 105 km and comes back to the starting point. The total time taken by him is:

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Ans : 24 Hours

- A motorboat, whose speed is 15 km/hr in still water goes 30 km downstream and comes back in a total of 4 hours 30 minutes. The speed of the stream (in km/hr) is?

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- A boat running downstream covers a distance of 16 km in 2 hours while for covering the same distance upstream, it takes 4 hours. What is the speed of the boat in still water?

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- The speed of a boat in still water in 15 km/hr and the rate of current is 3 km/hr. The distance travelled downstream in 12 minutes is

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- A boat takes 90 minutes less to travel 36 miles downstream than to travel the same distance upstream. If the speed of the boat in still water is 10 mph, the speed of the stream is?

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- A boat covers a certain distance downstream in 1 hour, while it comes back in 1.5 hours. If the speed of the stream be 3 kmph, what is the speed of the boat in still water?

- A man rows to a place 48 km distant and come back in 14 hours. He finds that he can row 4 km with the stream in the same time as 3 km against the stream. The rate of the stream is?

- **City A to City B is a downstream journey on a stream which flows at a speed of 5km/hr. Boats P and Q run a shuttle service between the two cities that are 300 kms apart. Boat P, which starts from City A has a still-water speed of 25km/hr, while boat Q, which starts from city B at the same time has a still-water speed of 15km/hr. When will the two boats meet for the first time?**

- **(When and where will they meet for the second time?)**

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Method of solving this CAT Question from Time Speed Distance:

Understanding relative speed would help.

Boat P starts from city A and Q starts from city B.

When boat P travels downstream, it will effectively have a speed to 30kmph. Likewise, Q will have an effective speed of 10kmph. The relative speed = 40kmph. So, the two boats will meet for the first time after $\frac{300}{40}$ hours (Distance/relative speed) = 7.5 hours (Actually, for this part we do not need the speed of the stream)

The second part is more interesting, because the speed of the boats change when they change direction. Boat P is quicker, so it will reach the destination sooner. Boat P will reach City B in 10 hours $\frac{300}{30}$. When boat P reaches city B, boat Q will be at a point 100kms from city B.

After 10 hours, both P and Q will be travelling upstream,

P's speed = 20 km/hr

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After 10 hours, both P and Q will be travelling upstream,

P's speed = 20 km/hr

Q's speed = 10 km/hr

Relative speed = 10km/hr

Q is ahead of P by 100 kms

P will catch up with Q after 10 more hours $\frac{Distance}{Relative Speed} - \frac{100}{10}$.

So, P and Q will meet after 20 hours at a point 200 kms from city B

The question is " **When will the two boats meet for the first time? When and where will they meet for the second time?**"

Hence, the answer is 7.5 hours and 20 hours

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