

Mathematics Mega Quiz for RRB NTPC (Solutions)

S1. Ans.(c)

Sol.

	days		efficiency
Amit	60	180	3
Ankit	90		2

Required time = $\frac{180}{3+2} = 36$ days

S2. Ans.(d)

Sol. Let $x_1 = -5, x_2 = 4, x_3 = 4$

$y_1 = 7, y_2 = -1, y_3 = -1$

Area of triangle formed by given points

$$= \frac{1}{2} [x_1(y_2 - y_3) + x_2(y_3 - y_1) + x_3(y_1 - y_2)]$$

$$= \frac{1}{2} [(-5)\{-1 - (-1)\} + (4)(-1 - 7) + 4(7 - (-1))]$$

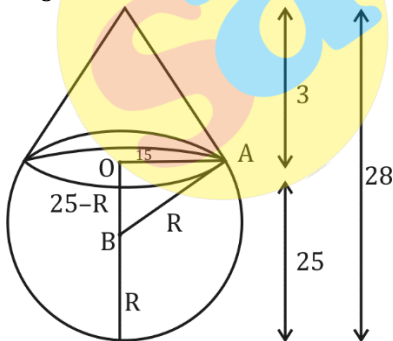
$$= 0$$

Hence the example ten points are not forming any triangle, rather they are collinear.

S3. Ans.(a)

Sol. Volume of cone = $\frac{1}{3}\pi r^2 h = 225\pi$

$$\Rightarrow \frac{1}{3} \times r^2 \times 3 = 225 \Rightarrow r = 15$$



In ΔAOB

$$R^2 = (25 - R)^2 + 15^2$$

$$R^2 = 625 - 50R + R^2 + 225$$

$$50R = 850$$

$$R = 17$$

$$\text{Required Volume} = \frac{4}{3}\pi r^3 = \frac{4}{3}\pi 17^3 = \frac{19652}{3}\pi$$



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S4. Ans.(b)**Sol.** When we need remainder put the value of divider and x solve the equation

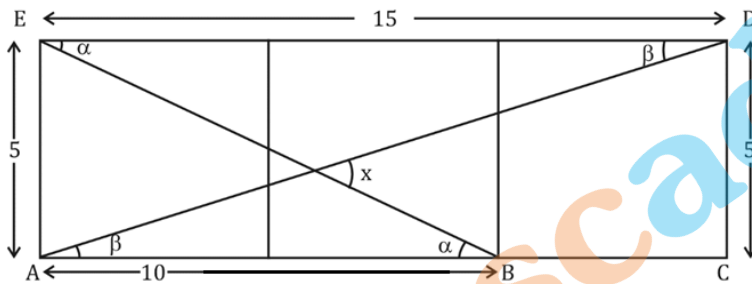
$$gx = x - \frac{1}{3} \Rightarrow x - \frac{1}{3} = 0, x = \frac{1}{3}$$

$$f(x) = 27x^3 - 45x^2 + 9x + 12$$

$$= 27 \times \frac{1}{27} - 45 \times \frac{1}{9} + 9 \times \frac{1}{3} + 12$$

$$= 1 - 5 + 3 + 12$$

$$= 11$$

S5. Ans.(d)**Sol.** Distance travelled in 12 minutes = $12 \times 10/60 = 2$ kmTotal time to each station = $\frac{5}{10} \times 60 = 30$ minutesRemaining time = $30 - 12 = 18$ minutesRaman's new speed = $\frac{2+5}{18/60} = \frac{70}{3} = 23\frac{1}{3}$ km/hr**S6. Ans.(c)****Sol.**

$$x^\circ = \beta^\circ + \alpha^\circ$$

In $\triangle ADE$

$$\tan \beta = \frac{5}{15} = \frac{1}{3}$$

In $\triangle ABE$

$$\tan \alpha = \frac{5}{10} = \frac{1}{2}$$

$$\tan(\beta^\circ + \alpha^\circ) = \frac{\tan \beta^\circ + \tan \alpha^\circ}{1 - \tan \beta \cdot \tan \alpha}$$

$$\tan(x^\circ) = \frac{\frac{1}{3} + \frac{1}{2}}{1 - \frac{1}{3} \times \frac{1}{2}} = \frac{\frac{5}{6}}{\frac{5}{6}} = 1$$

$$\tan x^\circ = 1 = 45^\circ$$

S7. Ans.(a)**Sol.** Ratio of CP : MP $\Rightarrow 100 - \text{discount} : 100 + \text{profit}$ $\Rightarrow 75 : 120$

Let cost of production = 75

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And market price = 120

$$\text{New production cost} = 75 \times \frac{120}{100} = 90$$

$$\text{New list price} = 120 \times \frac{120}{100} = 144$$

$$\text{Selling price} = 144 \times \frac{75}{100} = 108$$

$$\text{Profit percent} = \frac{108 - 90}{90} \times 100 = 20\%$$

S8. Ans.(d)

Sol. Let the roots of equation $x^2 - 12x + 35$

$$\alpha \& \beta = 7, 5$$

Let the roots of equation $x^2 + ax - 21 = 0$

Are α & α

$$\text{Multiply of roots (} \alpha \times \alpha) = -21 = 7 \times 3 \times (-1)$$

Common root = 7 and second root = -3

$$\text{Required sum of roots} = (7 - 3) = 4$$

S9. Ans.(b)

Sol. Let quantity of milk = n liter

And water = y liter

ATQ,

$$8n \times \frac{180}{100} = 9(n + y)$$

$$8n = 5n + 5y$$

$$3n = 5y$$

$$\frac{n}{y} = \frac{5}{3}$$

S10. Ans.(a)

$$\text{Sol. } 3^{15} + 3^{16} + 3^{17} + 3^{18} + 3^{19}$$

$$= 3^{15}(1 + 3 + 9 + 27 + 81)$$

$$= 3^{15} \times 121$$

$$= 3^{15} \times 11 \times 11$$

S11. Ans.(b)

$$\text{Sol. Ayesha's 1 day's work} = \frac{1}{16}. \text{ Amita's 1 day's work} = \frac{1}{8}.$$

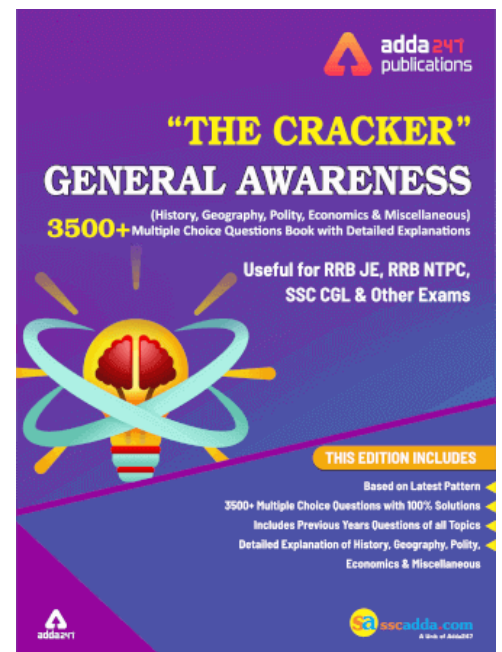
$$(\text{Ayesha} + \text{Amita})'s \text{ 1 day's work} = \left(\frac{1}{16} + \frac{1}{8}\right) = \frac{3}{16}.$$

$$\therefore \text{Both together can complete the work in } \frac{16}{3} = 5\frac{1}{3} \text{ days.}$$

S12. Ans.(a)

Sol. Required average

$$= \frac{\left(\frac{1}{4} + \frac{1}{5} + \frac{1}{6} + \frac{1}{10} + \frac{1}{12}\right)}{5} = \left(\frac{48}{60} \times \frac{1}{5}\right) = \frac{4}{25} = 0.16$$



S13. Ans.(a)

Sol. A's 1 day's work = $\frac{1}{18}$ and B's 1 day's work = $\frac{1}{9}$.

$$\therefore (A + B)'s\ 1\ day's\ work = \left(\frac{1}{18} + \frac{1}{9}\right) = \frac{1}{6}.$$

S14. Ans.(d)

Sol. (A + B)'s 1 day's work = $\left(\frac{1}{6} + \frac{1}{12}\right) = \frac{3}{12} = \frac{1}{4}$.

\therefore Both A and B together can complete the work in 4 days.

$$\text{Part of the work done by A} = \left(\frac{1}{6} \times 4\right) = \frac{2}{3}.$$

S15. Ans.(b)

Sol. A's share : B's share = Ratio of their 1 day's work

$$= \frac{1}{8} : \frac{1}{12} = 3 : 2$$

$$\therefore B's\ share = Rs. \left(200 \times \frac{2}{5}\right) = Rs. 80.$$

S16. Ans.(e)

Sol. A's 1 day's work = $\frac{1}{T+3}$;

B's 1 day's work = $\frac{1}{T+12}$.

(A + B)'s 1 day's work = $\frac{1}{T}$.

$$\therefore \frac{1}{T+3} + \frac{1}{T+12} = \frac{1}{T} \Rightarrow \frac{2T+15}{(T+3)(T+12)} = \frac{1}{T}$$

$$\Rightarrow 2T^2 + 15T = T^2 + 15T + 36$$

$$\Rightarrow T^2 = 36 \Rightarrow T = 6$$

S17. Ans.(c)

Sol. 1 day's work of the three persons = $\left(\frac{1}{15} + \frac{1}{20} + \frac{1}{25}\right) = \frac{47}{300}$.

So, all the three together will complete the work in $\frac{300}{47} \approx 6.4$ days.

S18. Ans.(b)

Sol. Amit's 1 day's work = $\left(\frac{1}{4} - \frac{1}{6}\right) = \frac{1}{12}$

\therefore Amit alone can plough the field in 12 days.

S19. Ans.(c)

Sol. (X + Y)'s 1 day's work = $\left(\frac{1}{16} + \frac{1}{16}\right) = \frac{2}{16} = \frac{1}{8}$.

Z's 1 day's work = (X + Y + Z)'s 1 day's work - (X + Y)'s 1 day's work = $\frac{1}{6} - \frac{1}{8} = \frac{1}{24}$.

\therefore Z alone can finish the work in 24 days.

S20. Ans.(c)

Sol. Whole work will be done by A in $(5 \times 3) = 15$ days.

Whole work will be done by B in $(10 \times \frac{5}{2}) = 25$ days.

A's 1 day's work = $\frac{1}{15}$; B's 1 day's work = $\frac{1}{25}$.

$(A + B)$'s 1 day's work = $(\frac{1}{15} + \frac{1}{25}) = \frac{16}{150} = \frac{8}{75}$.

\therefore A and B together can complete the work in $\frac{75}{8} = 9\frac{3}{8}$ days.

S21. Ans.(a)

Sol.

SI = $\frac{1}{2}$ of CI

P = 1050

S22. Ans.(d)

Sol. $2x + 3(5 - 2x) > 2 - 3x$

$\Rightarrow x < 13$

And,

$2 - 3x < 2x$

From given options only (d) satisfy both conditions.

S23. Ans.(d)

Sol. $(x + y)^2 = 144$

$x^2 + y^2 + 2xy = 144$

$x^2 + y^2 + 2 \times 32 = 144$

$x^2 + y^2 = 80$

S24. Ans.(a)

Sol. By simple division, only 51579 is divisible by 99.

S25. Ans.(a)

Sol. General formula

$\cos A + \cos B = 2 \cos$

S26. Ans.(d)

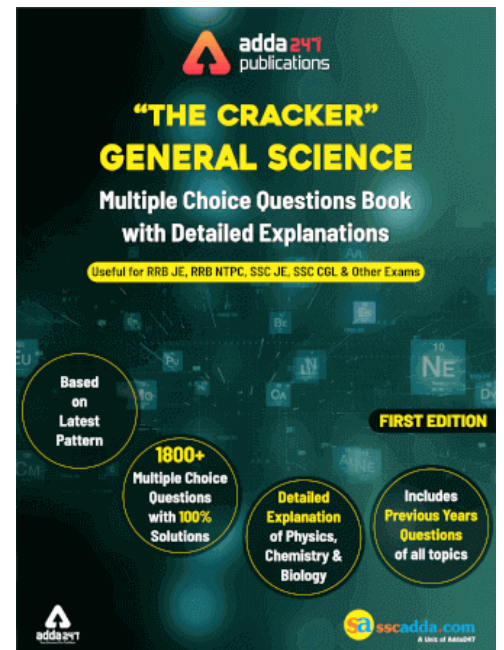
Sol. Length of arc

= 11 cm

S27. Ans.(d)

Sol. ATQ,

\Rightarrow Length of wire = 972 metres



S28. Ans.(c)

$$\begin{aligned}\text{Sol. } & (4x + 3)^2 (3x - 5) - (4x^3 - 12x^2 + 9x - 20) \\ \Rightarrow & (16x^2 + 9 + 24x) (3x - 5) - (4x^3 - 12x^2 + 9x - 20) \\ \Rightarrow & 44x^3 + 4x^2 - 102x - 25\end{aligned}$$

S29. Ans.(a)

Sol. Let the no. be x,


ATQ,

$$\Rightarrow x = 1$$

S30. Ans.(a)

$$\begin{aligned}\text{Sol. } & \text{Cosec}(-150^\circ) = \text{cosec}(360^\circ - 150^\circ) \\ & = \text{cosec}210^\circ \\ & = -2\end{aligned}$$

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