

Find the rate of the stream?



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Model Questions

- Simplify

$$\frac{\sqrt[4]{0.0625} + \sqrt[3]{0.008} + \sqrt{0.09} - 1}{\sqrt[3]{62.5} \sqrt[5]{32}}$$

a) 1/2 b) 2.4 c) 1.25 d) 0

Sol:

$$\frac{\sqrt[4]{(0.05)^4} + \sqrt[3]{(0.2)^3} + \sqrt{(0.3)^2} - 1}{\sqrt[3]{62.5} \sqrt[5]{(2)^5}}$$

$$= \frac{0.5 + 0.2 + 0.3 - 1}{\sqrt[3]{625.5} \cdot 2} = 0$$
Ans: d
- A man rows 12 km in 5 hours against the stream, the speed of current being 4 kmph. What time will be taken by him to row 15 km with the stream

a) 1 hour 27 $\frac{7}{13}$ min
 b) 1 hour 24 $\frac{7}{13}$ min
 c) 1 hour 25 $\frac{7}{13}$ min
 d) 1 hour 26 $\frac{7}{13}$ min

Sol: A man rows 12 kms in 5 hours against the stream, so upstream speed = $\frac{12}{5} = 2.4$ km/hr
 Speed of current = 4 km/hr
 Speed of man = 4 + 2.4 = 6.4 km/hr
 So, time taken to row 15 kms downstream = 1 hour 26 $\frac{7}{13}$ min **Ans:d**
- If $5 \tan A = 4$, then the value of $\frac{5 \sin A - 3 \cos A}{\sin A + 2 \cos A}$ is

a) $\frac{9}{14}$ b) $\frac{5}{6}$ c) $\frac{5}{14}$ d) $\frac{7}{9}$

Sol:

$5 \tan A = 4$
 $\tan A = \frac{4}{5}$

$$\frac{5 \sin A - 3 \cos A}{\sin A + 2 \cos A} = \frac{5 \cdot \frac{4}{\sqrt{41}} - 3 \cdot \frac{5}{\sqrt{41}}}{\frac{4}{\sqrt{41}} + 2 \cdot \frac{5}{\sqrt{41}}} = \frac{20 - 15}{4 + 10} = \frac{5}{14}$$
Ans:c
- The length of two parallel chords of a circle of radius 5cm are 6 cm and 8cm in the same side of the centre. The distance between them is

a) 1 cm b) 2 cm
 c) 3 cm d) 1.5 cm

- Sol:**
-
- EB = 1/2 AB = 3 cm FC = 1/2 CD = 4 cm
 OE = $\sqrt{OB^2 - EB^2} = \sqrt{5^2 - 3^2} = 4$ cm
 OF = $\sqrt{OC^2 - FC^2} = \sqrt{5^2 - 4^2} = 3$ cm
 So, EF = 4 - 3 = 1 cm
- If the angles of a triangle are in the ratio 2 : 3 : 5, then the measure of the least angle of the triangle is:

a) 20° b) 90°
 c) 18° d) 36°

Sol: ATQ, The measure of least angle = $\frac{2}{2+3+5} \cdot 180^\circ = 36^\circ$ **Ans: d**
 - The value of $\sec^4 A (1 - \sin^4 A) - 2 \tan^2 A$ is

a) 1/2 b) 0 c) 2 d) 1

Sol: $\sec^4 A (1 - \sin^4 A) - 2 \tan^2 A$

$$= \frac{(1 + \sin^2 A)(1 - \sin^2 A)}{\cos^4 A} - 2 \tan^2 A$$

$$= \sec^2 A + \tan^2 A - 2 \tan^2 A = 1$$
Ans: d
 - A vendor purchased 40 dozen bananas for 250. Out of these 30 bananas were rotten and could not be sold. At what rate per dozen should he sell the remaining bananas to make a profit of 20%?

a) 12 b) 10 c) 8 d) 6

Sol: Cost price of 40 dozen bananas = 250
 30 bananas were wasted. So, cost of per dozen bananas = $\frac{250}{37.5} = \frac{20}{3}$
 Profit percent = 20%
 Selling price = $\frac{20}{3} \cdot \frac{120}{100} = 8$ **Ans: c**
 - 15 men can finish a work in 20 days, however it takes 24 women to finish it in 20 days. If 10 men and 8 women undertake to complete the work, then they will take -

a) 20 days b) 30 days
 c) 10 days d) 15 days

Sol: 15 men \times 20 days = 24 women \times 24 days
 5 men = 8 women
 = 10 women + 8 women = 15men
 15 men can complete the work in 20 days. **Ans: a**
 - A can do half of a piece of work in 1 day, whereas B can do full. B can do half the work as C in 1



- day. The ratio of their efficiencies of work is

a) 1 : 2 : 4 b) 2 : 1 : 4
 c) 4 : 2 : 1 d) 2 : 4 : 1

Sol: Ratio of efficiency of A and B = 1 : 2
 Ratio of efficiency of B and C = 1 : 2
 So, ratio of efficiency of A, B and C = 1 : 2 : 4 **Ans: a**

- The average marks of 14 students was 71. It was later found that the marks of one of the students has been wrongly entered as 42 instead of 56 and of another as 74 instead of 32. What is the correct average?

a) 68 b) 71 c) 67 d) 69

Sol: Correct average = $\frac{14 \cdot 71 + (56 - 42) + (32 - 74)}{14}$

$$= \frac{14 \cdot 71 + 14 - 42}{14} = 71 + 1 - 3 = 69$$
Ans: d
- The value of $(\cos 0^\circ + \sin 45^\circ + \sin 30^\circ) (\sin 90^\circ - \cos 45^\circ + \cos 60^\circ)$

a) $\frac{7}{4}$ b) $\frac{5}{4}$ c) $\frac{3}{4}$ d) $\frac{3}{2}$

Sol: $(\cos 0^\circ + \sin 45^\circ + \sin 30^\circ) (\sin 90^\circ - \cos 45^\circ + \cos 60^\circ)$

$$= \left(1 + \frac{1}{\sqrt{2}} + \frac{1}{2}\right) \left(1 - \frac{1}{\sqrt{2}} + \frac{1}{2}\right)$$

$$\left(\frac{3}{2} + \frac{1}{\sqrt{2}}\right) \left(\frac{3}{2} - \frac{1}{\sqrt{2}}\right) = \frac{9}{4} - \frac{1}{2} = \frac{7}{4}$$
Ans: a
- If $2 \sin^2 \theta - 3 \sin \theta + 1 = 0$, θ being positive acute angle, then the value of θ are

a) 30°, 90° b) 60°, 55°
 c) 60°, 45° d) 45°, 50°

Sol: $2 \sin^2 \theta - 3 \sin \theta + 1 = 0$
 $2 \sin^2 \theta - 2 \sin \theta - \sin \theta + 1 = 0$
 $2 \sin \theta (\sin \theta - 1) - 1(\sin \theta - 1) = 0$
 $(\sin \theta - 1)(2 \sin \theta - 1) = 0$
 $\sin \theta = 1; \quad 2 \sin \theta = 1$
 $\sin \theta = \sin 90^\circ; \quad \sin \theta = \frac{1}{2} = \sin 30^\circ$
 $\theta = 90^\circ; \quad \theta = 30^\circ$
 $\theta = 30^\circ$ or 90° **Ans: a**
- The sum of $\frac{1}{x+y}$ and $\frac{1}{x-y}$ is

a) $\frac{2y}{x^2 - y^2}$ b) $\frac{2x}{x^2 - y^2}$
 c) $\frac{-2y}{x^2 - y^2}$ d) $\frac{2x}{y^2 - x^2}$

- Sol:** $\frac{1}{x+y} + \frac{1}{x-y} = \frac{x-y+x+y}{x^2 - y^2}$

$$= \frac{2x}{x^2 - y^2}$$
 Ans: b
- A man rows to a place 60 km distant and back in 13 hours 30 minutes. He finds that he can row 5 km with the stream in the same time as he can row 4 km against the stream. Find the rate of the stream.

a) 8 km/hr b) 1/2 km/hr
 c) 10 km/hr d) 1 km/hr

Sol: Ratio of upstream and downstream = 4 : 5
 Distance covered = 60 km
 Time taken = 13 hours 30 minutes

$$\frac{60}{4x} + \frac{60}{5x} = 13 \frac{1}{2}$$

$$\frac{15 + 12}{x} = \frac{27}{2}$$

$$x = 2$$
 So, the rate of stream = $\frac{5 \cdot 2 - 4 \cdot 2}{2} = 1$ km/hr **Ans: d**
 - The LCM of two numbers is 12 times their HCF. The sum of the HCF and LCM is 403. If one of the number is 93, then the other is -

a) 116 b) 124
 c) 112 d) 120

Sol: $\frac{\text{LCM}}{\text{HCF}} = 12$
 LCM = 12 HCF
 12 LCM + HCF = 403
 HCF = 31
 $N_1 \times N_2 = \text{HCF} \times \text{LCM}$
 $93 \times N_2 = 31 \times (31 \times 12)$
 $N_2 = 124$ **Ans: b**
 - On what sum of money will the difference between simple interest and compound interest for 2 years at 5% per annum be equal to 63?

a) 24,800 b) 25,200
 c) 25,500 d) 24,600

Sol: Difference of Interest = Principal $\times \left(\frac{\text{Rate}}{100}\right)^2$
 $63 = \text{Principal} \times \left(\frac{5}{100}\right)^2$
 Principal = 63 $\times 4 \times 100$
 Principal = 25200 **Ans:b**
 - If $\sin \theta + \cos \theta = \sqrt{2} \sin (90^\circ - \theta)$ then $\cot \theta$ is equal to:

a) $\sqrt{2} + 1$ b) 0
 c) $\sqrt{2} - 1$ d) $\sqrt{2}$

Sol: $\sin \theta + \cos \theta = \sqrt{2} \sin (90^\circ - \theta)$
 $\sin \theta + \cos \theta = \sqrt{2} \cos \theta$
 $\frac{\sin \theta}{\cos \theta} = \frac{1}{\sqrt{2} - 1}$
 $\cot \theta = \sqrt{2} + 1$ **Ans: a**
 - A train passes an electrical pole in 20 seconds and passes a platform 250m long in 45 seconds. Find the length of the train.

a) 300 m b) 250 m
 c) 400 m d) 200 m

Sol: Train can pass an electrical pole = 20sec
 Train can pass a platform = 45sec
 Let the speed of train = x m/s
 ATQ,
 $20 \times x = 45 \times x - 250$
 $45x - 20x = 250$
 $25x = 250$
 $x = 10$ m/s
 So, the length of train = 20 \times 10 = 200 m **Ans: d**
 - If $\frac{x}{3} + \frac{3}{x} = 1$, then the value of x^3 is

a) -27 b) 0 c) 27 d) 1

Sol: $\frac{x}{3} + \frac{3}{x} = 1$
 $x^2 + 9 = 3x$
 $x^2 - 3x + 9 = 0$
 Multiply by x + 3 on both sides
 $(x + 3)(x^2 - 3x + 9) = 0$
 $x^3 + 3^3 = 0$
 $x^3 = -27$ **Ans: a**
 - A man buys a TV at 16000. He pays 4000 at once and the rest after 15 months on which he is charged a simple interest at the rate of 12% per year. The total amount he pays for the TV is -

a) 17800 b) 16800
 c) 18200 d) 17200

Sol: Listed price = 16000
 Amount paid = 4000
 Amount due = (16000 - 4000) = 12000
 Rate of S.I. = 12%
 Time = 15 months = 1.25 years
 $\text{SI} = \frac{12000 \cdot 12 \cdot 1.25}{100} = 1800$
 Amount paid by man after 15 months = (12000 + 1800) = 13800
 Total amount = 13800 + 4000 = 17800 **Ans: a**
 - A and B can do a piece of work in 15 days. B and C can do the same work in 10 days and A and C can do the same in 12 days. Time taken by A, B and C together to do the Job is

a) 8 days b) 9 days
 c) 5 days d) 4 days

Sol: A + B = 15 C = 5
 B + C = 10 A = 6
 $\frac{C + A}{2(A + B + C)} = \frac{5}{15}$
 Let total units of work = 60
 Work done by A + B + C in a day = $\frac{15}{2}$
 So, time taken by A, B and C together to do the job = $\frac{60}{\frac{15}{2}} = 8$ days **Ans: a**