Math Paper Test 3 & 5

1. Directions [Set of 2 Questions]: Read the data carefully and answer the following questions:

A: $x * x * x + 2 * 3^2 * x^2 = 3 * 5 * x^2 + 4 * 7x$

B: $\frac{\sqrt{625y^4} - \sqrt{576y^4}}{2} + 20 = \frac{26y}{4}$

C: $z^2/3 = (7z - 36)$

1.What is the sum of smallest roots of equations A, and C?
A.4 **B.**11 **C.**13 **D.**16 **E.**2

2. Find the HCF of all largest roots of equations A, B, and C.
A.1 **B.**2 **C.**3 **D.**5 **E.**4

3. A boat can cover 32 km upstream in 4 hours and it covers 80 km downstream in same time. If the speed of the stream is increased by 33(1/3)%, then in how much time boat can cover 66 km in upstream and return back to starting point?
A.11 hours **B.**12 hours **C.**14 hours **D.**8 hours **E.**16 hours

4. The question below is followed by three statements numbered I, II and III. You have to decide whether the data provided in the statements are sufficient to answer the question.
Two items A and B were sold at the same percentage of profit and loss respectively. The loss suffered on item B was Rs. 1683. By what percentage was item B marked up?
I. The original cost price of item A was Rs. 4400.
II. The total loss incurred on both A and B together was Rs. 231.
III. Both the items together were marked up by Rs. 808.
A.If the data in statements II and either I or III together are sufficient to answer the question
B.If the data in statements III and either I or II together are sufficient to answer the question
C.If the data in all the three statements together are not sufficient to answer the question
D.If the data in statements I and either II or III together are sufficient to answer the question
E.If the data in all the three statements together are necessary to answer the question

5. What is the volume of the sphere?
I. The height of a right circular cylinder is 170% of the radius of the sphere.
II. The base radius of the right circular cylinder is 8 cm.
III. If the total surface area of the right circular cylinder is equal to the surface area of the sphere.
A.Only I and II together are sufficient. **B.**Only III is sufficient. **C.**All I, II and III together are sufficient.
D.Only II and III together are sufficient. **E.**None of the above

6. Jaya and Sona enter into a partnership. Then, for how many months did Jaya invest his money?
Statement I: Jaya and Sona started the business with investments of Rs. 27000 and Rs. 22500 respectively and the profit earned by Jaya is 60% of the profit earned by Sona.
Statement II: Jaya and Sona started the business with investments in the ratio of 3: 5 respectively and Jaya and Sona earned profits of Rs. 21000 and Rs. 70000 respectively.
A.If the data in statement I alone is sufficient to answer the question, while the data in statement II alone is not sufficient to answer the question.
B.If the data either in statement I alone or in statement II alone is sufficient to answer the question.
C.If the data in both statements I and II together are necessary to answer the question.
D.If the data given in both statements I and II together are not sufficient to answer the question.
E.If the data in statement II alone is sufficient to answer the question, while the data in statement I alone is not sufficient to answer the question.

7. The average number of students in two classes A and B who play basketball is 34. The total number of students in A and B are 60 and 70 respectively. What is the total number of girls in A and B together who do not play basketball?
I. The number of boys in A is 32. The average number of boys in A and B who play basketball is 20. The number of girls who do not play basketball in A is 8.
II. The number of boys who do not play basketball in A is 12. The number of boys who play basketball in B is twice the number of boys who do not play basketball in B.
A.If the data in both statements I and II together are not sufficient to answer the question
B.If the data in statement I alone are sufficient to answer the question while the data in statement II alone are not sufficient to answer the question
C.If the data either in statement I alone or in statement II alone are sufficient to answer the question
D.If the data in both statements I and II together are necessary to answer the question
E.If the data in statement II alone are sufficient to answer the question while the data in statement I alone are not sufficient to answer the question

8. Two statements numbered I and II are given below. You have to decide whether the data provided in the statements are sufficient to answer the question.
What is the total distance between home and school of Priyam?
I: If he travels at the speed 5 km/h less than his original speed, then he would take 18 minutes more to cover the distance between home and school.
II: If he travels at the speed 10 km/h more than his original speed, then he would take 14.4 minutes less to cover the distance between home and school.
A.If the data in Statement I alone is sufficient to answer the question while the data in statement II alone are not sufficient to answer the question.
B.If the data in Statement II alone is sufficient to answer the question while the data in statement I alone are not sufficient to answer the question.
C.If the data in both Statements I and II together are sufficient to answer the question.
D.If the data either in Statement I alone or in Statement II alone is sufficient to answer the question.
E.If data in both Statements I and II together are not sufficient to answer the question.

9. The ratio of the efficiency of A, B, and C are 4: 5: 3 respectively. A and C together can complete a piece of work in 15 days, but B and D together can complete the same wok in 20 days. What is the ratio between efficiency of A and that of D?
A.12: 1 **B.**9: 1 **C.**15: 1 **D.**20: 1 **E.**16: 1

10. What approximate value should come in place of question marks?
175.02 + 25.05 X 24.79 - 243.04 ÷ 2.97 X 9.99 = ? **A.**-10 **B.**21 **C.**35 **D.**10 **E.**15

11. 44.96 x 29.07 - 10.01 = ? x 35.04 **A.**37 **B.**35 **C.**38 **D.**40 **E.**56

12. $(?)^2 + 4.95^3 = 13.94^2 - 8.98$ **A.**16 **B.**8 **C.**4 **D.**24 **E.**20

13. 20.01 x $\sqrt{169.01}$ = ? x $\sqrt{2704.03}$ **A.**14 **B.**2 **C.**20 **D.**17 **E.**5

14. A firm dealing in furniture fixed their selling price of furniture at 40% above the cost price. They sell half of the stock at the fixed selling price, one-quarter of the stock at the price which comes after giving discount of 20% on the fixed selling price and rest at the price which comes after giving discount of 30% on the fixed selling price. Find the gain% altogether.
A.20.15% **B.**22.5% **C.**18.75% **D.**25.55% **E.**None of these

15. The concentration of camphor oil in 60L mixture of coconut oil and camphor oil is 30%. If x L of oil from the mixture is replaced by coconut oil and y L of oil from the resulting mixture is again replaced by coconut oil, then the concentration of camphor oil in the final mixture becomes 24.75%. Which option(s) satisfies/satisfy the values of x and y respectively in the question? (A) 6, 5 (B) 9, 8 (C) 10, 0.6
A.Only A **B.**Only C **C.**Both A and B **D.**Both B and C **E.**Both A and C

Directions [Set of 5 Questions]: Read the data carefully and answer the following questions.
Line graph given below shows the total quantity of milk (in Litre) consumed in Jan and Feb together and also shows the difference between quantity of milk consumed in Jan and Feb by five different families - A, B, C, D and E.

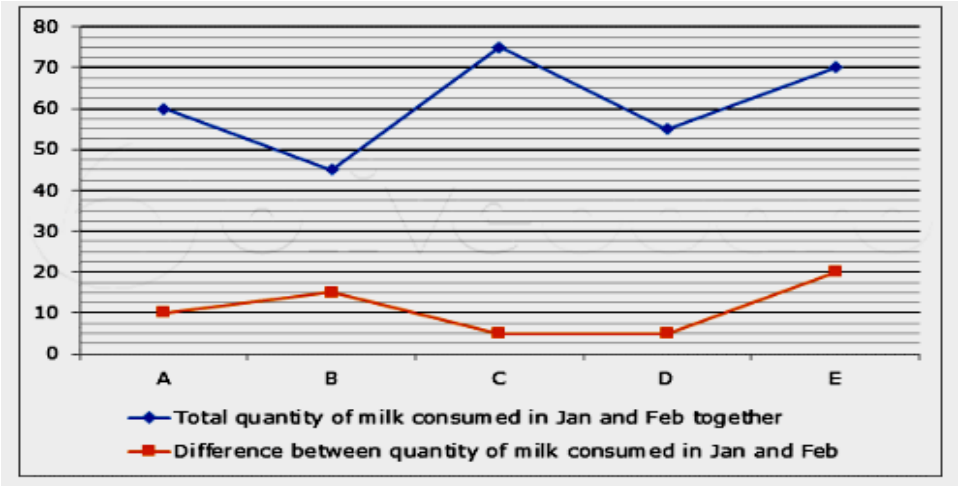

Table given below shows the ratio of quantity of milk consumed in Feb to that consumed in Mar by each of the given families.

Family	Ratio of quantity of milk consumed in Feb to that consumed in Mar
A	5: 6
B	5: 7
C	5: 4
D	5: 4
E	5: 7

Note: In each family, quantity of milk consumed in Jan is more than that consumed in Feb.

16.Find the ratio of total quantity of milk consumed by family A to that consumed by family D in all the 3 months together?
A.27: 25 **B.**15: 13 **C.**6: 5 **D.**10: 9 **E.**5: 4

17.In family C, if average quantity of milk consumed in Jan, Feb, Mar and Apr is 35 L, then find that the quantity of milk consumed in Apr is what per cent of that consumed in Jan?
A.87.5% **B.**93.75% **C.**85% **D.**92.5% **E.**90%

18.Find the average quantity of milk consumed by families A, C and D in Mar.
A.26 L **B.**32 L **C.**24 L **D.**28 L **E.**30 L

19.Total quantity of milk consumed by family B in all the 3 months together is approximately what percent of that consumed by family E in all the 3 months together?
A.63% **B.**55% **C.**75% **D.**51% **E.**60%

20.Find the total quantity of milk consumed by all the 5 families together in Feb.
A.105 L **B.**125 L **C.**120 L **D.**115 L **E.**110 L

21.If a natural number 'x' is chosen at random from the first 12 natural numbers, what is the probability that $2x^2 - 15x + 25 > 0$?
A.5/7 **B.**2/7 **C.**3/4 **D.**1/4 **E.**1/2

22.P scored 25% of the maximum marks in an examination and failed by 5 marks. Q scored n% and got 15 marks more than the pass marks. R scored 70% and scored 36 marks less than the maximum marks. What is the value of n?
A.41.66 **B.**45 **C.**36 **D.**33.33 **E.**38

23. There are three series and you have to find the values of a, b and c and then establish relationship among them.
(i) 8, a, 2.5, 3, 8, 56 (ii) 29, 28, 25, 20, 13, b (iii) c, 9, 30, 124, 625, 3756
A.a = c > b **B.**a = c < b **C.**a = c = b **D.**a < c = b **E.**a > c = b

24. (i) 7, 16, 34, a, 142, 286 (ii) 3, 5, 15, 36, b, 123 (iii) 18, 34, c, 138, 278, 554
A.a < b = c **B.**a = c < b**C.**a < b < c **D.**a = b = c **E.**a > b = c

25. (i) 5, 5, 15, a, 525, 4725 (ii) 34, 52, b, 85, 100, 114 (iii) 18, 12, 15, 25.5, c, 138
A.a > b > c **B.**b > c > a **C.**b = c = a **D.**a > b = c **E.**c = a < b

26. The ratio of height of Jayesh to that of Mayesh is 6: 7 and the ratio of height Mayesh to that of Lokesh is 5: 6. If the sum of 1.5 times the height of Jayesh and twice the height of Lokesh is 580.5cm, then what is the average height of Jayesh, Mayesh and Lokesh?
A.163.5 cm **B.**160.5 cm **C.**156.5 cm **D.**164.5 cm **E.**166.5 cm

27. A man invested same amount in each of two schemes A and B. Scheme A offered 6% per annum at simple interest and scheme B offered 10% per annum at simple interest. Man received a total of Rs.39390 as interest. Find the total amount invested in both schemes together if he invested for 2 years in scheme A and for 4 years in scheme B.
A.Rs.155100 **B.**Rs.105150 **C.**Rs.151500 **D.**Rs.151000 **E.**Rs.151550

Directions [Set of 4 Questions]: Read the information given below in the paragraph carefully and answer the following questions:
Two friends A and B together started a business with their total investment of Rs.70000. After 'x' years C also joins the business with an investment of 3 times the investment of A. After 0.5 more years, B left the business and the total profit share from the business at the end of 6 years is Rs.20700. The ratio of profit share of A to that of C is 4: 5 and the profit share of A is Rs.1200 less than that of B.

28.What is the ratio of investment of A to that of B in the business?
A.1: 2 **B.**2: 3 **C.**3: 5 **D.**4: 7 **E.**5: 9

29. After how many years from the start of the business, person B left the business?
A.3 years **B.**4 years **C.**3.5 years **D.**4.5 years **E.**1.5 years

30. The profit share of C in the business is what percent of his investment in the business?
A.20% **B.**25% **C.**15% **D.**5% **E.**10%

31. What is the difference between the investment of A in the business and the total profit amount from the business?
A.Rs.4300 **B.**Rs.4700 **C.**Rs.4100 **D.**Rs.4500 **E.**Rs.3900

Directions [Set of 5 Questions]: Study the following information carefully and answer the questions given below:
There are total 16000 students in a college and respective ratio of boys and girls among them is 5:3. All the students are one among Intermediate students, UG students and PG students. All the students in the college are divided into two groups viz. music club group and sports club group.
Intermediate: 35% of the total number of students are Intermediate students. Respective ratio of the number of students who are in music club and number of students who are in sports club is 4:3. Number of boys are 400 more than the number of girls.
UG: Number of boys are 20% less than the number of intermediate boys. Number of girls are 200 more than the number of intermediate girls. Respective ratio of the number of students who are in music club and number of students who are in sports club is 15:11.
PG: 55% of the total number of students of PG are in music club.

32.Find the difference between total number of Intermediate students and total number of PG students in the college.
A.450 **B.**600 **C.**400 **D.**550 **E.**None of these

33. Find the total number of students in the college who are in music club group.
A.9060 **B.**8240 **C.**7020 **D.**6640 **E.**None of these

34. Number of UG boys in the college is what percent of the number of PG girls in the college?
A.450% **B.**350% **C.**400% **D.**300% **E.**None of these

35.Find the average of the number of Intermediate boys, number of Intermediate students who are in sports club group and number of PG students who are in sports club group.
A.3120 **B.**3240 **C.**2580 **D.**2960 **E.**None of these

36. Find the respective ratio of the number of Intermediate girls in the college and number of UG students in the college who are in ports club group.
A.7:5 **B.**11:9 **C.**9:7 **D.**13:11 **E.**None of these

37. Train A left Delhi for Jaipur and two hours later train B left Delhi for Jaipur. Both the trains reached Jaipur at the same time. If both the trains start simultaneously from Delhi and Jaipur moving towards each other, they take 144 minutes to meet. Find the time taken by train B to reach Jaipur from Delhi if the distance between Delhi and Jaipur is 360 km.
A.6 hours **B.**4.5 hours **C.**5 hours **D.**4 hours **E.**None of these

38. Which of the following values will fill the blank in the same order?
The ratio of number of white balls to the number of black balls in a bag is _____respectively, after taking out 12 black balls from the bag. After that, when 15 white balls are added in the bag and 6 black balls are taken out from the bag, the ratio becomes _____. Initially, the number of black balls in the bag was ____.
(A) 11:14, 4:3, 54 (B) 7:9, 19:15, 66 (C) 10:27, 3:5, 93
A.Only A and C **B.**Only A and B **C.**Only B and C**D.**All A, B and C **E.**Only A

39. The diameter and height of a cylinder are 25 cm and 30 cm respectively. If the diameter is increased by ___ % and the height is increased by ___ %, the volume of the cylinder would increase by ___ %. Which of the following values can we fill in the same order?
A- 25, 20, 87.5 B- 30, 10, 85 C- 10, 40, 70 D- 20, 25, 80
A.A only **B.**A, B and C only **C.**D only **D.**C and D only **E.**A and D only

40. The sum of present ages of mother and daughter is 57 years. Respective ratio of their ages 12 years ago was 8: 3. What is the respective ratio of age of mother before 8 years and age of daughter after 14 years? **A.**3: 4 **B.**4: 5 **C.**6: 7 **D.**7: 8 **E.**8: 9

Solution

A: $x * x * x + 2 * 3^2 * x^2 = 3 * 5 * x^2 + 4 * 7x$

$\Rightarrow x^2 + 3x - 28 = 0$

$\Rightarrow (x + 7)(x - 4) = 0$

$\Rightarrow x = -7$ or 4

B: $\frac{\sqrt{625y^4} - \sqrt{576y^4}}{2} + 20 = \frac{26y}{4}$

$\Rightarrow y^2 - 13y + 40 = 0$

$\Rightarrow (y - 5)(y - 8) = 0$

$\Rightarrow y = 5$ or 8

C: $z^2/3 = (7z - 36)$

$\Rightarrow z^2 - 21z + 108 = 0$

$\Rightarrow (z - 9)(z - 12) = 0$

$\Rightarrow z = 9$ or 12

The sum of smallest roots of equations A, and C = -7 + 9 = 2

2. Solution

A: $x * x * x + 2 * 3^2 * x^2 = 3 * 5 * x^2 + 4 * 7x$

$\Rightarrow x^2 + 3x - 28 = 0$

$\Rightarrow (x + 7)(x - 4) = 0$

$\Rightarrow x = -7$ or 4

B: $\frac{\sqrt{625y^4} - \sqrt{576y^4}}{2} + 20 = \frac{26y}{4}$

$\Rightarrow y^2 - 13y + 40 = 0$

$\Rightarrow (y - 5)(y - 8) = 0$

$\Rightarrow y = 5$ or 8

C: $z^2/3 = (7z - 36)$

$\Rightarrow z^2 - 21z + 108 = 0$

$\Rightarrow (z - 9)(z - 12) = 0$

$\Rightarrow z = 9$ or 12

HCF of all largest roots of equations A, B, and C = HCF of 4, 8, 12 = 4

3. Solution

Upstream speed = 32/4 = 8 km/h

And, downstream speed = 80/4 = 20 km/h

Speed of the boat in still water = (20 + 8)/2 = 14 km/h

And, speed of the stream = (20 - 8)/2 = 6 km/h

So, speed of the increase stream = 6 * 4/3 = 8 km/h

New upstream speed = 14 - 8 = 6 km/h

And, new downstream speed = 14 + 8 = 22 km/h

Required time = 66/22 + 66/6 = 14 hours

4. Solution

From I and II together:

Loss on B = 1683

Total loss = 231

So, profit on A = 1683 - 231 = 1452

So, A was sold at a profit of (1452/4400) * 100% = 33%

So, C.P. of B = 1683/0.33 = 5100

But we cannot determine the marked-up price of B. So, statements I and II are not sufficient together.

From II and III together:

Let the C.P. of A and B be Rs. a and Rs. b respectively.

Total loss = 231

So, profit on A = 1683 - 231 = 1452

As the percentages of profit and loss are equal, so

1452/a =1683/b

But we cannot determine the C.P. of B. So, statements II and III are not sufficient together.

From I and III together:

C.P. of A = 4400

Let C.P. of B be Rs. b.

So, S.P. of B = b - 1683

But we cannot determine the C.P. of B. So, statements I and III are not sufficient together.

From I, II and III together:

From I and II, we got C.P. of B = 5100

C.P. of A = 4400

Now, total mark-up = 808

We cannot determine by how much each item was marked-up by. So, all the statements together are not sufficient.

5. Solution

Let radius of sphere is r and radius and height of cylinder is R and H respectively.

From I and II:

Height of cylinder = H = 170% of r = 1.7r.

Base radius of cylinder = R = 8 cm

We can't determine the volume of sphere because here the radius of sphere is not given.

Hence, statements I and II together are not sufficient.

From III:

Total surface area of the right circular cylinder = Surface area of the sphere

$\Rightarrow 2\pi RH + 2\pi R^2 = 4\pi r^2$

We can't determine the volume of sphere because here the radius and height of cylinder is not given.

Hence statement III alone is not sufficient.

From II and III:

Total surface area of the right circular cylinder = Surface area of the sphere

$\Rightarrow 2\pi RH + 2\pi R^2 = 4\pi r^2$

Base radius of cylinder = R = 8 cm

We can't determine the volume of sphere because here the height of cylinder is not given.

Hence statements II and III together are not sufficient.

From I, II and III:

Height of cylinder = H = 170% of r = 1.7r

Base radius of cylinder = R = 8 cm

Total surface area of the right circular cylinder = Surface area of the sphere

$\Rightarrow 2\pi RH + 2\pi R^2 = 4\pi r^2$

$\Rightarrow 2 * 8 * 1.7r + 2 * 8^2 = 4 * r^2$

$\Rightarrow r = 10$ cm

Volume of sphere = 4/3 πr^3=4/3* π* 10^3 =4000/3 π cm^3
Hence all statements I, II and III together are sufficient.

6. Solution

Let Jaya's times period of investment be a months and Sona's time period of investment be b months.
From I:
Jaya and Sona started the business with investments of Rs. 27000 and Rs. 22500 respectively.
profit earned by Jaya is 60% of the profit earned by Sona.
Ratio of their investment = 6000 * a: 5000 * b
=> 6a/5b = 60/100
=> a/b = 1/2
From this data we cannot find the answer.
From II:
Jaya and Sona started the business with investments in the ratio of 3: 5 and they earned profits of Rs. 21000 and Rs. 70000 respectively
So, ratio of their investment = 3a : 5b
=> 3a/5b = 21000/70000
=> a/b = 1/2
From this data we cannot find the answer.
From I and II:
isn't feasible as ratios of investments are different.
So, both statements I and II together are not sufficient.

7. Solution

Total no. of students who play basketball = 2 * 34 = 68
Total no. of students who do not play basketball = 130 - 68 = 62
Let the no. of girls from A and B who play be m and n respectively and boys from A and B who play be o and p respectively. Let the no. of girls from A and B who don't play be q and r respectively and boys from A and B who don't play be s and t respectively.
m + n + o + p = 68
q + r + s + t = 62
m + o + q + s = 60
n + p + r + t = 70
From I alone:
No. of boys who play basketball = 2 * 20 = 40, i.e., o + p = 40
So, no. of girls who play basketball = 68 - 40 = 28, i.e., m + n = 28
o + s = 32
No. of girls in A = 60 - 32 = 28, i.e., m + q = 28
q = 8, so m = 20
It can't be determined how many girls don't play. So, I alone is not sufficient.
From II alone:
s = 12
p = 2t
It can't be determined how many girls don't play. So, II alone is not sufficient.
From I and II together:
q = 8, m = 20, s = 12
o + s = 32, so o = 20
o + p = 40, so p = 20
m + n = 28, so n = 8
p = 2t, so t = 10
So, q + r + s + t = 62
q + r = 62 - 12 - 10 = 40
40 girls don't play. So, both the statements together are necessary.

8. Solution

Let the distance between home and school and his original speed is D and S respectively.
Time taken to cover that distance with original speed = D/S
From I:
According to the question:
D/(S - 5) = (D/S) + (18/60)
D/(S - 5) = (D/S) + 0.3 ..... (1)
We can't calculate the required distance between home and school of Priyam.
Statement I alone is not sufficient.
From II:
D/(S + 10) = (D/S) - (14.4/60)
D/(S + 10) = (D/S) - 0.24 ..... (2)
We can't calculate the required distance between home and school of Priyam.
Statement II alone is not sufficient.
From I and II:
From statement I we get:
D/(S - 5) = (D/S) + 0.3 ..... (1)
From statement II we get:
D/(S + 10) = (D/S) - 0.24 ..... (2)
From (1) and (2):
[{(S - S + 5)/S(S - 5)}/{S + 10 - S}/S(S + 10)] = 5/4
[5(S + 10)]/[10(S - 5)] = 5/4
4S + 40 = 10S - 50
S = 15
From equation (1):
D/10 = D/15 + 0.3
D/30 = 0.3
S = 9 km
Statements I and II together are sufficient.

9. Solution

Let the efficiency of A be 4a, then B's efficiency = 5a and C's efficiency = 3a units per day
Total work done by A and C together in 15 days = (4a + 3a)*15 = 7a*15 units
Let the efficiency of D be d units per day
Then, 7a*15/(5a + d) = 20
105a = 100a + 20d
5a = 20d
d = 5a/20 = 0.25a
Ratio of the efficiency of A and D = 4a: 0.25a = 16: 1

10. Solution

175.02 + 25.05 X 24.79 - 243.04 ÷ 2.97 X 9.99 = ?
175 + 25 X 25 - 243 ÷ 3 X 10 = ?
175 + 25 X 25 - 81 X 10 = ?
175 + 625 - 810 = ?
? = -10

11. Solution
? = (45 x 29 - 10)/35
= (1305 - 10)/35
= 1295/35 = 37
12. Solution
$(?)^2 \approx 14^2 - 9 - 5^3$
= 196 - 9 - 125 = 62
So, ? ≈ 8
13. Solution
? ≈ (20 x √169)/√2704
= (20 x 13/52) = 5
14. Solution
Let the cost price be Rs.100
Then, marked price = 100* 140/100 = Rs.140
Given, they sell half of the stock at the marked price. So,
Selling price of half of the stock = 140* ½ = Rs.70
Given, they sell one-quarter of the stock at the price which comes after giving discount of 20% on the marked price. So,
Selling price of one-quarter of the stock = 0.80* (140* ¼) = 0.80* 35 = Rs.28
Given, they sell rest at the price which comes after giving discount of 30% on the marked price. So,
Selling price of rest of the stock = 0.70* (140 *1/4) = 0.70 * 35 = Rs 24.5
Total selling price = 70 + 28 + 24.5 = Rs.122.5
Required profit percentage = 22.5%
15. Solution
Total quantity of mixture = 60L
Percentage of camphor oil in initial mixture = 30%
Percentage of camphor oil in final mixture = 24.75%
So,
30/100 * (1 - x/60) (1 - y/60) = 24.75/100
(60 - x)(60 - y) = 24.75* 3600/30
(60 - x)(60 - y) = 2970.... (1)
From option A,
x = 6, y = 5
LHS = 54* 55 = 2970 = RHS
So, option A satisfies the blank.
From option B,
x = 9, y = 8
LHS = 51* 52 = 2652 ¹ RHS
So, option B does not satisfy the blank.
From option C,
x = 10, y = 0.6
LHS = 50* 59.4 = 2970 = RHS
So, option C satisfies the blank.
16. Solution
Total quantity of milk consumed in Jan and Feb together by family A = 60 L
Difference in quantity of milk consumed in Jan and Feb by family A = 10 L
Since, in each family, quantity of milk consumed in Jan is more than that consumed in Feb.
So, quantity of milk consumed in Jan by family A = (60 + 10)/2 = 35 L
Quantity of milk consumed in Feb by family A = (60 - 10)/2 = 25 L
And Quantity of milk consumed in Mar by family A = 25 * (6/5) = 30 L
Similarly, we can calculate for other families as well.

Family	Milk consumed in Jan (in L)	Milk consumed in Feb (in L)	Milk consumed in Mar (in L)
A	35	25	30
B	30	15	21
C	40	35	28
D	30	25	20
E	45	25	35

Total quantity of milk consumed by family A in all the 3 months together = 35 + 25 + 30 = 90 L
Total quantity of milk consumed by family D in all the 3 months together = 30 + 25 + 20 = 75 L
Required ratio = 90: 75
= 6: 5
17. Total quantity of milk consumed by family C in Jan, Feb, Mar and Apr together = 35 * 4 = 140 L
So, quantity of milk consumed by family C in Apr = 140 - 40 - 35 - 28 = 37 L
Since quantity of milk consumed by family C in Jan = 40 L
So, required percentage = (37/40) * 100
= 92.5%
18. Total quantity of milk consumed by families A, C and D together in Mar = 30 + 28 + 20 = 78 L
Required average = 78/3
= 26 L
19. Total quantity of milk consumed by family B in all the 3 months together = 30 + 15 + 21 = 66 L
Total quantity of milk consumed by family E in all the 3 months together = 45 + 25 + 35 = 105 L
Required percentage = (66/105) * 100
= 63% (approx.)
20. Total quantity of milk consumed by all the 5 families together in Feb = 25 + 15 + 35 + 25 + 25
= 125 L
21. Solution
$2x^2 - 15x + 25 > 0$
$\Rightarrow 2x^2 - 10x - 5x + 25 > 0$
$\Rightarrow 2x(x - 5) - 5(x - 5) > 0$
$\Rightarrow (x - 5)(2x - 5) > 0$
$\Rightarrow x < 5/2$ and $x > 5$
So, x can be {1, 2, 6, 7, 8, 9, 10, 11, 12}
Required probability = 9/12 = 3/4
22. Solution
Let the maximum marks be 'T'.
For R: 0.7T = T - 36

T = 120
For P: 0.25T + 5 = pass marks
Pass marks = 0.25 * 120 + 5 = 35
Hence, for Q:
(n/100) * 120 - 15 = 35
n = 50 * 100/120
n = 41.66%

23. Solution

(i)
8 * 0.5 - 0.5 = 3.5 = a
3.5 * 1 - 1 = 2.5
2.5 * 2 - 2 = 3
3 * 4 - 4 = 8
8 * 8 - 8 = 56
(ii)
29 - 1 = 28
28 - 3 = 25
25 - 5 = 20
20 - 7 = 13
13 - 9 = 4 = b
(iii)
c * 2 + 2 = 9
c = 3.5
9 * 3 + 3 = 30
30 * 4 + 4= 124
124 * 5 + 5 = 625
625 * 6 + 6 = 3756
Hence, a = c < b

24. Solution

(i)
7 * 2 + 2 = 16
16 * 2 + 2 = 34
34 * 2 + 2 = 70 = a
70 * 2 + 2 = 142
142 * 2 + 2 = 286
(ii)
Difference of difference:

3	5	15	36	71	123
2	10	21	35	52	
8	11	14	17		
3	3	3			

b = 71
(iii)
(18 - 1) * 2 = 34
(34 + 1) * 2 = 70 = c
(70 - 1) * 2 = 138
(138 + 1) * 2 = 278
(278 - 1) * 2 = 554
Hence, a = c < b

25. Solution

(i)
5 * 1 = 5
5 * 3 = 15
15 * 5 = 75 = a
75 * 7 = 525
525 * 9 = 4725
(ii)
34 + 18 = 52
52 + 17 = 69 = b
69 + 16 = 85
85 + 15 = 100
100 + 14 = 114
(iii)
18 * 0.5 + 3 = 12
12 * 1 + 3 = 15
15 * 1.5 + 3 = 25.5
25.5 * 2 + 3 = 54 = c
54 * 2.5 + 3 = 138
Hence, a > b > c

26. Solution

Let the heights of Jayesh, Mayesh and Lokesh are a cm, b cm and c cm, respectively.
a: b = 6: 7 and b: c = 5: 6
So, a: b: c = 30: 35: 42
Let a = 30h, b = 35h and c = 42h
1.5a + 2c = 580.5
=> 1.5 * 30h + 2 * 42h = 580.5
=> 129h = 580.5
=> h= 4.5
Thus, a = 30 * 4.5 = 135, b = 35 * 4.5 = 157.5, and c = 42 * 4.5 = 189
So, required average = (135 + 157.5 + 189)/3 = 160.5 cm

27. Solution

Let the amount invested in each of scheme A and scheme B be Rs. P.
ATQ,
[(P* 6* 2) /100] + [(P* 10* 4) /100] = 39390
[12P/100] + [40P/100] = 39390
52P/100 = 39390
P = 75750
Therefore, total amount invested in both schemes together = 75750* 2 = Rs.151500.

28. Solution

Let investment of A and B is 'a' and '70000 - a' respectively.
Investment of C = 3a
Profit weightage of A = [a * 6] = 6a
Profit weightage of B = [(70000 - a) * (x + 0.5)] = (70000 - a)(x + 0.5)
Profit weightage of C = [3a * (6 - x)] = 3a(6 - x)
According to the question
6a: 3a(6 - x) = 4: 5
30 = 72 - 12x
12x = 42

x = 3.5
Ratio of profit of A, B and C = 6a: (70000 - a)(x + 0.5): 3a(6 - x)
= 6a: (280000 - 4a): 7.5a
Now,
[(280000 - 4a - 6a)/(6a + 280000 - 4a + 7.5a)] = 1200/20700 = 4/69
69(280000 - 10a) = 4(280000 + 9.5a)
69 * 280000 - 690a = 4* 280000 + 38a
728a = 65 * 280000
a = 25000
Ratio of profit of A, B and C in the business = 6a: (280000 - 4a): 7.5a
= 150000: 180000: 187500
= 20: 24: 25
Investment of A = a = Rs.25000
Investment of B = 70000 - a = Rs.45000
Required ratio = 25000: 45000 = 5: 9

29. Solution
Let investment of A and B is 'a' and '70000 - a' respectively.
Investment of C = 3a
Profit weightage of A = [a * 6] = 6a
Profit weightage of B = [(70000 - a) * (x + 0.5)] = (70000 - a)(x + 0.5)
Profit weightage of C = [3a * (6 - x)] = 3a(6 - x)
According to the question
6a: 3a(6 - x) = 4: 5
30 = 72 - 12x
12x = 42
x = 3.5
Ratio of profit of A, B and C = 6a: (70000 - a)(x + 0.5): 3a(6 - x)
= 6a: (280000 - 4a): 7.5a
Now,
[(280000 - 4a - 6a)/(6a + 280000 - 4a + 7.5a)] = 1200/20700 = 4/69
69(280000 - 10a) = 4(280000 + 9.5a)
69 * 280000 - 690a = 4* 280000 + 38a
728a = 65 * 280000
a = 25000
Ratio of profit of A, B and C in the business = 6a: (280000 - 4a): 7.5a
= 150000: 180000: 187500
= 20: 24: 25
Persons B left the business after 'x + 0.5' years.
Required years = 3.5 + 0.5 = 4 years

30. Solution
Let investment of A and B is 'a' and '70000 - a' respectively.
Investment of C = 3a
Profit weightage of A = [a * 6] = 6a
Profit weightage of B = [(70000 - a) * (x + 0.5)] = (70000 - a)(x + 0.5)
Profit weightage of C = [3a * (6 - x)] = 3a(6 - x)
According to the question
6a: 3a(6 - x) = 4: 5
30 = 72 - 12x
12x = 42
x = 3.5
Ratio of profit of A, B and C = 6a: (70000 - a)(x + 0.5): 3a(6 - x)
= 6a: (280000 - 4a): 7.5a
Now,
[(280000 - 4a - 6a)/(6a + 280000 - 4a + 7.5a)] = 1200/20700 = 4/69
69(280000 - 10a) = 4(280000 + 9.5a)
69 * 280000 - 690a = 4* 280000 + 38a
728a = 65 * 280000
a = 25000
Ratio of profit of A, B and C in the business = 6a: (280000 - 4a): 7.5a
= 150000: 180000: 187500
= 20: 24: 25
Profit share of C in the business = 20700 * (25/69) = Rs.7500
Investment of C = 3a = Rs.75000
Required percent = (7500/75000) * 100 = 10%

31. Solution
Let investment of A and B is 'a' and '70000 - a' respectively.
Investment of C = 3a
Profit weightage of A = [a * 6] = 6a
Profit weightage of B = [(70000 - a) * (x + 0.5)] = (70000 - a)(x + 0.5)
Profit weightage of C = [3a * (6 - x)] = 3a(6 - x)
According to the question
6a: 3a(6 - x) = 4: 5
30 = 72 - 12x
12x = 42
x = 3.5
Ratio of profit of A, B and C = 6a: (70000 - a)(x + 0.5): 3a(6 - x)
= 6a: (280000 - 4a): 7.5a
Now,
[(280000 - 4a - 6a)/(6a + 280000 - 4a + 7.5a)] = 1200/20700 = 4/69
69(280000 - 10a) = 4(280000 + 9.5a)
69 * 280000 - 690a = 4* 280000 + 38a
728a = 65 * 280000
a = 25000
Ratio of profit of A, B and C in the business = 6a: (280000 - 4a): 7.5a
= 150000: 180000: 187500
= 20: 24: 25
Investment of A = a = Rs.25000
Total profit amount from the business = Rs.20700
Required difference = 25000 - 20700 = Rs.4300

32. Number of students who are in sports club = 5200 - 2860 = 2340

	Total	Boys	Girls	Music club	Sports club
Intermediate	5600	3000	2600	3200	2400
UG	5200	2400	2800	3000	2200
PG	5200	4600	600	2860	2340

Total number of Intermediate students = 5600
Total number of PG students = 5200
Required difference = 5600 - 5200 = 400

33. Number of Intermediate students who are in music club group = 3200
Number of UG students who are in music club group = 3000

Number of PG students who are in music club group = 2860
Total number of students in the college who are in music club group = 3200 + 3000 + 2860
= 9060

34. Number of UG boys in the college = 2400
Number of PG girls in the college = 600
Required percentage = 2400/600 x 100 = 400%

.35. Number of Intermediate boys = 3000
Number of Intermediate students who are in sports club group = 2400
Number of PG students who are in sports club group = 2340
Required average = (3000 + 2400 + 2340)/3
= 7740/3
= 2580

36. Number of Intermediate girls in the college = 2600
Number of UG students in the college who are in sports club group = 2200
Required ratio = 2600 : 2200
= 13:11

37. Solution

Let the speed of train A be 't' km/hr and train B be 'y' km/hr
ATQ, (360/t) - (360/y) = 2 hours ------(1)
In opposite direction, they take 144 minutes to meet
360/ (t + y) = 12/5 hours ----------(2)
=> from equation 2, t + y = 150
=> t = 150 -y ------(3)
Putting (3) in (1), we get $y^2 + 210y - 27000 = 0$
We get, y = 90 and - 300
Ignoring negative value, we get y = 90 km/hr
Hence, t = 150 - 90 = 60 km/hr
Required time by train B = 360/90 = 4 hours.

38. Solution

Let the number of white and black balls in the bag initially be 'y' and 't' respectively.

From (A)

Given, t = 54

$$\Rightarrow \frac{y}{t-12} = \frac{11}{14} \text{ -----(1)}$$

Putting t = 54 in equation (1), we get:

$$\Rightarrow \frac{y}{42} = \frac{11}{14}$$

=> y = (3 x 11) = 33

$$\text{Now, } \frac{33+15}{42-6} = \frac{48}{36} = 4:3$$

So, it satisfied.

From (B)

Given, t = 66

$$\Rightarrow \frac{y}{t-12} = \frac{7}{9} \text{ -----(1)}$$

Putting t = 66 in equation (1), we get:

$$\Rightarrow \frac{y}{54} = \frac{7}{9}$$

=> y = (6 x 7) = 42

$$\text{Now, } \frac{42+15}{54-6} = \frac{57}{48} = 19:16$$

So, it didn't satisfy.

From (C)

Given, t = 93

$$\Rightarrow \frac{y}{t-12} = \frac{10}{27} \text{ -----(1)}$$

Putting t = 93 in equation (1), we get:

$$\Rightarrow \frac{y}{81} = \frac{10}{27}$$

=> y = (3 x 10) = 30

$$\text{Now, } \frac{30+15}{81-6} = \frac{45}{75} = 3:5$$

So, it satisfied.

39. Solution

The percentage increase can be calculated even without knowing the radius and height. Suppose the radius is R and height is H.
Volume = $\pi R^2 H$
A -
New volume = $\pi(1.25\ R)^2(1.2\ H) = 1.875\ \pi R^2 H$
Increase in volume = 87.5%
B -
New volume = $\pi(1.3\ R)^2(1.1\ H) = 1.859\ \pi R^2 H$
Increase in volume = 85.9%
C -
New volume = $\pi(1.1\ R)^2(1.4\ H) = 1.694\ \pi R^2 H$
Increase in volume = 69.4%
D -
New volume = $\pi(1.2\ R)^2(1.25\ H) = 1.8\ \pi R^2 H$
Increase in volume = 80%
Only A and D satisfy the condition.

40. Solution

Let present ages of mother and daughter are 'a' years and 'b' years respectively. Then,
a = 57 - b
And, (a - 12): (b - 12) = 8: 3
(57 - b - 12): (b - 12) = 8: 3
b = 21 years
And, a = 57 - 21 = 36 years
Therefore, ratio of age of mother before 8 years and age of daughter after 14 years
= (36 - 8): (21 + 14)
= **4: 5**