

Find the speed of the boat in still water



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MODEL QUESTIONS

Directions (Q.No.1-5): What will come in place of the question mark '?' in the following question?

- $2403 \div 3 + 15 \times (10 + 2) - 20 + 2 \times (25 - 3 \times 2) = ?$
a) 1009 b) 989
c) 999 d) 1019
e) 899
- $(3584 \div 32) - 11 = \sqrt{?}$
a) 10021 b) 12001
c) 10221 d) 10201
e) 10012
- $25 \times 3 - 7 \times \frac{1}{2} \text{ of } 16 - \{49 \div (5 + 2)\} = ?$
a) 12 b) 10
c) 19 d) 14 e) 13
- $\frac{22}{30} \cdot \frac{0.5}{0.4} \cdot \frac{10+6-2}{4+76-6} = ?$
a) 0.90 b) 1.20
c) 1.60 d) 2.21 e) 2.80
- $(8536 - \sqrt{2209}) \cdot 0.3 = ?$

- 2556.7 b) 2456.7
- 2546.7 d) 2645.7
- 2654.7

Directions (Q.No.6-10): What approximate value should come in place of the question mark (?) in the following question? (You are not expected to calculate the exact value)

- $121 \div (7/5 \times 3/8 \times 4/5) = ?$
a) 162 b) 288
c) 208 d) 298 e) 198
- $(71.77 \times 4.10) - (3.80 \times 67.10) = 98.91 - ?$
a) 89 b) 71
c) 81 d) 67 e) 79
- $(10.097)^2 + (3.98)^3 \times 5.05 = 20.95 \times ?$
a) 13 b) 20
c) 27 d) 42 e) 35
- $335.01 \times 24.99 \div 5.5 = ?$
a) 1490 b) 1520 c) 1420
d) 1590 e) 1400
- $25.05\% \text{ of } 2843.94 + 14.984\% \text{ of } 2399.987 = ?$
a) 954 b) 845 c) 1254
d) 1071 e) 1654

Directions (Q.No.11-15): In each of these questions, two



equations are given. You have to solve these equations and find out the values of x and y.

- I. $18x^2 + 18x + 4 = 0$
II. $12y^2 + 26y + 14 = 0$
a) $x < y$ b) $x > y$
c) $x \leq y$ d) $x \geq y$
e) $x = y$ or relationship can be established
- I. $2x^2 + 5x + 3 = 0$
II. $2y^2 - 7y + 6 = 0$
a) $x < y$ b) $x > y$
c) $x \leq y$ d) $x \geq y$
e) $x = y$ or relationship can be established
- I. $x^2 - 20x + 96 = 0$
II. $y^2 - 10y + 24 = 0$
a) $x < y$ b) $x > y$

- $x \leq y$ d) $x \geq y$
- $x = y$ or relationship can be established

- I. $x^2 - 324 = 0$
II. $y^2 - 36y + 323 = 0$
a) $x < y$ b) $x > y$
c) $x \leq y$ d) $x \geq y$
e) $x = y$ or relationship can be established
- I. $x^2 - x - 2 = 0$
II. $y^2 + y - 2 = 0$
a) $x < y$ b) $x > y$
c) $x \leq y$ d) $x \geq y$
e) $x = y$ or relationship can be established
- A boat sails downstream 50 km in 2 hours and maintains a speed of 10 km/h while travelling upstream. Find the speed of the boat in still water?
a) 17.5 km/h b) 18 km/h c) 40 km/h
d) 50 km/h e) 60 km/h
- A train moving at a speed of 72 km/h, passes a tunnel and a platform in 15 seconds and 12 seconds respectively. If the length of the platform is 50% of the length of the tunnel, find the length of the train.

- 180 meters
 - 210 meters
 - 160 meters d) 280 meters
 - None of these
- 3 Pipes A, B and C can fill a tank in 15 minutes, 45 minutes and 60 minutes respectively. In how much time they can fill the empty tank, if they are opened simultaneously?
a) $19\frac{1}{9}$ minutes b) $9\frac{9}{19}$ minutes
c) $11\frac{1}{9}$ minutes d) 80 minutes
e) None of these
 - An electric cable is bent in the form of circular form encloses an area of 154 cm. If the same cable is bent in the form of square, then calculate the area of region enclosed by that wire?
a) 105 b) 135
c) 140 d) 121 e) 131
 - Calculate probability of forming different words in which letters of word INDIAN can be arranged so that vowels always occur together
a) 3/10 b) 2/5
c) 1/6 d) 1/5 e) 1/30

Solutions

- c;** Now, the given expression:
 $\Rightarrow 2403 \div 3 + 15 \times 12 - 20 + 2 \times (25 - 3 \times 2) = ?$
 $\Rightarrow 801 + 15 \times 12 - 20 + 2 \times 19 = ?$
 $\Rightarrow 801 + 180 - 20 + 38 = ?$
 $\Rightarrow ? = 981 - 20 + 38$
 $\Rightarrow ? = 1019 - 20$
 $\Rightarrow ? = 999$
- d;** Given expression is,
 $(3584 \div 32) - 11 = \sqrt{?}$
 $101 = \sqrt{?}$
 $\Rightarrow ? = 101 \times 101$
 $\therefore ? = 10201$
- a;** $75 - \frac{7 \cdot 16}{2} - \{49 \cdot 7\}$
 $\Rightarrow 75 - 56 - 7 = ?$
 $\Rightarrow 19 - 7 = ?$
 $\Rightarrow ? = 12$
- b;** $\frac{22}{30} \cdot \frac{0.5}{0.4} \cdot \frac{10+6-2}{4+76-6} = ?$
Apply BODMAS rule in numerator and denominator
 $\Rightarrow \frac{44}{75} \cdot \frac{10+4}{4+70} = ?$
 $\Rightarrow \frac{440+4}{300+70} = ? \Rightarrow \frac{444}{370} = ?$
 $\therefore ? = 1.2$
- c;** Given expression is,
 $(8536 - \sqrt{2209}) \cdot 0.3 = ?$
 $\Rightarrow ? = (8536 - 47) \times 0.3$
 $\Rightarrow ? = (8489) \times 0.3$
 $\therefore ? = 2546.7$
- b;** Given expression is,
 $121 \left(\frac{7}{5} \cdot \frac{3}{8} \cdot \frac{4}{5} \right) = ?$
 $\Rightarrow ? = 121 \div (21/50)$
 $\Rightarrow ? = 121 \times 50/21$

- $\Rightarrow ? = \frac{6050}{21}$
 $\therefore ? = 288.09 \approx 288$
- e;**
 $\Rightarrow (71.77 \times 4.10) - (3.80 \times 67.10) = 98.91 - ?$
 $\Rightarrow (72 \times 4) - (4 \times 67) = 99 - ?$
 $\Rightarrow 288 - 268 = 99 - ?$
 $\Rightarrow 20 = 99 - ? \Rightarrow ? = 99 - 20$
 $\Rightarrow ? \approx 79$
- b;** $(10.097)^2 + (3.98)^3 \times 5.05 = 20.95 \times ?$
Approximating the value to the nearest integer:
 $10^2 + 4^3 \times 5 = 21 \times (?)$
 $100 + 64 \times 5 = 21 \times (?)$
 $100 + 320 = 21 \times (?)$
 $420 = 21 \times (?)$
 $? = \frac{420}{21} \Rightarrow ? = 20$
- b;** $335.01 \times 24.99 \div 5.5 = ?$
This can be approximated as
 $? = 335 \cdot \frac{25}{5.5} = 1522 \approx 1520$
- d;** $25.05\% \text{ of } 2843.94 + 14.984\% \text{ of } 2399.987 = ?$
Approximating the value to the nearest integer:
 $25\% \times 2844 + 15\% \times 2400 = ?$
 $\left(\frac{25}{100} \right) 2844 + \left(\frac{15}{100} \right) 2400 = ?$
 $711 + 360 = ? \Rightarrow ? = 1071$
- b;** I. $18x^2 + 18x + 4 = 0$
 $\Rightarrow 18x^2 + 12x + 6x + 4 = 0$
 $\Rightarrow 6x(3x + 2) + 2(3x + 2) = 0$
 $\Rightarrow (6x + 2)(3x + 2) = 0$
Then, $x = (-2/6)$ or $x = (-2/3)$
II. $12y^2 + 26y + 14 = 0$
 $\Rightarrow 12y^2 + 12y + 14y + 14 = 0$
 $\Rightarrow 12y(y + 1) + 14(y + 1) = 0$
 $\Rightarrow (y + 1)(12y + 14) = 0$

- Then, $y = (-1)$ or $y = (-14/12)$
 $\therefore x > y$
- a;** First equation:
 $2x^2 + 5x + 3 = 0$
 $\Rightarrow 2x^2 + 2x + 3x + 3 = 0$
 $\Rightarrow 2x(x + 1) + 3(x + 1) = 0$
 $\Rightarrow x = -1$ or $-3/2$
Second Equation:
 $2y^2 - 7y + 6 = 0$
 $\Rightarrow 2y^2 - 4y - 3y + 6 = 0$
 $\Rightarrow 2y(2y - 4) - 3(2y - 4) = 0$
 $\Rightarrow y = 2$ or $3/2$
 \Rightarrow When $x = -1, y > x$
 \Rightarrow When $x = -3/2, y > x$
 $\therefore y > x$
 - b;** I. $x^2 - 20x + 96 = 0$
 $\Rightarrow x^2 - 12x - 8x + 96 = 0$
 $\Rightarrow x(x - 12) - 8x - 12 = 0$
 $\Rightarrow (x - 12)(x - 8) = 0$
Then, $x = (12)$ or $x = (8)$
II. $y^2 - 10y + 24 = 0$
 $\Rightarrow y^2 - 6y - 4y + 24 = 0$
 $\Rightarrow y(y - 6) - 4(y - 6) = 0$
 $\Rightarrow (y - 4)(y - 6) = 0$
Then, $y = (6)$ or $y = (4)$
 \therefore So, we can find that $x > y$.
 - e;** I. $x^2 - 324 = 0$
 $\Rightarrow x^2 = 324$
 $\Rightarrow x = 18$ or $x = -18$
II. $y^2 - 36y + 323 = 0$
 $\Rightarrow y^2 - 17y - 19y + 323 = 0$
 $\Rightarrow y(y - 17) - 19(y - 17) = 0$
 $\Rightarrow (y - 17)(y - 19) = 0$
 $\Rightarrow y = 17$ or $y = 19$
 \therefore The relationship cannot be established.
 - e;** I. $x^2 - x - 2 = 0$
 $\Rightarrow x^2 - 2x + x - 2 = 0$
 $\Rightarrow x(x - 2) + 1(x - 2) = 0$
 $\Rightarrow (x + 1)(x - 2) = 0$
Thus, $x = -1$ or 2

- II. $y^2 + y - 2 = 0$
 $\Rightarrow y^2 + 2y - y - 2 = 0$
 $\Rightarrow y(y + 2) - 17 + 2 = 0$
 $\Rightarrow (y + 2)(1 - 1) = 0$
Thus, $y = -2$ or 1
 \therefore We can observe that no relationship could be established between x and y
- a;** Downstream speed of boat = $50/2 = 25$ km/h
Upstream speed = 10 km/h
Speed of boat in still water = (Downstream speed + Upstream speed)/2
 \therefore Speed of boat in still water = $\frac{25+10}{2} = \frac{35}{2} = 17.5$ km/h
- a;** Let the length of the train be X meters, and the lengths of the tunnel and platform be 2p and P meters respectively,
Speed of the train = 72 km/h = $72 \cdot \frac{5}{18}$ m/s = 20m/s
When the train passes the tunnel, Distance travelled by the train while passing the tunnel = X + 2P Meters,
Distance = speed time,
 $= X + 2P = 20 \times 15 = 300$ ----(1)
When the train passes the platform Distance travelled by the train while passing the Platform = X + P Meters,
Distance = speed \times time,
 $= X + P = 20 \times 12 = 240$ meters ----(2)
Solving equations (1),(2) we get, P = 60 mtrs and X = 180 mtrs
- b;** We know that:
 \Rightarrow A's 1 minute work = 1/15,

- \Rightarrow B's 1 minute work = 1/45,
 \Rightarrow C's 1 minute work = 1/60,
 \therefore (A + B + C)'s 1 minute work = $\frac{1}{15} + \frac{1}{45} + \frac{1}{60} \Rightarrow \frac{12+4+3}{180} \Rightarrow \frac{19}{180}$
Hence total time = $\frac{180}{19}$ minute = $9\frac{9}{19}$ minute
- d;** According to the condition given in the problem,
Area of circle = 154
 $\Rightarrow 22/7 \times r^2 = 154$
 $\Rightarrow r^2 = 49 \Rightarrow r = 7$
The wire is bent in the form of square, then
Length of wire = perimeter of circle
Length of wire = $2\pi r$
 $= 2\pi \times 7 = 44$ cm = perimeter of square
 $\Rightarrow 4a =$ perimeter of square (assuming a = side of square)
 $\Rightarrow 4a = 44 \Rightarrow a = 11$
Area of square = $a^2 = 11^2 = 121$ cm²
 \Rightarrow Area of square is 121 cm²
- d;** Vowels = I, I, and A
We need to consider that all I, I, A come together thus consider them as a single group
= Number of words that can be formed = $\frac{4!}{2! \cdot 2!} = 36$
Total number of words that can be formed = $\frac{61}{(2! \cdot 2!)} = 180$
 \therefore required probability = (total number of words when vowels occur together) / (total number of words formed)
 $= \frac{36}{180} = \frac{1}{5}$