
Bipin Nambiar
(SBI PO 2018)
Shiraz Khan
(SBI Clerk 2018)
Kuldeep Yadav
(SBI PO 2018)
Rajat Saxena
(IBPS Clerk 2018)
Anupam Tyagi
(IBPS PO 2018)
FRIENDS!
WE USED TESTZONE
AND CRACKED BANK EXAMS
बैंक परीक्षाओ के लिए निश्चित
रूप से सर्वश्रेष्ट मॉक
टेस्ट सीरीज
IT'S YOUR TURN NOW
TAKE A FREE MOCK TEST
Smartkeeda
The Question Bank

Mixed Math Questions for SSC Exams

PDF Set - 2

Directions: Read the following questions carefully and choose the right answer.

1. A right circular cone is cut by 3 planes parallel to its base. The planes cut the altitude of the cone in four equal parts. Find out the ratio of volume of each part.

A. 1 : 7 : 19 : 37

B. 1 : 8 : 27 : 64

C. 1 : 9 : 16 : 25

D. 1 : 2 : 3 : 4

2. A merchant uses a weight of 125 gram instead of 100 gram while buying an article. He used 80 gram instead of 100 gram while selling. He marked up the price by 20% and then offers 20% discount. Find the overall profit or loss percentage.

A. 20%

B. 30%

C. 40%

D. 50%

3. $\boldsymbol{if\ x = \frac{\sqrt{\sqrt{5}+1}}{\sqrt{\sqrt{5}-1}}}$,

$\boldsymbol{then\ the\ value\ of\ 5x2 - 5x - 1\ will\ be.}$

A. 0

B. 3

C. 4

D. 5

4. The ratio of the work done by 50 women to the work done by 25 men, in the same time is 4 : 3. If 18 women and 12 men can finish a piece of work in 5 days, then how many women can finish the same work in 20/3 days?

A. 18

B. 27

C. 33

D. 30

5. Two varieties of sugar are mixed in the ratio 3 : 2 and sold for ₹80 per kg to make a profit of 25%. If the cost of the variety of sugar whose quantity is more is ₹40 per kg, what is the cost of the other variety of sugar?

A. Rs. 50

B. Rs. 48

C. Rs. 75

D. Rs. 100

6. $\boldsymbol{if\ \sin 21^\circ - \sin 69^\circ\ is\ equal\ to.}$

$A.\ \frac{x^2}{y\sqrt{(y^2-x^2)}}$ $B.\ \frac{y^2}{y\sqrt{(y^2-x^2)}}$

$C.\ \frac{x^2}{y\sqrt{(x^2-x^2)}}$ $D.\ \frac{y}{x\sqrt{(x^2-x^2)}}$

7. PQRSTU is a regular hexagon whose diagonals meet at point at O. Find the ratio of area of quadrilateral PQOU to the area of hexagon PQRSTU.

A. 1 : 2 B. 1 : 3

C. 1 : 4 D. 1 : 6

8. A boat goes to a place and return back in 45 hours. It can go 10 km upstream in 1 hour and 20 km downstream in the same time. Find the total distance covered by the boat in the whole journey.

A. 200 km B. 600 km

C. 300 km D. 250 km

9. In ΔABC, ∠A = ∠B = 60°, AC = √34 cm. The lines AD and BD intersect at D with ∠D = 90°. If DB = 3 cm, then the length of AD is:

A. 16 B. 5

C. 4 D. 25

10. $\boldsymbol{Find\ the\ value\ of}$

$$\left(\frac{\sin 35^\circ}{\cos 55^\circ}\right)^2 + \left(\frac{\cos 55^\circ}{\sin 35^\circ}\right)^2 - 2\cos 30^\circ .$$

A. 0 B. 1 – √3

C. 2 – √3 D. 3

11. If $\sin \alpha + (\text{Sin } \alpha)^2 = 1$,

then the value of

$(\cos \alpha)^{12} + 3(\cos \alpha)^{10} + 3(\cos \alpha)^8 + (\cos \alpha)^6 - 1$ is

A. 0

B. 1

C. -1

D. 2

12. One flies a kite with a thread 180 meter long. If the thread of the kite makes an angle of 60° with the horizontal line, then the height of the kite from the ground (assuming thread to be in straight line) is

A. 50 meter

B. $90\sqrt{3}\ meter$

C. $75\sqrt{3}\ meter$

D. 90 meter

13. If a + b + c = 0 then the value of

$$\frac{a^2}{a^2 - bc} + \frac{b^2}{b^2 - ca} + \frac{c^2}{c^2 - ab}$$ **is:**

A. 4

B. 2

C. 1

D. 0

14. Three cubes of metal whose edges are in the ratio 3 : 4 : 5, are melted and one cube is formed. If the diagonal of the cube is 12√3 cm, then find the edge of the largest among three cubes.

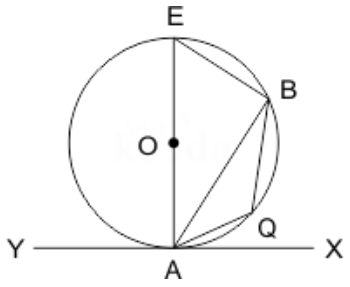
A. 15 cm

B. 12.5 cm

C. 17.5 cm

D. 10 cm

15. In the figure given below, YAX is a tangent to the circle with center O. If ∠BAX = 70° and ∠BAQ = 40°, then what is ∠ABQ equal to



A. 20°

B. 30°

C. 35°

D. 40°

16. In an examination the marks of Anil was 28.57% less than that of Barun's marks and Barun's marks was 11.11% less than that of Chandan's marks. If the difference between the marks obtained by Anil and Chandan is 80.5 then find the marks obtained by Barun?

A. 196

B. 225.5

C. 140

D. 184

17. Rohan borrowed some money at 10% per annum for first 6 years, 5% per annum for next three years 13% per annum for the period after 9 years. If the interest paid by him at the end of 12 year is Rs 22800, then find how much did he borrowed.

A. 30000

B. 25000

C. 20000

D. 35000

18. A shop of electronic goods remains closed on Monday. The average sales per day for remaining six days of a week is Rs. 13240 & the average sale of Tuesday to Saturday is Rs. 13924. The sales on Sunday is:

A. Rs. 2379

B. Rs. 201888

C. Rs. 21704

D. None of these

19. A pump can be used for filling as well emptying a tank. The capacity of the tank is 2400 m^3. The emptying tank capacity is 10 m^3 per minute higher than its filling capacity and the pump needs 8 minutes lesser to empty the tank than it needs to fill it. What is the filling capacity of the pump?

A. 60 m^3/min

B $70m^3/min$

C. 50 m^3/min

D. None of these

20. The length of the sides of a triangle are 9 cm, 12 cm and 15 cm. Find the length of the perpendicular from the opposite vertex to the side whose length is 15 cm.

A. 4.8 cm

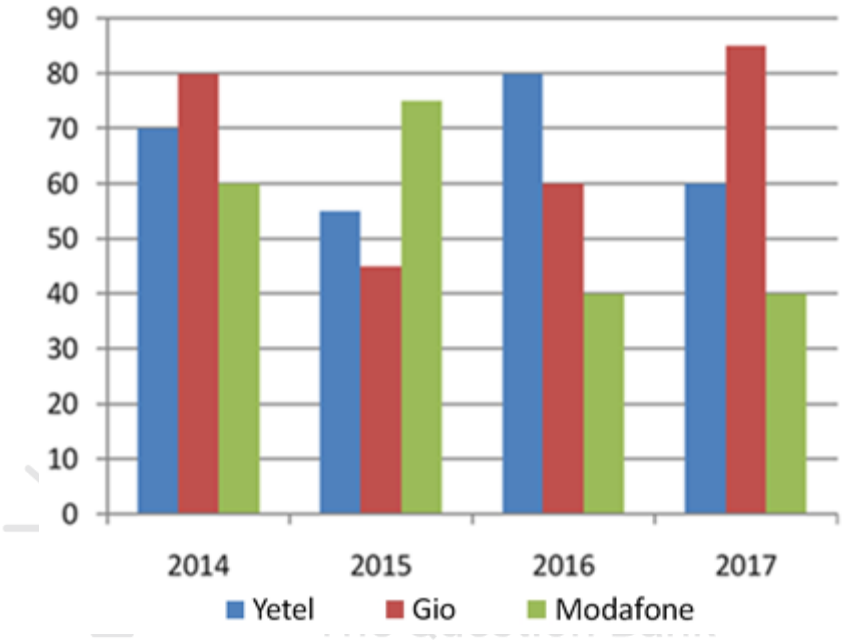
B. 6.4 cm

C. 7.2 cm

D. 6.8 cm

Directions (21-24): Study the following bar-graph carefully and answers the questions given beside:

The graph shows the number of users in lakhs of three different mobile network companies Yetel, Gio and Modafone in various years 2014 to 2017.



Questions:

21. What is the ratio of the number of users of Yetel to that of Modafone during the period 2015 to 2017.

A. 36 : 37

B. 39 : 31

C. 38 : 39

D. 31 : 39

22. Total users of all three companies in 2017 are what percentage less than the total users of all the three companies in 2014?

A. 11.9%

B. 9.9%

C. 12.5%

D. 22%

23. The total number of users of Modafone and Gio in the year 2016 was what percentage of the number users of Yetel in that year?

A. 50%

B. 100%

C. 150%

D. 125%

24. What is the average number of users of all the three companies in the given period?

A. 87.5 lakhs

B. 187.5 lakhs

C. 210 lakhs

D. 156.5 lakhs

Directions: Read the following questions carefully and choose the right answer.

25. The difference between the time taken by 2 cars to cover 450 Km is 1 hour 30 minutes. If the difference between their speeds is 15 Kmph, find the speed of the slower car?

A. 45 km/hr

B. 60 km/hr

C. 75 km/hr

D. 80 km/hr

26. There are 351 gold coins that are supposed to be divided among Abhay, Vishal and Kishore in the ratio 2 : 3 : 4 but by mistake it was divided in the ratio of 1/2 : 1/3 : 1/4. The number of extra/deficit gold coins incurred to Abhay due to this mistake is?

A. 45

B. 54

C. 56

D. 84

27. Lagaan is levied on the 40% of the total land in Village Sitapur. The revenue department collected total Rs. 4,48,800 through the lagaan from the village. Hari, a very rich farmer, paid only Rs. 580 as lagaan for his piece of land. The percentage of total land of Hari over the total taxable land of the village (appox) is:

A. 0.208%

B. 0.125%

C. 0.323%

D. 0.733%

28. A shopkeeper marked up the price of an item by 96% on the actual cost price and allows the discount of 25%. If he gave 2 items free on every dozen purchase, then find the profit percent on sale of 1 dozen items.

A. 35%

B. 36%

C. 25%

D. 26%

29. A can do a piece of work in 15 days, B can do the same work in 10 days, and C do the same work in 12 days. All three of them do the same work together, then they collectively get Rs. 9000. If B's share is divided among three new persons D, E and F in the ratio of 1 : 5 : 3 respectively then find the share of F.

A. 1800

B. 2700

C. 1400

D. 1200

30. If x + y + z = 12 , then find the maximum value of (x – 1) (y – 2) (z – 3)

A. 4

B. 6

C. 8

D. 24

31. If $\cos^4 A - \sin^4 A = p$, then find the value of p.

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

B. $2\cos^2 A + 1$

C. $\cos^2 A - 1$

D. $\cos^2 A + 1$

32. A sum of money triples itself in 7 years. In how many years it amounts to 9 times of itself, if the interest is compounded annually?

A. 10 years 6 months

B. 14 years 6 months

C. 14 years

D. 21 years

33. The cost of 1 litre of milk is Rs. 20, what amount of water should be added to 1 litre of mixture to gain 25% profit, if the mixture is being sold at Rs. 20/litre?

A. 150 ml

B. 250 ml

C. 200 ml

D. 300 ml

34. Find the digits indicated by x & y in the number 353292xy if the number is completely divisible by 33.

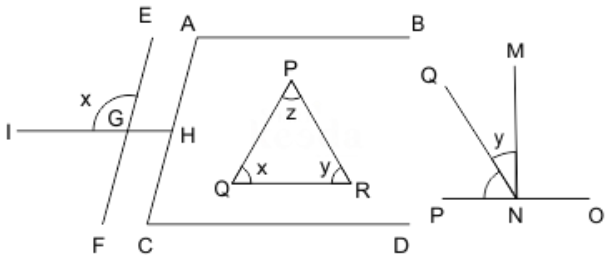
A. x = 4, y = 5

B. x = 0, y = 6

C. x = 3, y = 6

D. x = 0, y = 9

35. If AB || CD || IH and AC || EF, ∠BAC = 80° and MN is perpendicular to PO, then find x, y, z using following figure



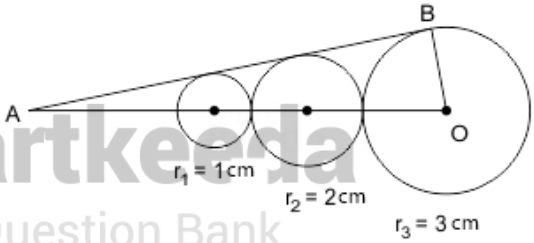
A. x = 80°, y = 45°, z = 55°

B. x = 80°, y = 55°, z = 45°

C. x = 80°, y = 90°, z = 10°

D. x = 80°, y = 10°, z = 90°

36. In the figure below, find the value of AB.



A. √140

B. √112

C. √145

D. √135

37. For what value of k, does the equation $7x^2 + 14x + k$ k become perfect square?

A. 7

B. 8

C. 6

D. 9

38. A cube of side 11 cm is melted and converted into a solid cylinder. It is found that the height of the cylinder so formed is 7 times the length of the rectangle whose width is 1.5 cm and perimeter 4 cm. Find the radius of the cylinder?

A. 3.5 cm

B. 11 cm

C. 7 cm

D. 10 cm

39. The minimum value of $16\tan^2\theta + 25\cot^2\theta$ *is* is

A. 5

B. 4

C. 30

D. 40

40. The average of six numbers is 35. If each of the first three numbers increased by 4 and each of the remaining three is decreased by 8, then what is the new average?

A. 31

B. 23

C. 32

D. 33

41. An article is sold at a profit of Rs. 30 which is 5% of the cost price if the cost price is increased by 20% and the article is now to be sold at the profit of 15% then find the new selling price?

A. Rs. 756

B. Rs. 802

C. Rs. 812

D. Rs. 828

42. The filling efficiency of pipe A is 4 times faster than second pipe B. If B takes 30 minutes to fill a tank, then determine the time taken by them to fill a tank together.

A. 8 min

B. 5 min

C. 7 min

D. 6 min

43. A, B and C invested in a business and their investments are in the ratio 2 : 3 : 4. If A gets 20% of the total profit as salary and rest is divided according to investment , then find the share of A, if B gets Rs. 3600.

A. 5300

B. 5250

C. 5200

D. 5100

$44.\ if\ 7\ sin^2\ \theta + 3\ cos^3\ \theta = 4, (0° < \theta < 90°).\ then\ value\ of\ \theta\ is$

A. π/2

B. π/3

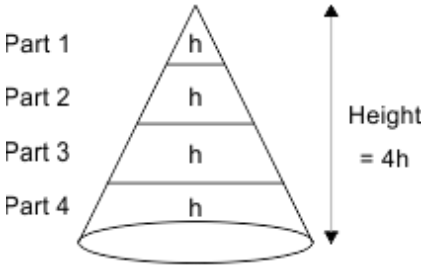
C. π/6

D. π/4

Correct Answer:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
A	D	C	B	D	A	B	A	B	C	A	B	B	D	A	A	C	D	C	C
21	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**
B	A	D	B	B	D	C	D	D	C	A	C	C	B	D	B	A	B	D	D
41	**42**	**43**	**44**																
D	B	D	C																

Explanation:



1. Volume of cone, V ∝r3 ∝h3
Volume of 1st part, a ∝ h3
Volume of 2nd part, b ∝ 8h3– h3 = 7h3
Volume of 3rd part, c∝ 27h3– 8h3 =19h3
Volume of 4th part, d ∝ 64h3– 27h3 = 37h3
Therefore, required ratio = h3 : 7h3 : 19h3 : 37h3 = 1 : 7 : 19 : 37
Hence, option A is correct.

2. $= \frac{125}{100} \times \frac{100}{80} \times \frac{120}{100} \times \frac{80}{100} = \frac{3}{2}$

$Therefore\ profit\ percentage = \frac{1}{2} \times 100 = 50\ \%$

Thus, D is the correct answer.

3. According to the given question

we have,

$$x = \frac{\sqrt{\sqrt{5}+1}}{\sqrt{\sqrt{5}-1}} = \sqrt{\frac{\sqrt{5}+1}{\sqrt{5}-1}}$$

Now, Numerator and denominator multiplied by (√5+1)

$$x = \sqrt{\frac{(\sqrt{5}+1) \times (\sqrt{5}+1)}{(\sqrt{5}-1)(\sqrt{5}+1)}} = \sqrt{\frac{(\sqrt{5}+1)^2}{5-1}} = \frac{\sqrt{5}+1}{2}$$

$Now\ we\ have\ also, 5x^2 - 5x - 1$

Put value of x in above equation

$$\Rightarrow 5\left(\frac{\sqrt{5}+1}{2}\right)^2 - 5\left(\frac{\sqrt{5}+1}{2}\right) - 1$$

$$\Rightarrow 5\frac{(3+\sqrt{5})}{2} - \frac{5\sqrt{5}-5-2}{2}$$

$$\Rightarrow \frac{15+5\sqrt{5}-5\sqrt{5}-7}{2} = \frac{8}{2} = 4$$

Hence, option C is correct.

4. Given that,

The ratio of the work done by 50 woman and 25 men is

$$\frac{1}{3}:\frac{1}{4}$$

The ration of the work done by man and one woman

$$= \frac{1}{150}:\frac{1}{100}$$

Let the time taken by one woman and one man to complete the work be =150x and 100x respectively.

$$\frac{18\times 5}{150x} + \frac{12\times 5}{100x} = 1$$

$$x = \frac{6}{5}$$

Time taken by one woman and one man to complete the work be 180 days and 10 days respectively.

The number of woman worked for 20/3 days to complete the work

$$= \frac{3}{20}\times 180 = 27$$

Hence, option B is correct.

5. Sale price of the mixture = Rs.80

$Cost\ prce\ of\ mixture = 80 \times \frac{100}{125} = Rs.64$

Rs. 40 Rs. x

\ /

Rs. 64

/ \

x – 64 24

$\Rightarrow \frac{x-64}{24} = \frac{3}{2} \Rightarrow x = Rs.100$

Hence, option D is correct.

6. $Sin\ 21° = \frac{x}{y}$

$Cos\ 21° = (\sqrt{(1-(sin21°)^2)}$

$\Rightarrow \sqrt{1-\frac{x^2}{y^2}} = \frac{\sqrt{y^2-x^2}}{y}$

$\Rightarrow \sec 21° - \sin 69°$

According to the question,

$\Rightarrow \sec 21° - \sin 69°$

$\Rightarrow \sec 21° - \sin(90 - 21°)$

$\Rightarrow \sec 21° - \sin(90 - 21°)$

$\Rightarrow \sec 21° - \cos 21°$

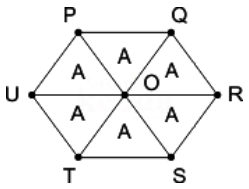
$\Rightarrow \frac{y}{\sqrt{y^2-x^2}} - \frac{\sqrt{y^2-x^2}}{y}$

$\Rightarrow \frac{x^2}{y\sqrt{y^2}-x^2}$

Hence, option A is correct.

7. We know that regular hexagonal consists of 6 equilateral triangles of same area.

Let the area of 1 equilateral be A.



Therefore area of hexagon = 6A

From figure, area of quadrilateral PQOU = 2A

Thus,

$$\frac{ar\ of\ quad.PQOU}{ar\ of\ hexagon\ PQRSTU} = \frac{2A}{6A} = \frac{1}{3}$$

Hence option B is the correct answer.

8. Let the speed of the boat = x km/h

And the speed of the stream = y km/h

According to the question:

x – y = 10

x + y = 20

adding both the equation we get

2x = 30

⇒ x = 15 km/h

Hence, y = 20 – 15 = 5 km/h

Let total distance covered by the boat = 2d

$$\frac{d}{15-5}+\frac{d}{15+5}=45$$

$$\Rightarrow d\left(\frac{1}{10}+\frac{1}{20}\right)=45$$

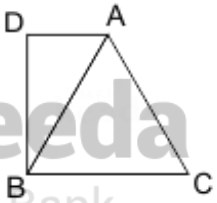
$$\Rightarrow \frac{3d}{20}=45$$

$$\Rightarrow d=300\ km$$

Total distance covered by the boat = 2d = 2×300 = 600km

Hence option B is correct.

9. inΔABC, ∠A = ∠B = 60°



⇒ ∠C = 60°

⇒ ΔABC is an equilateral triangle with AB

= BC = √34 cm

The lines AD and BD itersect at D with ∠D = 90°

⇒ ΔADB is a right triangle with DB = 3 cm and AB = √34 cm

$AB^2 = AD^2 + BD^2$

$\Rightarrow (\sqrt{34})^2 = AD^2 + 3^2$

$\Rightarrow 34 = AD^2 + 9$

$\Rightarrow AD^2 = 25$

$\Rightarrow AD = \sqrt{25} = 5$

Therefore, option (B) is correct.

10. $\left(\frac{\sin 35°}{\cos 55°}\right)^2 + \left(\frac{\cos 55°}{\sin 35°}\right)^2 - 2\cos 30°$

$\Rightarrow \left(\frac{\sin(90-35°)}{\cos 55°}\right)^2 + \left(\frac{\cos(90-55°)}{sin\ 35°}\right)^2 - 2\ cos\ 30°$

$\Rightarrow \left(\frac{cos\ 55°}{cos\ 55°}\right)^2 + \left(\frac{sin\ 35°}{sin\ 35°}\right)^2 - 2\ \cos 30°$

$\Rightarrow 1 + 1 - 2 \times \frac{\sqrt{3}}{2}$

$\Rightarrow 2 - \sqrt{3}$

Hence, option C is correct.

11. $\sin\alpha + (\sin\alpha)^2 = 1$

$\Rightarrow \sin\alpha = 1 - (\sin\alpha)^2$

$\Rightarrow \sin\alpha = (\cos\alpha)^2$

According to the question,

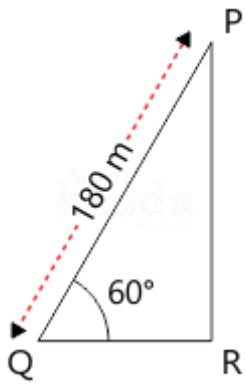
we have $(\cos\alpha)^{12} + 3(\cos\alpha)^{10} + 3(\cos\alpha)^8 + (\cos\alpha)^{6-1}$

$\Rightarrow ((\cos\alpha)^4 + (\cos\alpha)^2)^3 - 1$

$\Rightarrow ((\sin\alpha)^2 + (\cos\alpha)^2)^3 - 1 = 1 - 1 = 0$

Hence, option A is correct.

12. AB = length of thread = 180 meter



∠PQR = 60°

In Δ PQR

$$Sin\ 60° = \frac{PR}{PQ} = \frac{\sqrt{3}}{2} = \frac{PR}{180}$$

$$so, \quad \frac{PR}{180} = \frac{\sqrt{3}}{2}$$

$$PR = 180 \times \frac{\sqrt{3}}{2} = 90\sqrt{3}$$

Hence, option B is correct.

13. a + b + c = 0 a = – b – c or a2 = (b + c)2 Therefore given expression,

$$\frac{a^2}{a2 - bc} + \frac{b^2}{b2 - ca} + \frac{c^2}{c2 - ab}$$

$$= \frac{(b + c)^2}{(b + c)^2 - bc} + \frac{b^2}{b^2 + c\,(b + c)} + \frac{c^2}{c^2 + b\,(b + c)}$$

$$= \frac{(b + c)^2}{(b^2 + c^2 + bc)} + \frac{b^2}{b^2 + c^2 + bc} + \frac{c^2}{b^2 + c^2 + bc}$$

$$= \frac{b^2 + c^2 + 2bc + b^2 + c^2}{b^2 + c^2 + bc}$$

$$= 2\,\frac{b^2 + c^2 + bc}{b^2 + c^2 + bc}$$

= 2

Hence, option (B) is correct.

14. Let the edges of the cubes be 3x, 4x and 5x cm

We know that diagonal of a cube with side 'a' = a √3

$$Side\ of\ the\ new\ cube\ = \frac{12\,3}{\sqrt{3}} = 12$$

Therefore equating volumes we get, $(3x)^3 + (4x)^3 + (5x)^3 = 123\ (27 + 64 + 125)$ ×

$x^3 = 1728$

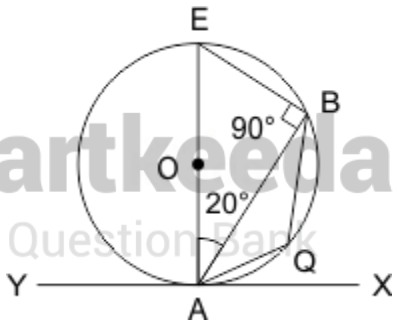
$x^3 = \frac{1728}{216} = 8$

x = 2 So the edge of the largest cube will be 5 × 2 = 10 cm

Hence, option (D) is correct.

15. ∠ABE = 90°

(Semicircle Angle)



∠BAX = 70°

∠EAB = 20°

In ABE

∠AEB = 180° – (90° + 20) = 70°

∠BQA = 180° – 70° = 110°

(Cyclic quadrilateral)

∠BAQ = 40° (Given)

So, ∠ABQ = 180° – (110° + 40°)

∠ABQ = 30°

Hence, option B is correct.

16. Let Barun's marks = B, Anil's marks = A and Chandan's marks = C

According to question:

A = 28.57% less then B = 71.43% of B (we know that 1/7 = 14.28% approximately)

So, $A = \frac{5}{7} \times B$

A: B = 5: 7 ----(I)

And B = 11.11% less than C , B = (8/9) × C

B: C = 8: 9 -------(II)

A: B: C = 40 : 56 : 63

A = 40X

B = 56X

C = 63X

According to question, C – A = 23X = 80.5

So, the value of x = 3.5

Now the marks obtained by Barun = 56x = 56 × 3.5 = 196

Hence, option A is correct.

17. Let x be the amount borrowed by Rohan

Therefore , according to question

$$\frac{x \times 10 \times 6}{100} + \frac{x \times 5 \times 3}{100} + \frac{x \times 13 \times 3}{100} = 22800$$

Solving above equation we get ,

$$\frac{114x}{100} = 22800$$

$$x = 20000$$

Hence, option C is the correct.

18. Tuesday to Sunday = Rs. 13240 × 6 = Rs.79440

Tuesday to Saturday = 13924 × 5 = Rs.69620

Sale on Sunday = 79440 – 69620 = Rs.9820

Hence, option D is correct.

19. Let the filling capacity be x m^3

Emptying capacity = x + 10

According to the question,

$$\Rightarrow \frac{2400}{x} - \frac{2400}{x+10} = 8$$

$$\Rightarrow \frac{x+10-x}{(x+10)\,x} = \frac{1}{300}$$

$\Rightarrow 3000 = x\,(x+10)$

Alternate Method:

Using option C,

$50 \times 60 = 3000$ satisfies

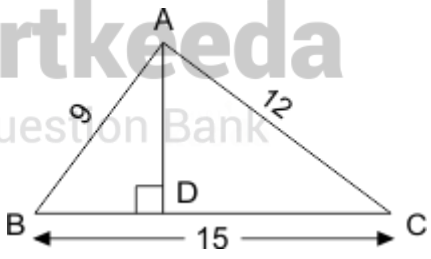
Hence, option C is correct.

20. Lengths of the sides of a triangle are 9 cm, 12 cm and 15 cm

$\because 9^2 + 12^2 = 15^2$

$\therefore$ This is right angled triangle

$\because \Delta$ ABC and Δ ADC are similar triangles



$$\text{Then, AD} = \frac{AB \times AC}{BC} = \frac{9 \times 12}{15} = 7.2 \text{ cm}$$

Hence, option C is correct.

21. The number of users of Yetel during 2015 to 2017 = (55 + 80 + 60) = 195

The number of users of Modafone during 2015 to 2017 = (75 + 40 + 40) = 155

Required ratio = 195 : 155 = 39 : 31.

Hence, option B is correct.

22. Total users of all three companies in 2014 = 70 + 80 + 60 = 210

Total users of all three companies in 2017 = 60 + 85 + 40 = 185

$$Reqd\ \% = \frac{210 - 185}{210} \times 100 = 11.9\%$$

Hence, option A is correct

23. The number of users of Modafone & Gio in the 2016 = 40 + 60

And the number of users of Yetel in 2016 = 80

$$Reqd\ \% = \frac{100}{80} \times 100 = 125\%$$

Hence, option D is correct.

24. Total number of users in all the years together = 70 + 80 + 60 + 55 + 45 + 75 + 80 + 60 + 40 + 60 + 85 + 40 = 750

$$Reqd\ avg = \frac{750}{4} = 187.5\ lakhs$$

Hence, option B is correct.

25. Let the speed of the slower car be x and the time taken to cover 450 km be T_1

Then speed of car = x + 15 and time taken to cover 450 km be T_2

Also time difference to cover 450 km by cars, i.e. $T_1 - T_2 = 1.5$ hours

$$So, \frac{450}{x} - \frac{450}{x + 15} = 1.5$$

$$Or, \frac{300}{x} - \frac{300}{x + 15} = 1$$

Applying 'Hit and Trial' method, we get the putting x = 60 we get LHs = RHS.

Therefore B is the correct Answer.

26. Abhay was supposed to get 2/9th of the total amount initially,

But the division in the ratio of 1/2 : 1/3 : 1/4 = 6 : 4 : 3

So, Abhay eventually got 6/13 of the total gold coins.

$$So\ Abhay's\ gain\ = \left(\frac{6}{13} - \frac{2}{9}\right) \times 351 = 84$$

Hence, option D is correct.

27. Let x be the total land

Therefore taxable land = 40% of x = 0.4x

Rs. 448800 collected for 0.4x of land

$$Rs.1\ collected\ for \frac{0.4x}{448800}\ of\ land$$

As Hari paid Rs. 580 as Lagaan

$$Thus, taxable\ land\ of\ Hari\ = 580 \times \frac{0.4x}{448800}$$

Since taxable land is only 40 % of total land.

$$Thus\ total\ land\ of\ Hari\ = \frac{100}{40} \times \frac{580 \times 0.4x}{448800}$$

Thus % of total land of hari over total taxable land of village

$$= \frac{\frac{100 \times 580 \times 0.4x}{40 \times 448800}}{0.4x} \times 100 \approx 0.323$$

Hence, option C is correct.

28. Let the CP be Rs. 100.

Here, we will use the concept of net effect on multiple discount and mark ups.

$$Net\ ratio\ of\ SP\ to\ CP\ = \frac{196}{100} \times \frac{3}{4} \times \frac{12}{14} = 14 \times 9 = 126$$

$$Therefore, profit\ \%\ = \frac{126 - 100}{100} \times 100 = 26\%$$

Hence, option D is correct.

29. We know that money is distributed in the ratio of efficiency.

As ratio of time = 15 : 10 : 12

Therefore, ratio of efficiency $= \frac{1}{15} : \frac{1}{10} : \frac{1}{12} = 4 : 6 : 5$

Thus, B's share = $\frac{6}{15} \times 9000 = 3600$

Now, F 's share = $\frac{3}{9} \times 3600 = 1200$

Hence, option D is correct.

30. We know that, average ≥ geometric mean,

Now, x + y + z = 12

$$(x - 1) + (y - 2) + (z - 3) = 6$$

Taking the arithmetic average, we get

$$\frac{(x - 1) + (y - 2) + (z - 3)}{3} = \frac{6}{3} = 2$$

⇒ arithmetic average = 2

Now the geometric mean = $\sqrt[3]{(x-1)(y-2)(z-3)}$

Thus, $2 \geq \sqrt[3]{(x-1)(y-2)(z-3)}$

Or, $8 \geq (x-1)(y-2)(z-3)$

Therefore, maximum value of given expression is 8

Hence, option C is correct.

31. we know, $a^2 - b^2 = (a+b)(a-b)$

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

$\Rightarrow \{\cos^2 A - (1 - \cos^2 A)\}$ [using, $\sin^2 A + \cos^2 A = 1$]

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

Hence, option A is correct.

32. Let the rate of interest be R% and the time after which it becomes 9 times be t years.

Assume the principal be x

We have,

$3x = x\left(1 + \frac{R}{100}\right)^7$

$(3)^{(1/7)} = \left(1 + \frac{R}{100}\right)$ **.....eq. (i)**

Also, $9x = x\left(1 + \frac{R}{100}\right)^t$

$(9)^{(1/t)} = \left(1 + \frac{R}{100}\right)$

$(3)^{(2/t)} = \left(1 + \frac{R}{100}\right)$ **.....eq. (ii)**

From eq(1)& eq(2),we get

$(3)^{(1/7)} = (3)^{(2/t)}$

$\text{or, } \frac{1}{7} = \frac{2}{t}$

or, t = 14 years.

Hence, option C is correct.

33. C.P of milk = Rs. 20

S.P of milk mixture = Rs. 20

Profit % = 25%

Thus, C.P of mixture = $\frac{4}{5} \times 20$ = Rs. 16

We can find amount of milk in mixture by mixture & allegations

Price of milk : Price of water

20 0

\ /

16

/ \

16 – 0 4

16 4

$\frac{\text{ratio of water}}{\text{ratio of mixture}} = \frac{4}{16 + 4} = \frac{4}{20} = \frac{1}{5}$

Therefore, the amount of water in 1 kilolitre of mixture

= 1 × 1000 = 200 ml

5

Hence, option C is correct.

34. We can solve this question applying hit and trial method. Among the given options, only option B (0 and 6) satisfies the divisibility conditions for factors of 3 (3 and 11).

The given number:

353292xy

Putting the values, we get

35329206

The sum of all the digits is = 30 which is divisible by 3.

And

(Sum of the digits at even places) - (Sum of the digits at odd places) = 15 - 15 = 0

Clearly, the number is divisible by 11 as well.

Option B is hence the correct answer.

35. As AB || IH,

∴ ∠A = ∠H = 80° [alternate interior angles of parallel sides are equal]

Also, AC || EF,

∴ ∠H = ∠G = x = 80° [adjacent angles of parallel sides are equal]

Now, we have, MN ⊥ PO

∴ 90 + x + y = 180 [linear pair axion]

y = 180 – 90 – 80

y= 10°

In Δ PQR,

x + y + z = 180°

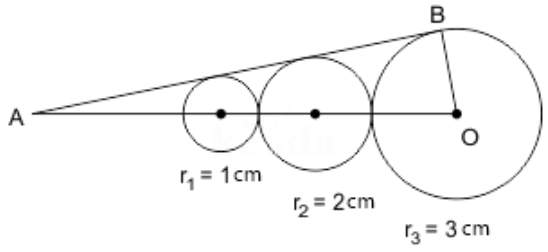
80 + 10 + z = 180°

z = 180 – 90

z = 90°

Hence, option D is correct.

36. We can redraw the given figure as below-



As angle A is common to both ΔADE and ΔACF and also ∠C = ∠D = 90°

Therefore, ΔADE~Δ ACF

Therefore, ratio of sides will be same as given below-

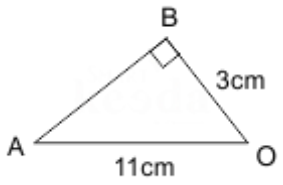
$$\frac{x+1}{x+4} = \frac{1}{2}$$

2x + 2 = x + 4

Or, x = 2 cm

∴ AO = 2 + 1 + 1 + 2 + 2 + 3 = 11 cm

Consider following right-angled triangle,



$AB^2 = 11^2 - 3^2$

$AB^2 = 121 - 9$

AB = √112 cm

Hence, option B is correct.

37. Here, a = 7,b = 14, c = k

For perfect square, we have

$b^2 - 4ac = 0$

$\Rightarrow (14)^2 - 4 \times 7 \times k = 0$

$\Rightarrow 196 = 28k$

or, k = 7

Hence, option A is correct.

38. Volume of cube = $(11)^3$

We have, volume of cylinder = volume of cube

$\Rightarrow \pi r2\, h = 11 \times 11 \times 11$

$\frac{22}{1} \times r2\, h = 11 \times 11 \times 11$

$r^2h = \frac{121 \times 7}{2} cm^3 \ . \ --- \ eq.(1)$

Now,

2 (L + B) = 4

L+ B = 2

L = 2 – 1.5

$L = 0.5 = 0.5 = \frac{1}{2} cm$

$Therefore, h = 7 \times \frac{1}{2} = \frac{7}{2}$

Now eq(1) becomes,

$r^2 \times \frac{7}{2} = 121 \times \frac{7}{2}$

$r^2 = 121$

r = 11 cm

Hence, option B is correct.

39. Comparing $16 \tan^2\theta + 25 \cot^2\theta$ with $a \tan^2\theta + b \cot^2\theta$, we get

a = 16

and, b = 25

We know that the minimum value of such equation = $2\sqrt{ab}$

Thus the minimum value = $2\sqrt{(16 \times 25)}$

$\Rightarrow 2 \times 4 \times 5 = 40$

Hence, option D is correct.

40. Sum of the numbers = 6 × 35 = 210

Change in total after the increase and decrese in values = (3 × 4) – (8 × 3) = – 12

$New\ Average = \frac{210 - 12}{6} = 33$

Hence, option D is correct.

41. Here the profit received after selling the article is Rs. 30 which is 5% of the cost price.

So, the cost price of the article = Rs. 600

Now, the cost price is increased by 20%.

$$So, the\ new\ cost\ price\ = \frac{120}{100} \times 600\ =\ Rs. 720$$

Here new profit on the article is 15%.

$$Thus, new\ selling\ price\ = \frac{115}{100} \times 720\ =\ Rs. 828$$

Hence, the new selling price is Rs. 828

Therefore, option D is correct.

42. If pipe A is 4 timers faster than pipe B, it infers that efficiency of pipe A must be 5 times that of B.

We know the ratio of efficiency is inversely proportional to time.

$$Therefore, \frac{time\ taken\ by\ A}{time\ taken\ by\ B} = \frac{1}{5}$$

$$time\ taken\ by\ A\ =\ 30 \times \frac{1}{5} = 6\ min.$$

$$A's\ 1\ min\ work\ = \frac{30}{6} = 5\ unit/min.$$

$$B's\ 1\ min\ work\ = \frac{30}{30} = 1\ unit/min.$$

A and B together do = 5 + 1 = 6 unit/min

Therefore, time taken by them 30/5 = 5 min

Hence, option B is correct.

43. Let the total profit be Rs. x

$Therefore, B's\ share\ =\ 80\%\ of\ \frac{3}{9}x$

$or, \frac{4}{5}\times\frac{3}{9}x = 3600$

$x = 45 \times 300$

X = 13500

$Thus\ A's\ share\ =\ 20\%\ of\ 13500\ +\ 80\%\ of\ \frac{2}{9}\times 13500$

$=\frac{1}{5}\times 13500 + \frac{4}{5}\times\frac{2}{9}\times 13500$

= 2700 + 2400 = Rs.5100

Hence, option D is correct.

44. $7\sin^2\Theta + 3\cos^2\Theta = 4$

$4\sin^2\Theta + 3(\sin^2\Theta + \cos^2\Theta) = 4$

$4\sin^2\Theta + 3\sin^2\Theta + 3\cos^2\Theta = 4$

$\sin^2\Theta = \frac{1}{4}$

$$sin\,\Theta = \frac{1}{2}$$

$$\Theta = \frac{\pi}{6}$$

Hence, option C is correct.