

Mathematics Mega Quiz for RRB NTPC (Solutions)

S1. Ans.(a)

Sol.

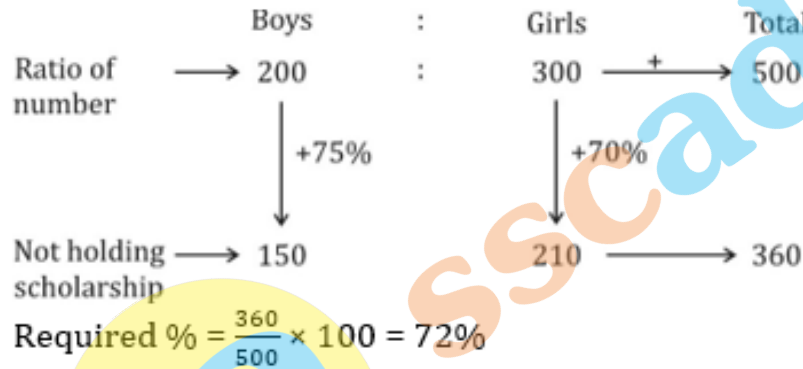
$$10\% = \frac{1}{10}$$

Ankita	Eakta
9	10
$\downarrow \times 9$	$\downarrow \times 9$
81	90

Hence, marks obtained by Eakta = 90

S2. Ans.(a)

Sol.

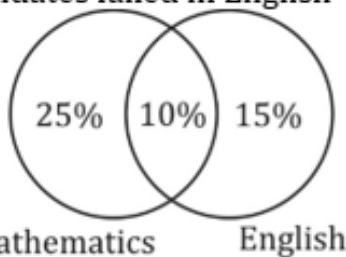


S3. Ans.(a)

Sol.

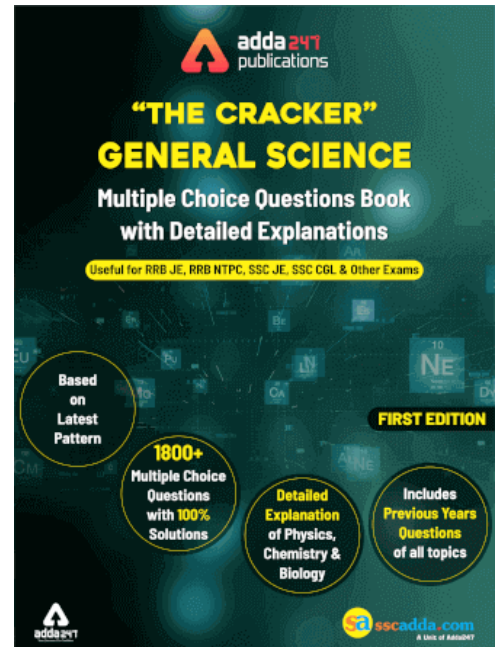
Candidates failed in Mathematics = 35%

Candidates failed in English = 25%



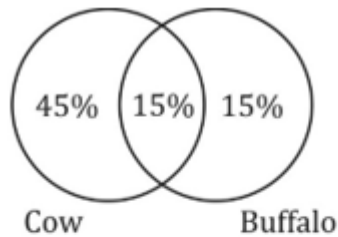
Venn diagram of failed students

Hence percentage of passed candidates in both Subjects = $100 - (25 + 10 + 15) = 50\%$



S4. Ans.(b)

Sol.



Venn diagram of families which have buffalo and cow.

Required families which do not have a cow or a buffalo

$$= 100 - (45 + 15 + 15)$$

$$= 25\%$$

$$\text{Required number} = \frac{96}{100} \times 25 = 24$$

S5. Ans.(c)

Sol.

Let number of boys = 300

Number of girls = 200



$$\text{Required \%} = \frac{390}{(300 + 200)} \times 100$$
$$= 78\%$$

S6. Ans.(d)

Sol.

Let the number of boys = 400

Let the number of girls = 100

Total number of students who do not get scholarship

$$= 400 \times \frac{25}{100} + 100 \times \frac{30}{100}$$

$$= 100 + 30 = 130$$

$$\text{Required percentage} = \frac{130}{500} \times 100 = 26\%$$

S7. Ans.(c)

Sol.

$$\text{decrease in area} = \frac{x^2}{100} \% = \frac{(10)^2}{100} = 1\%$$

S8. Ans.(b)**Sol.**

$$\% \text{ change} = \frac{R}{100 + R} \times 100\%$$

$$\text{Required answer} = \frac{50}{(100 + 50)} = \frac{1}{3}$$

S9. Ans.(a)**Sol.**

Due to reduction, he will save

$$= \frac{240 \times 25}{100} = \text{Rs. } 60$$

$$\text{New price of rice/kg.} = \frac{60}{2} = \text{Rs. } 30$$

S10. Ans.(b)**Sol.**

Required reduction in consumption

$$= \frac{15}{(100 + 15)} \times 100 = \frac{15}{115} \times 100$$

$$= \frac{300}{23} = 13 \frac{1}{23}\%$$

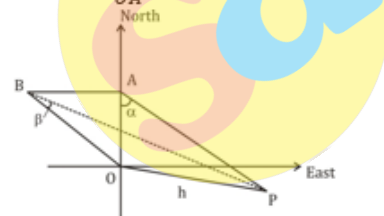
S11. Ans.(a)**Sol.**Profit ratio = Investment \times time

$$X : Y = 80,000 \times 2 : 100,000 \times \frac{3}{2}$$

$$= 16 : 15$$

S12. Ans.(a)**Sol.** $\Delta OAP,$

$$\tan \alpha = \frac{h}{OA} \dots\dots(i)$$

 $\Delta OBP,$

$$\tan \beta = \frac{h}{OB} \dots\dots(ii)$$

 $\Delta OAB,$

$$OB^2 = OA^2 + AB^2$$

$$AB^2 = h^2 \cot^2 \beta - h^2 \cot^2 \alpha$$

$$AB^2 = h^2 \cdot [\text{cosec}^2 \beta - \text{cosec}^2 \alpha]$$

$$AB^2 = h^2 \cdot \left[\frac{\sin^2 \alpha - \sin^2 \beta}{\sin^2 \alpha \cdot \sin^2 \beta} \right]$$

$$h = \frac{AB \cdot \sin \alpha \cdot \sin \beta}{\sqrt{\sin^2 \alpha - \sin^2 \beta}}$$

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S13. Ans.(c)

Sol.

Sum of all one digit & two digit numbers

$$1 + 2 + 3 + \dots + 99.$$

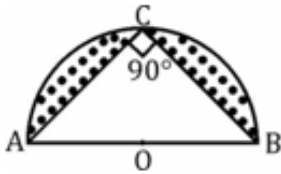
$$= \frac{n(n+1)}{2} = \frac{99 \times 100}{2} = 99 \times 50$$

$$\text{Avg} = \frac{99 \times 50}{99} = 50$$

S14. Ans.(b)

Sol.

$$\angle ACB = 90^\circ$$



$$AC = CB = x \text{ cm}$$

$$AB = 14 \text{ cm}$$

From $\triangle ABC$

$$x^2 + x^2 = 14^2$$

$$x = 7\sqrt{2} \text{ cm}$$

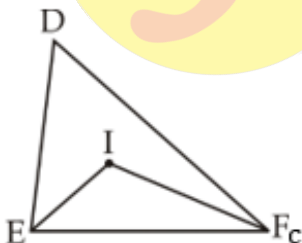
$$\therefore \text{Area of } \triangle ABC = \frac{1}{2} AC \cdot BC = \frac{1}{2} \cdot 7\sqrt{2} \cdot 7\sqrt{2} = 49 \text{ sq. cm.}$$

$$\text{Area of semi-circle} = \frac{\pi r^2}{2} = \frac{22}{7 \times 2} \times 7 \times 7 = 77 \text{ sq. cm.}$$

$$\text{Area of shaded region} = 77 - 49 = 28 \text{ sq. cm}$$

S15. Ans.(c)

Sol.



$$\angle EIF = 90^\circ + \frac{1}{2} \angle EDF$$

$$= 90 + \frac{1}{2} \times 110$$

$$= 145^\circ$$

S16. Ans.(a)

Sol.

$$\text{We have} = \frac{1}{3.197} = 0.3127$$

then,

$$\frac{1}{0.0003197} = \frac{1}{3.197} \times 10000$$

$$= 0.3127 \times 10000$$

$$= 3127$$

S17. Ans.(a)

Sol.

Let cp of Cow = x

Cp of Goat = 2500 - x

According to question

$$x \times 1.2 = (2500 - x) \times 1.3$$

$$2.5x = 2500 \times 1.3$$

$$x = 1300$$

$$\text{CP of goat} = 2500 - 1300 = 1200 \text{ Rs.}$$

S18. Ans.(c)

Sol.

Let take CP = 100 and successive discount 10, 15 and 20%

$$\text{So SP} = 100 \times \frac{90}{100} \times \frac{85}{100} \times \frac{80}{100}$$

$$\text{SP} = \frac{18 \times 17}{5} = 61.2$$

$$\text{Hence discount} = 100 - 61.2 = 38.8\%$$

S19. Ans.(b)

Sol.

$$4x + 3y = 0 \quad \& \quad 7x + 5y = 0$$

x	0	-
		3
y	0	4

&

x	0	5
y	0	-
		7

Clearly, given lines intersect only at one point i.e. origin.

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S20. Ans.(c)

Sol.



In cyclic quadrilateral $\square PRQS$

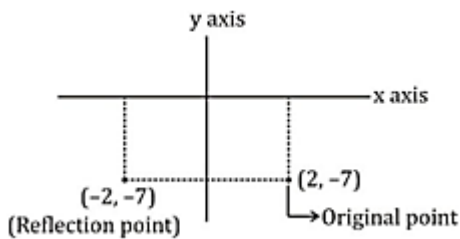
$$\angle PRQ + \angle PTQ = 180^\circ$$

$$\angle PTQ = 130^\circ$$

S21. Ans.(b)

Sol.

In reflection to y-axis, only the x-coordinate's sign changes.



S22. Ans.(c)

Sol.

Let the price of the article be 100

$$\therefore \text{Reduced price} = 97$$

% increase to restore to its original

$$\text{Price} = \frac{100 - 97}{97} \times 100$$

$$= 3.09\%$$

S23. Ans.(c)

Sol.

$$CI = P \left[\left(1 + \frac{R}{100} \right)^t - 1 \right]$$

$$= 16000 \left[\left(1 + \frac{10}{100} \right)^2 - 1 \right]$$

$$= \text{Rs. } 3360$$

ATQ,

$$SI = \frac{1}{2} \times \text{Rs. } 3360 = 1680$$

$$1680 = \frac{P \times 8 \times 3}{100}$$

$$P = \text{Rs. } 7000$$

S24. Ans.(a)

Sol.

$$\frac{144 a^3 b^3 c^3}{24 b^2 c}$$

$$= 6a^3bc^2$$

S25. Ans.(b)

Sol.

$$X = \cos^4 A - \sin^4 A$$

$$= (\cos^2 A + \sin^2 A) (\cos^2 A - \sin^2 A)$$

$$= 1 (\cos^2 A - \sin^2 A)$$

$$= \cos^2 A - (1 - \cos^2 A)$$

$$= 2 \cos^2 A - 1$$

S26. Ans.(b)

Sol.

Total amount to be paid without discount

$$= 1600 \times 23 + 1200 \times 10 = 48,800$$

ATQ,

10 children can get free ticket with 20 Adult,

so all the children will get free tickets

$$\therefore \text{Total discount} = 1200 \times 10 = \text{Rs. } 12000$$

$$\% \text{ Discount} = \frac{12000}{48800} \times 100$$

$$= 24.59\%$$

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S27. Ans.(d)

Sol.

$$\begin{aligned}\text{Total curved S. Area} &= 2\pi rh + \pi r\ell \\ &= 2 \times \frac{22}{7} \times 10 \times 5 + \frac{22}{7} \times 10 \times 15 \\ &= \frac{5500}{7}\end{aligned}$$

As 20% extra is required

∴ Total canvas Required

$$\begin{aligned}&= \frac{5500}{7} \times \frac{120}{100} \\ &= 942.8 \text{ m}^2\end{aligned}$$

S28. Ans.(c)

Sol. ATQ,

Distance travel by Goods train in

11 hours is equal to the

distance travel by other train in 18 hours.

$$\therefore 11 \times 54 = 18 \times x$$

$$\Rightarrow x = 33 \text{ km/hr}$$

S29. Ans.(b)

Sol. ATQ,

$$\frac{112b^3x^2a^4z^3}{7a^3b^2z} = 16bx^2az^2$$

S30. Ans.(c)

Sol.

$$\text{Slope}(m) = 3/4$$

Point = (0, 5)

$$\text{Eq}^n \text{ of line} \Rightarrow (y - y_1) = m(x - x_1)$$

$$\Rightarrow (y - 5) = \frac{3}{4}(x - 0)$$

$$\Rightarrow 4y - 20 = 3x$$

$$\Rightarrow 3x - 4y = -20$$

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