



Your Personal Exams Guide



NDA



CDS



SSC CGL



CBSE UGC NET



IAS



SSC CHSL



CTET



MPSC



AFCAT



CSIR UDC NET



IBPS PO



UP POLICE



SSC MTS



SBI PO



BPSC



UP TET



IBPS RRB



IBPS CLERK



IES



UPSC CAPF



SSC Stenogr..



RRB NTPC



SSC GD



RBI GRADE B



RBI Assistant



DSSSB

SSC CGL 2016 (Tier-II: Quant) (Re-Exam) Prev. Yr. Paper (12-Jan-2017)

Total Time: 2 Hour

Total Marks: 200

Instructions

Sl No.	Section Name	No. of Question	Maximum Marks	Negative Marks	Positive Marks
1	Quantitative Aptitude	100	200	0.5	2

- 1.) A total of 120 minutes is allotted for the examination.
- 2.) The server will set your clock for you. In the top right corner of your screen, a countdown timer will display the remaining time for you to complete the exam. Once the timer reaches zero, the examination will end automatically. The paper need not be submitted when your timer reaches zero.
- 3.) There will, however, be sectional timing for this exam. You will have to complete each section within the specified time limit. Before moving on to the next section, you must complete the current one within the time limits.

Your Personal Exams Guide

Quantitative Aptitude

1. Twenty-one times of a positive number is less than its square by 100. The value of the positive number is (+2, -0.5)
- a. 25
 - b. 26
 - c. 42
 - d. 41
-
2. Two pipes of length 1.5 m and 1.2 m are to be cut into equal pieces without leaving any extra length of pipes. The greatest length of the pipe pieces of the same size which can be cut from these two lengths will be (+2, -0.5)
- a. 0.41 m
 - b. 0.13 m
 - c. 0.3 m
 - d. 0.4 m
-
3. A General of an Army wants to create a formation of the square from 36562 army men. After arrangement, he found some army men remained unused. Then the number of such army men remained unused was: (+2, -0.5)
- a. 97
 - b. 65
 - c. 81

d. 36

4. The smallest number, which should be added to 756896 so as to obtain a multiple of 11, is (+2, -0.5)

a. 2

b. 5

c. 1

d. 3

5. A boy found the answer to the question "Subtract the sum of $\frac{1}{4}$ and $\frac{1}{5}$ from unity and express the answer in decimals" as 0.45. The percentage of error in his answer was (+2, -0.5)

a. $(200/11)\%$

b. 50%

c. $(100/11)\%$

d. 10%

6. The product of two numbers is 48. If one number equals "The number of wings of a bird plus 2 times the number of fingers on your hand divided by the number of wheels of a Tricycle". Then the other number is (+2, -0.5)

a. 18

b. 12

c. 10

d. 9

7. Natu and Buchku each have a certain number of oranges. Natu says to Buchku, "If you give me 10 of your oranges, I will have twice the number of oranges left with you". Buchku replies, "If you give me 10 of your oranges, I will have the same number of oranges as left with you". What is the number of oranges with Natu and Buchku, respectively? (+2, -0.5)

a. 50, 20

b. 70, 50

c. 20, 50

d. 50, 70

8. A square playground measures 1127.6164 sq.m. If a man walks $2\frac{9}{20}m$ a minute, the time taken by him to walk one round around it is approximately: (+2, -0.5)

a. 54.62 min

b. 50.82 min

c. 50.62 min

d. 54.82 min

9. Three electronic devices make a beep after every 48 sec, 72 sec and 108 sec respectively. They beeped together at 10 a.m. The time when they will next make a beep together at the earliest is (+2, -0.5)

a. 10:07:36 hrs

- b. 10:07:12 hrs
 - c. 10:07:24 hrs
 - d. 10:07:48 hrs
-

10. Two baskets together have 640 oranges. If $(1/5)^{\text{th}}$ of the oranges in the first basket be taken to the second basket, then the oranges becomes equal in both basket. The number of oranges in the first basket is (+2, -0.5)
- a. 800
 - b. 600
 - c. 400
 - d. 300
-

11. P can do $(1/4)^{\text{th}}$ of work in 10 days, Q can do 40% of work in 40 days and R can do $(1/3)^{\text{rd}}$ of work in 13 days. Who will complete the work first? (+2, -0.5)
- a. P
 - b. Q
 - c. R
 - d. Both P and R
-

12. Working 7 hours in a day, 4 men can do a piece of work in 8 days. Working 8 hours in a day, the required number of men to perform the same work in 4 days will be (+2, -0.5)

- a. 8
 - b. 9
 - c. 7
 - d. 4
-

13. 35 persons are engaged to complete a work in 60 days. After 32 days it is observed that only $(2/5)^{\text{th}}$ part of the work has been done. The number of persons to be engaged to complete the remaining work in the said period is (+2, -0.5)

- a. 20
 - b. 35
 - c. 25
 - d. 30
-

14. The time taken by 4 men to complete a job is double the time taken by 5 children to complete the same job. Each man is twice as fast as a woman. How long will 12 men, 10 children and 8 women take to complete a job, given that a child would finish the job in 20 days? (+2, -0.5)

- a. 4 days
 - b. 2 days
 - c. 3 days
 - d. 1 day
-

15. The labourers A, B, C were given a contract of Rs. 750 for doing a certain piece of work. All the three together can finish the work in 8 days. A and C together can do it in 12 days, while A and B together can do it in $13\frac{1}{3}$ days. The money will be divided in the ratio. (+2, -0.5)

a. 4 : 5 : 6
b. 4 : 7 : 5
c. 5 : 7 : 4
d. 5 : 6 : 8

16. A and B together can complete a piece of work in 12 days. They worked together for 5 days and then A alone finished the rest work in 14 days. A alone can complete the work in _____. (+2, -0.5)

a. 22 days
b. 18 days
c. 24 days
d. 20 days

17. A shopkeeper offers 15% discount on all plastic toys. He offers a further discount of 4% on the reduced price to those customers who pay cash. What does a customer have to pay (in Rs) in the case for a toy of Rs 200? (+2, -0.5)

a. 133.7
b. 129.8
c. 153.3

d. 163.2

18. A photographer allows a discount of 10% on the advertised price of a camera. The price (in Rs) that must be marked on the camera, which cost him Rs 600, to make a profit of 20% would be (+2, -0.5)

a. 800

b. 850

c. 650

d. 700

19. A dinner set is quoted for Rs. 1500. A customer pays Rs. 1173 for it. If the customer got a series of two discounts and the rate of the first discount is 15% then the rate of the second discount was, (+2, -0.5)

a. 8%

b. 7%

c. 9%

d. 15%

20. A dishonest dealer defrauds to the extent of $x\%$ in buying as well as selling his goods by using faulty weight. What will be the gain percent on his outlay? (+2, -0.5)

a. $2x\%$

b. $\left(\frac{10}{x} + x^2\right)\%$

c. None of these

d. $\left(x + \frac{x^2}{100}\right) \%$

21. In a college union, there are 48 students. The ratio of the number of boys to the number of girls is 5 : 3. The number of girls to be added in the union, so that the number of boys to girls in 6 : 5 is (+2, -0.5)

a. 17

b. 7

c. 12

d. 6

22. There are three bottles of a mixture of syrup and water of ratios 2 : 3, 3 : 4 and 7 : 5. 10 Litres of first and 21 Litres of second bottles are taken. How much quantity from the third bottle is to be taken so that the final mixture from three bottles will be of ratios 1 : 1. (+2, -0.5)

a. 35 Litres

b. 25 Litres

c. 30 Litres

d. 20 Litres

23. In a coloured picture of blue and yellow colour, blue and yellow colour is used in the ratio of 4 : 3 respectively. If in the upper half, blue : yellow is 2 : 3, then in the lower half blue : yellow is (+2, -0.5)

- a. 1:1
- b. 2:1
- c. 26:9
- d. 9:26

24. A and B start an enterprise together, with A as active partner. A invests Rs. 4000 and Rs. 2000 more after 8 months. B invests Rs. 5000 and withdraws Rs. 2000 after 9 months. Being the active partner, A takes Rs. 100 per month as an allowance, from the profit. What is the share of B if the profit for the year is Rs. 6700? (+2, -0.5)

- a. Rs. 3250
- b. Rs. 2800
- c. Rs. 3350
- d. Rs. 2700

25. A sum of Rs. 15525 is divided among Sunil, Anil and Jamil such that if Rs. 22, Rs. 35 and Rs. 48 be diminished from their shares respectively, their remaining sums shall be in the ratio 7 : 10 : 13. What would have been the ratio of their sums if Rs. 16, Rs. 77 and Rs. 37 respectively were added to their original shares? (+2, -0.5)

- a. 9:13:17
- b. 18:26:35
- c. 36:52:67
- d. None of these

26. A's income is Rs 140 more than B's income and C's income is Rs 80 more than D's. If the ratio of A's and C's income is 2 : 3 and the ratio of B's and D's income is 1 : 2, then the incomes of A, B, C and D are respectively (+2, -0.5)

- a. Rs 260, Rs 120, Rs 320 and Rs 240
- b. Rs 300, Rs 160, Rs 600 and Rs 520
- c. Rs 400, Rs 260, Rs 600 and Rs 520
- d. Rs 320, Rs 180, Rs 480 and Rs 360

27. A batsman has a certain average of runs for 12 innings. In the 13th inning he scores 96 runs thereby increasing his average by 5 runs. What will be his average after 13th inning? (+2, -0.5)

- a. 42
- b. 36
- c. 32
- d. 28

28. A team of 8 persons joins in a shooting competition. The best marksman scored 85 points. If he had scored 92 points, the average score for the team would have been 84. The number of points the team scored was (+2, -0.5)

- a. 672
- b. 645
- c. 588

d. 665

29. A librarian purchased 60 story books for his library. But he found that he could get 4 extra books by spending Rs 336 more and then the overall average price per book would be reduced by Re 1. The previous average price of each book was (+2, -0.5)

a. Rs 84

b. Rs 83

c. Rs 100

d. Rs 68

30. In an exam, the average marks obtained by John in English, Maths, Hindi and Drawing were 50. His average marks in Maths, Science, Social Studies and Craft were 70. If the average marks in all seven subjects is 58, his score in maths was (+2, -0.5)

a. 50

b. 60

c. 74

d. 52

31. The average weight of 3 men A, B and C is 84 Kg. Another man D joins the group and the average now becomes 80 Kg. If another man E whose weight is 3 Kg more than that of D, replaces A then the average weight of B, C, D and E becomes 79 Kg. What is the weight of A? (+2, -0.5)

- a. 80 Kg
 - b. 75 Kg
 - c. 70 Kg
 - d. 72 Kg
-

32. The average monthly salary of all the employees in a factory is Rs 8840. If the average salary of all the officers is Rs 15000 and that of the remaining employees is Rs 8000, then what is the percentage of the officers among the employees? (+2, -0.5)

- a. 10
 - b. 12
 - c. $8\frac{1}{3}$
 - d. 15
-

33. The ratio of cost price and selling price of an article is 20 : 21. Then gain percent on it is (+2, -0.5)

- a. 5
 - b. 10
 - c. 8
 - d. 6
-

34. The ratio of cost price and selling price 25 : 26. The percent of profit will be (+2, -0.5)

- a. 1%
- b. 4%
- c. 25%
- d. 26%

35. A shopkeeper buys a product of Rs 150 per Kg. 15% of product was damaged. At what price (per Kg) should he sell the remaining so as to earn a profit of 20%? (+2, -0.5)

- a. Rs. $207\frac{13}{17}$
- b. Rs. $211\frac{13}{17}$
- c. 180
- d. 190

36. Mr. Kapur purchased two toy cycles for Rs. 750 each. He sold these cycles, gaining 6% on one and losing 4% on the other. The gain or loss percent in the whole transaction is (+2, -0.5)

- a. 1% loss
- b. 1.5% loss
- c. 1% gain
- d. 1.5 gain

37. The profit earned by a shopkeeper by selling a bucket at a gain of 8% is Rs 28 more than when he sells it at a loss of 8%. The cost price (in Rupees) of (+2, -0.5)

the bucket is

- a. 190
- b. 165
- c. 175
- d. 170

38. A man bought 500 metres of electronic wire at 50 paise per metre. He sold 50% of it at a profit of 5%. At what percent should he sell the remainder so as to gain 10% on the whole transaction? (+2, -0.5)

- a. 12.5%
- b. 20%
- c. 15%
- d. 13%

39. A line of length 1.5 metres was measured as 1.55 metres by mistake. What will be the value of the error percent? (+2, -0.5)

- a. 0.05%
- b. $3\frac{1}{3}\%$
- c. $3\frac{7}{31}\%$
- d. 0.5%

40. A businessman imported Laptops, worth Rs 210000, Mobile phones worth Rs 100000 and Television sets worth Rs 150000. He had to pay 10% duty on laptops, 8% on Phones and 5% on Television sets as a special case. How much total duty (in Rupees) he had to pay on all items as per above details? (+2, -0.5)
- a. 37000
 - b. 36500
 - c. 37500
 - d. 37250
-
41. A man spend $7\frac{1}{2}\%$ of his money and after spending 75% of the remaining, he had Rs. 370 left. How much money did he have? (+2, -0.5)
- a. 1200
 - b. 1500
 - c. 1600
 - d. 1400
-
42. On a certain date, Pakistan has a success rate of 60% against India in all the ODIs played between the two countries. They lost the next 30 ODIs in a row to India and their success rate comes down to 30%. The total number of ODIs played between the two countries is (+2, -0.5)
- a. 30
 - b. 60

c. 45

d. 50

43. Two donkeys are standing 400 meters apart. First donkey can run at a speed of 3 m/sec and the second can run at 2 m/sec. If two donkeys run towards each other after how much time (in sec) will they bump into each other? (+2, -0.5)

a. 400

b. 80

c. 60

d. 40

44. Rubi goes to a multiplex at the speed of 3 km/hr to see a movie and reaches 5 minutes late. If she travels at the speed of 4 Km/hr she reaches 5 minutes early. Then the distance of the multiplex from her starting point is (+2, -0.5)

a. 2 km

b. 2 m

c. 5 m

d. 5 km

45. A man travels some distance at a speed of 12 km/hr and returns at a speed of 9 km/hr. If the total time taken by him is 2 hrs 20 min, the distance is (+2, -0.5)

- a. 35 Km
 - b. 12 Km
 - c. 9 Km
 - d. 21 Km
-

46. A and B are 15 kms apart and when travelling towards each other meet after half an hour whereas they meet two and a half hours later if they travel in the same direction. The faster of the two travels at the speed of (+2, -0.5)

- a. 15 km/hr
 - b. 18 km/hr
 - c. 10 km/hr
 - d. 8 km/hr
-

47. The sum for 2 years gives a compound interest of Rs 3225 at 15% rate. Then sum is (+2, -0.5)

- a. 32250
 - b. 20000
 - c. 10000
 - d. 15000
-

48. In 3 years Rs 3000 amounts to Rs 3993 at x% compound interest, compounded annually. The value of x is (+2, -0.5)

- a. 8
 - b. 10
 - c. 5
 - d. $3\frac{1}{3}$
-

49. A man borrowed some money and agreed to pay-off by paying Rs 3150 at the end of the 1st year and Rs 4410 at the end of the 2nd year. If the rate of compound interest is 5% per annum, then the sum is (+2, -0.5)

- a. Rs 5000
 - b. Rs 9200
 - c. Rs 6500
 - d. Rs 7000
-

50. Rs 260200 is divided between Ram and Shyam so that the amount that Ram receives in 3 years is the same as that Shyam receives in 6 years. If the interest is compounded annually at the rate of 4% per annum then Ram's share (approx) is (+2, -0.5)

- a. 137745
 - b. 152000
 - c. 108200
 - d. 125000
-

51. The radii of two cylinders are in the ratio 2 : 3 and their heights are in the ratio 5 : 3. The ratio of their volumes is (+2, -0.5)

- a. 4 : 9
- b. 27 : 20
- c. 20 : 27
- d. 9 : 4

52. Three cubes of iron whose edges are 6 cm, 8 cm and 10 cm respectively are melted and formed into a single cube. The edge of the new cube formed is (+2, -0.5)

- a. 18 cm
- b. 14 cm
- c. 12 cm
- d. 16 cm

53. The radii of two concentric circles are 68 cm and 22 cm. The area of the closed figure bounded by the boundaries of the circles is (+2, -0.5)

- a. 4080π sq. cm.
- b. 4110π sq. cm.
- c. 4140π sq. cm.
- d. 4050π sq. cm.

54. The radius of a sphere is 6 cm. It is melted and drawn into a wire of radius 0.2 cm. The length of the wire is (+2, -0.5)

- a. 81 m
- b. 75 m
- c. 80 m
- d. 72 m

55. The radius of a wire is decreased to one – third. If volume remains the same, length will increase by (+2, -0.5)

- a. 3 times
- b. 9 times
- c. 6 times
- d. 1.5 times

56. In a trapezium ABCD, AB and CD are parallel sides and $\angle ADC = 90^\circ$. If AB = 15 cm, CD = 40 cm and diagonal AC = 41 cm. Then the area of the trapezium ABCD is (+2, -0.5)

- a. 245 cm^2
- b. 247.5 cm^2
- c. 240 cm^2
- d. 250 cm^2

57. The area of a rhombus having one side 10 cm and one diagonal 12 cm is (+2, -0.5)

- a. 48 cm^2
- b. 144 cm^2
- c. 96 cm^2
- d. 192 cm^2

58. The cost of levelling a circular field at 50 Paise per square metre is Rs. 7700. (+2, -0.5)
The cost (in Rs) of putting up a fence all round it at Rs. 1.20 per meter is
(Use $\pi = 22/7$)

- a. Rs. 264
- b. Rs. 132
- c. Rs. 528
- d. Rs. 1056

59. From the four corners of a rectangular sheet of dimensions $25 \text{ cm} \times 20 \text{ cm}$, (+2, -0.5)
square of side 2 cm is cut off from four corners and a box is made. The
volume of the box is

- a. 500 cm^3
- b. 1000 cm^3
- c. 828 cm^3
- d. 672 cm^3

60. The height and the total surface area of a right circular cylinder are 4 cm and 8π sq.cm. respectively. The radius of the base of cylinder is (+2, -0.5)

- a. 2 cm
- b. $(2 - \sqrt{2})$ cm
- c. $(2\sqrt{2} - 2)$ cm
- d. $\sqrt{2}$ cm

61. The radius of a cylindrical milk container is half its height and total surface area of the inner part is 616 sq.cm. The amount of milk that the container can hold, approximately, is [Use : $\sqrt{5} = 2.23$ and $\pi = 22/7$] (+2, -0.5)

- a. 1.53 litres
- b. 1.82 litres
- c. 1.42 litres
- d. 1.71 litres

62. A solid brass sphere of radius 2.1 dm is converted into a right circular cylindrical rod of length 7cm. The ratio of total surface areas of the rod to the sphere is (+2, -0.5)

- a. 7 : 3
- b. 3 : 1
- c. 3 : 7
- d. 1 : 3

63. The sum of the length and breadth of a rectangle is 6 cm. A square is constructed such that one of its sides is equal to a diagonal of the rectangle. If the ratio of areas of the square and rectangle is 5 : 2, the area of the square in cm^2 is (+2, -0.5)

- a. $10\sqrt{2}$
- b. 10
- c. 20
- d. $4\sqrt{5}$

64. The length of a side of an equilateral triangle is 8 cm. The area of the region lying between the circum – circle and the incircle of the triangle is (use : $\pi = 22/7$) (+2, -0.5)

- a. $50\frac{1}{7} \text{ cm}^2$
- b. $75\frac{1}{7} \text{ cm}^2$
- c. $50\frac{2}{7} \text{ cm}^2$
- d. $75\frac{2}{7} \text{ cm}^2$

65. A solid sphere of radius 3 cm is melted to form a hollow right circular cylindrical tube of length 4 cm and external radius 5 cm. The thickness of the tube is (+2, -0.5)

- a. 1.5 cm
- b. 9 cm

- c. 1 cm
 - d. 0.6 cm
-

66. If $x^2 + 1/x^2 = 98$ ($x > 0$), then the value of $x^3 + 1/x^3$ is (+2, -0.5)

- a. 970
 - b. 1030
 - c. -970
 - d. -1030
-

67. If $a + 1/b = 1$ and $b + 1/c = 1$, then the value of $c + 1/a$ is (+2, -0.5)

- a. 0
 - b. 2
 - c. 1
 - d. 3
-

68. If $x = y + z$ then $x^3 - y^3 - z^3$ is: (+2, -0.5)

- a. $-3xyz$
 - b. 0
 - c. $3xyz$
 - d. 1
-

69. If $a + b + c + d = 4$ then the value of $\frac{1}{(1-a)(1-b)(1-c)} + \frac{1}{(1-b)(1-c)(1-d)} + \frac{1}{(1-c)(1-d)(1-a)} + \frac{1}{(1-d)(1-a)(1-b)}$ is (+2, -0.5)

- a. 0
- b. $1 + abcd$
- c. 1
- d. 4

70. The simplified value of $\frac{\sqrt{3}-\sqrt{2}}{\sqrt{12}-\sqrt{18}} - \frac{1}{3} \times \sqrt{27} - \frac{1}{2} \times \sqrt[3]{27}$ is (+2, -0.5)

- a. $(\sqrt{3} - 1)$
- b. $(1 - \sqrt{3})$
- c. $\left[\sqrt{3} + 1 + \frac{1}{2} + \frac{1}{\sqrt{6}}\right]$
- d. $-\left[\sqrt{3} + 1 + \frac{1}{2} + \frac{1}{\sqrt{6}}\right]$

71. If $x = 11$, the value of $x^5 - 12x^4 + 12x^3 - 12x^2 + 12x - 1$ is (+2, -0.5)

- a. -10
- b. 12
- c. 11
- d. 10

72. If $a = \frac{1}{a-5}$ ($a > 0$), then the value of $a + 1/a$ is (+2, -0.5)

- a. $\sqrt{27}$
- b. $\sqrt{29}$
- c. $\sqrt{28}$
- d. $-\sqrt{29}$

73. If $a + 1/b = b + 1/c = c + 1/a$ (where $a \neq b \neq c$), then abc is equal to (+2, -0.5)

- a. +1
- b. -1
- c. +1 & -1
- d. None of the options

74. If $ax + by = 1$ and $bx + ay = \frac{2ab}{a^2 + b^2}$ then $(x^2 + y^2)(a^2 + b^2)$ is equal to (+2, -0.5)

- a. 1
- b. 0
- c. 0.5
- d. 2

75. If x, y, z are the three factors of $a^3 - 7a - 6$, then value of $x + y + z$ will be (+2, -0.5)

- a. 6
- b. 3

c. $3a$

d. a

76. ABCD is a cyclic quadrilateral of which AB is the diameter. Diagonals AC and BD intersect at E. If $\angle DBC = 35^\circ$, then $\angle AED$ measures (+2, -0.5)

a. 90°

b. 35°

c. 55°

d. 45°

77. In a triangle ABC, $\angle A = 70^\circ$, $\angle B = 80^\circ$ and O is the incentre of $\triangle ABC$. $\angle ACB = 2x^\circ$ and $\angle BOC = y^\circ$. The values of x and y, respectively are (+2, -0.5)

a. 15, 130

b. 35, 40

c. 30, 150

d. 15, 125

78. In a right – angled triangle $\triangle DEF$, if the length of the hypotenuse EF is 12 cm, then the length of the median DX is (+2, -0.5)

a. 3 cm

b. 12 cm

c. 4 cm

d. 6 cm

79. Two equal circles intersect so that their centres, and the points at which they intersect form a square of side 1 cm. The area (in sq.cm) of the portion that is common to the circles is (+2, -0.5)

a. $\pi/2 - 1$

b. $(\sqrt{2} - 1)$

c. $\pi/5$

d. $\pi/4$

80. PQRA is a rectangle, AP = 22 cm, PQ = 8 cm. ΔABC is a triangle whose vertices lie on the sides of PQRA such that BQ = 2 cm and QC = 16 cm, then the length of the line joining the mid points of the sides AB and BC is (+2, -0.5)

a. 5 cm

b. $4\sqrt{2}$ cm

c. 6 cm

d. 10 cm

81. ΔABC is an isosceles right – angled triangle having $\angle C = 90^\circ$. If D is any point on AB, then $AD^2 + BD^2$ is equal to (+2, -0.5)

a. CD^2

b. $2CD^2$

c. $3CD^2$

d. $4CD^2$

-
82. D and E are points on the sides AB and AC respectively of $\triangle ABC$ such that DE is parallel to BC and $AD : DB = 4 : 5$, CD and BE intersect each other at F. Then the ratio of the areas of $\triangle DEF$ and $\triangle CBF$ (+2, -0.5)

a. $81 : 1$

b. $16 : 81$

c. $16 : 25$

d. $4 : 9$

-
83. Diagonals of a trapezium ABCD with $AB \parallel CD$ intersect each other at the point O. If $AB = 2CD$, then the ratio of the areas of $\triangle AOB$ and $\triangle COD$ is (+2, -0.5)

a. $1 : 16$

b. $16 : 1$

c. $4 : 1$

d. $1 : 4$

-
84. If O is the orthocentre of $\triangle ABC$ and $\angle BOC = 100^\circ$, the measure of $\angle BAC$ is (+2, -0.5)

a. 200°

b. 180°

c. 80°

d. 100°

85. PQ and RS are common tangents to two circles intersecting at A and B. AB, when produced both sides, meet the tangents PQ and RS at X and Y, respectively. If $AB = 3$ cm, $XY = 5$ cm, then PQ (in cm) will be (+2, -0.5)

a. 3 cm

b. 2 cm

c. 5 cm

d. 4 cm

86. If $\sec A + \tan A = a$, then the value of $\cos A$ is (+2, -0.5)

a. $\frac{2a}{a^2-1}$

b. $\frac{a^2-1}{2a}$

c. $\frac{a^2+1}{2a}$

d. $\frac{2a}{a^2+1}$

87. If $\sin P + \operatorname{cosec} P = 2$, then the value of $\sin^7 P + \operatorname{cosec}^7 P$ is (+2, -0.5)

a. 2

b. 3

c. 0

d. 1

88. If $\cos x \cdot \cos y + \sin x \cdot \sin y = -1$ then $\cos x + \cos y$ is (+2, -0.5)

- a. -2
- b. 2
- c. 1
- d. 0

89. The value of the expression $2(\sin^6 \theta + \cos^6 \theta) - 3(\sin^4 \theta + \cos^4 \theta) + 1$ is (+2, -0.5)

- a. 0
- b. 2
- c. -1
- d. 1

90. If $\cos \theta = \frac{x^2 - y^2}{x^2 + y^2}$ then the value of $\cot \theta$ is equal to [If $0^\circ \leq \theta \leq 90^\circ$] (+2, -0.5)

- a. $\frac{2xy}{x^2 - y^2}$
- b. $\frac{2xy}{x^2 + y^2}$
- c. $\frac{x^2 + y^2}{2xy}$
- d. $\frac{x^2 - y^2}{2xy}$

91. The distance between two pillars is 120 metres. The height of one pillar is thrice the other. The angles of elevation of their tops from the midpoint of (+2, -0.5)

the line connecting their feet are complementary to each other. The height (in metres) of the taller pillar is (Use: $\sqrt{3} = 1.732$)

- a. 34.64
- b. 69.28
- c. 51.96
- d. 103.92

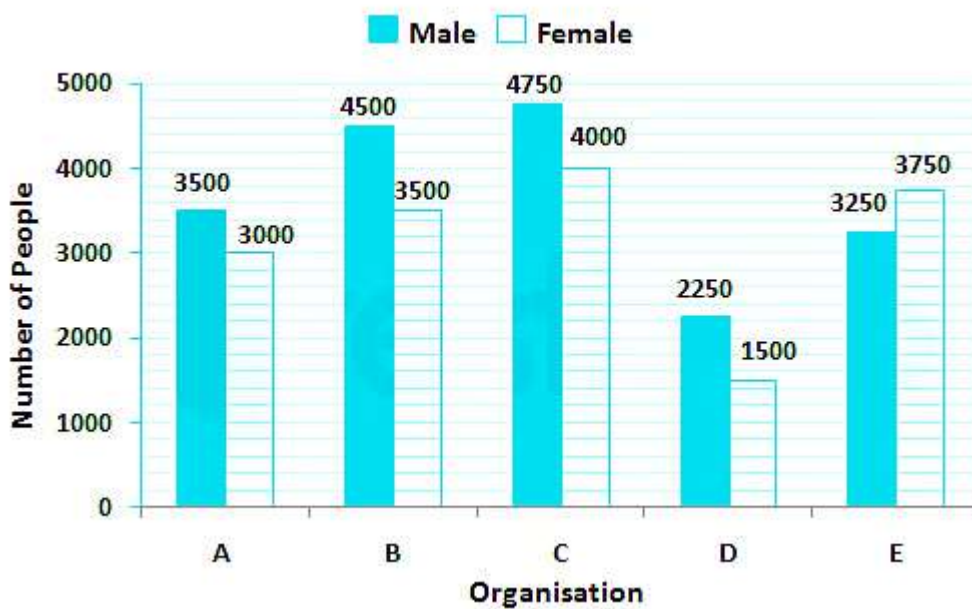
92. If $x = \operatorname{cosec}\theta - \sin\theta$ and $y = \sec\theta - \cos\theta$, then the relation between x and y is (+2, -0.5)

- a. $x^2 + y^2 + 3 = 1$
- b. $x^2 y^2 (x^2 + y^2 + 3) = 1$
- c. $x^2 (x^2 + y^2 - 5) = 1$
- d. $y^2 (x^2 + y^2 - 5) = 1$

93. A hydrogen filled balloon ascending at the rate of 18 kmph was drifted by wind. Its angle of elevation at 10th and 15th minutes were found to be 60° and 45° respectively. The wind speed (in whole numbers) during the last five minutes, approximately, is equal to (+2, -0.5)

- a. 26 km/hr
- b. 7 km/hr
- c. 33 km/hr
- d. 11 km/hr

-
94. The angle of elevation of an aeroplane as observed from a point 30 m above the transparent water – surface of a lake is 30° and the angle of depression of the image of the aeroplane in the water of the lake is 60° . The height of the aeroplane from the water – surface of the lake is (+2, -0.5)
- a. 50 m
 - b. 45 m
 - c. 60 m
 - d. 75 m
-
95. The angles of depression of two ships from the top of a light house are 60° and 45° towards east. If the ships are 300 m apart, the height of the light house is (+2, -0.5)
- a. $250(3 + \sqrt{3})$ meter
 - b. $160(3 + \sqrt{3})$ meter
 - c. $200(3 + \sqrt{3})$ meter
 - d. $150(3 + \sqrt{3})$ meter
-
96. **Direction:** The following bar – diagram shows the total number of males and females in five different organisations. Study it carefully to answer the questions. (+2, -0.5)

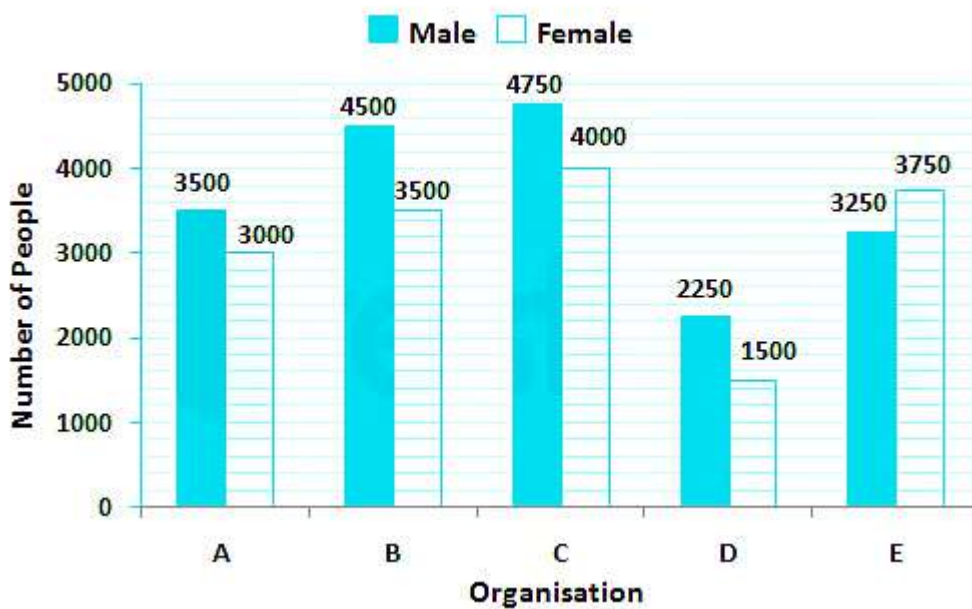


What is the difference between the total number of females and the total number of males from all the organisations together?

- a. 2500
- b. 2055
- c. 2005
- d. 2550

97. **Direction:** The following bar – diagram shows the total number of males and females in five different organisations. Study it carefully to answer the questions.

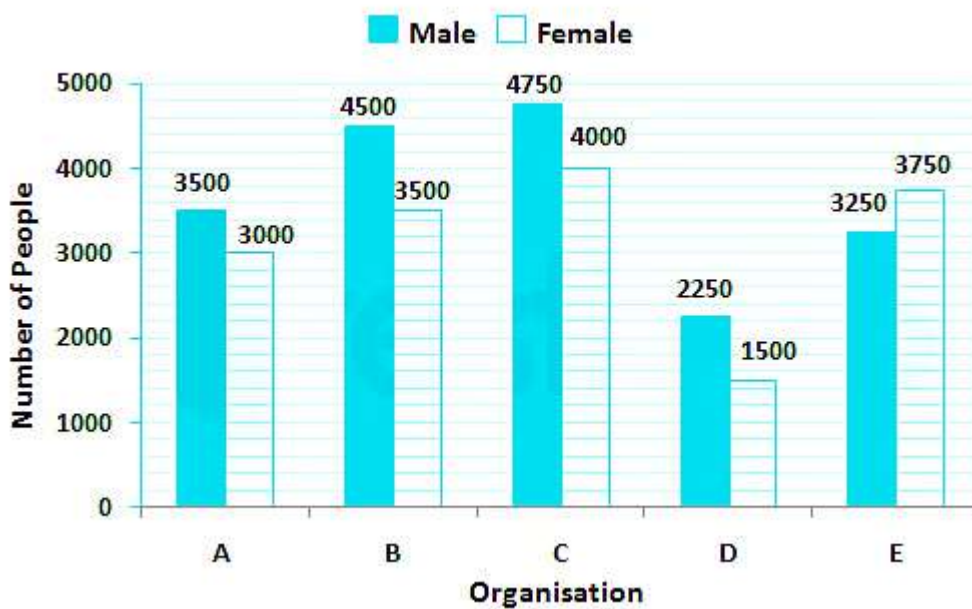
(+2, -0.5)



By how much percentage is the average number of females from all the organisations together is more than the number of males in organization 'D'?

- a. 45%
- b. 40%
- c. 38%
- d. 42%

98. **Direction:** The following bar – diagram shows the total number of males and females in five different organisations. Study it carefully to answer the questions. (+2, -0.5)

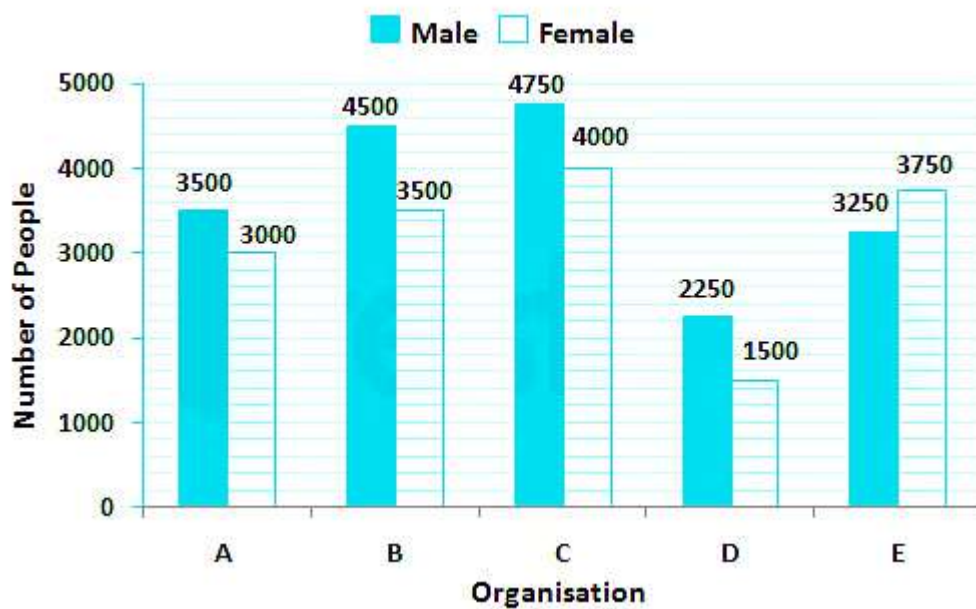


What is the ratio of the number of females from the organisations B and C to the number of males from the organisations D and E?

- a. 12 : 11
- b. 12 : 15
- c. 15 : 11
- d. 11 : 15

99. **Direction:** The following bar – diagram shows the total number of males and females in five different organisations. Study it carefully to answer the questions.

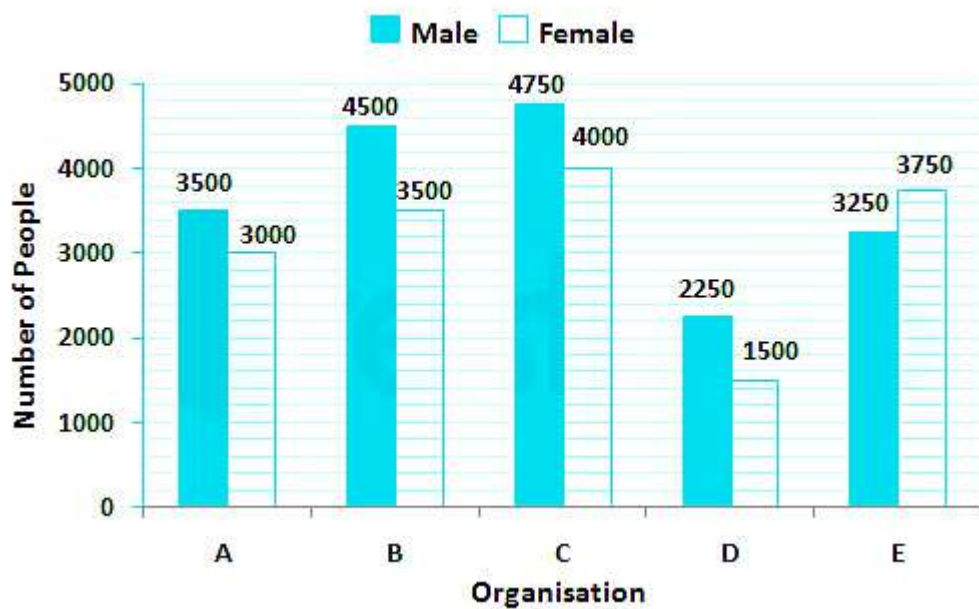
(+2, -0.5)



Males from organisations A and B together form what percent of total number of males from organisations C, D and E together?

- a. 47.08%
- b. 78.04%
- c. 74.08%
- d. 87.44%

100. **Direction:** The following bar – diagram shows the total number of males and females in five different organisations. Study it carefully to answer the questions. (+2, -0.5)



What is the ratio of average number of females from the organisations A, B and C to the average number of males from the organisations C, D and E?

- a. 40 : 41
- b. 41 : 40
- c. 42 : 41
- d. 41 : 42

Answers

1. Answer: a

Explanation:

Let the number be x , then

According to the question

$x^2 - 21x = 100$ [put the value in options and satisfied the answer or going through detailed method]

$$\Rightarrow x^2 - 21x - 100 = 0$$

$$\Rightarrow x^2 - 25x + 4x - 100 = 0$$

$$\Rightarrow x(x - 25) + 4(x - 25) = 0$$

$$\Rightarrow (x - 25)(x + 4) = 0$$

Taking,

$$\Rightarrow (x - 25) = 0$$

$$\Rightarrow x = 25$$

Short Trick:

With the help of options

Let the number be 25, then

$$\Rightarrow 25^2 - 21 \times 25 = 100$$

$$\Rightarrow 625 - 525 = 100$$

$$\Rightarrow 100 = 100 \text{ (satisfied)}$$

2. Answer: c

Explanation:

$$\begin{array}{r} 1.2 \overline{) 1.5} (1 \\ \underline{1.2} \\ 0.3 \end{array} \quad \begin{array}{r} 1.2 \overline{) 1.2} (1 \\ \underline{1.2} \\ 0 \end{array}$$

HCF of 1.5 m and 1.2 m is 0.3 m

So, the greatest length of the pipe pieces of the same size which can be cut from these two lengths will be 0.3 m.

3. Answer: c

Explanation:

	191
1	36562
+1	1
29	265
+9	261
381	462
	381
	-81

the number of such army men remained unused was 81.

4. Answer: d

Explanation:

$$\begin{array}{r}
 11 \overline{) 756896(6889} \\
 \underline{66} \\
 96 \\
 \underline{88} \\
 88 \\
 \underline{88} \\
 96 \\
 \underline{99} \\
 -3
 \end{array}$$

So the smallest number is 3.

5. Answer: a

Explanation:

$$\text{Sum of } \frac{1}{4} \text{ and } \frac{1}{5} = \frac{1}{4} + \frac{1}{5} = \frac{(5 + 4)}{20} = \frac{9}{20} = 0.45$$

According to the question

$$\text{Correct answer} = 1 - 0.45 = 0.55$$

$$\text{Wrong answer} = 0.45$$

$$\text{Error in both answers} = 0.55 - 0.45 = 0.10$$

$$\therefore \text{The percentage of error was} = \left[\frac{0.10}{0.55} \right] \times 100 = (200/11)\%$$

6. Answer: b

Explanation:

$$\text{Product of two number is} = 48$$

$$\text{First number is} = \frac{[2 + 2 \times 5]}{3} = \frac{12}{3} = 4$$

Let the second number be x , then

$$\Rightarrow 4x = 48$$

$$\Rightarrow x = 48/4$$

$$x = 12$$

7. Answer: b

Explanation:

Short Trick:

With help of options

Let Natu has 70 oranges and Buchku has 50 oranges.

If Natu take 10 oranges from Buchku, then Natu's oranges become $= 70 + 10 = 80$

Buchku's remaining oranges $= 50 - 10 = 40$ (condition satisfied)

Detailed Method:

Let Natu and Buchku has x and y oranges respectively.

Condition first

$$x + 10 = 2(y - 10)$$

$$\Rightarrow x - 2y = -30 \quad \text{-----(1)}$$

Condition second

$$x - 10 = y + 10$$

$$\Rightarrow x - y = 20 \quad \text{-----(2)}$$

Subtraction equation (1) from equation (2)

$$y = 50 \text{ and } x = 70$$

8. Answer: d

Explanation:

prepp

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	33.58
3	1127.6164
+3	9
63	227
+3	189
665	3861
+5	3325
6708	53664
	53664
	X

As we know,

Area of square shape playground = a^2

$$\Rightarrow a^2 = 1127.6164$$

$$\Rightarrow a = \sqrt{1127.6164}$$

$$\Rightarrow a = 33.58 \text{ m}$$

$$\text{Perimeter of playground} = 4 \times 33.58 = 134.32 \text{ m}$$

$$\text{Speed of man} = 49/20 \text{ m/min}$$

$$\therefore \text{Time to covered } 134.32 \text{ m distance} = 134.32 / (49/20) = 54.82$$

9. Answer: b

Explanation:

2	48, 72, 108
2	24, 36, 54
2	12, 18, 27
2	6, 9, 27
3	3, 9, 27
3	1, 3, 9
3	1, 1, 3
	1, 1, 1

$$\text{LCM of } 48, 72 \text{ and } 108 = 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 3 = 432 \text{ seconds}$$

As we know,

$$\Rightarrow 1 \text{ min} = 1/60 \text{ sec}$$

$$\Rightarrow 432 \text{ sec} = 7 \text{ min } 12 \text{ sec}$$

$\therefore$ Required Time = 10 : 07 : 12 hrs

10. Answer: c

Explanation:

With the help of option

Let the number of oranges in first basket be 400,

Number of oranges in second basket = $640 - 400 = 240$

$1/5^{\text{th}}$ of 400 = 80

After getting $1/5^{\text{th}}$ of orange of first basket, then remaining oranges = $400 - 80 = 320$

Oranges in second basket will be = $240 + 80 = 320$ (satisfied)

Details method:

Let the number of oranges in first basket be x ,

Number of oranges in second basket = $640 - x$

According to the question

$$x - x/5 = 640 - x + x/5$$

$$\Rightarrow 4x/5 = 640 - 4x/5$$

$$\Rightarrow 4x/5 + 4x/5 = 640$$

$$\Rightarrow 8x/5 = 640$$

$$\Rightarrow x = 640 \times (5/8)$$

$$\Rightarrow x = 400$$

$\therefore$ Number of oranges in first basket = 400.

11. Answer: c

Explanation:

P can do $\frac{1}{4}^{\text{th}}$ of work in = 10 days

P alone can do the whole work in = $10 \times 4 = 40$ days

Q can do 40% of work in = 40 days

Q can do 100% of work in = $40/40 \times 100 = 100$ days

R can do $\frac{1}{3}^{\text{rd}}$ of work in = 13 days

R can do the whole work in = 39 days

As we know R has minimum time to complete among three, so R will complete the work first.

12. Answer: c

Explanation:

As we know,

$$M_1 \times T_1 \times D_1 = M_2 \times T_2 \times D_2$$

$$\Rightarrow 4 \times 7 \times 8 = M_2 \times 8 \times 4$$

$$\Rightarrow M_2 = 7$$

$\therefore$ The required men are 7.

13. Answer: c

Explanation:

Remaining days $D_2 = 60 - 32 = 28$ days

Remaining Work $W_3 = 1 - 2/5 = 3/5$

As per know,

$$[M_1 \times D_1]/W_1 = [M_2 \times D_2]/W_2$$

$$\Rightarrow [35 \times 32]/(2/5) = [x \times 28]/(3/5)$$

$$\Rightarrow x = (35 \times 32 \times 3)/(2 \times 28)$$

$$\Rightarrow x = 60$$

$\therefore$ The number of more worker = $60 - 35 = 25$

14. Answer: d

Explanation:

Short trick:

Let the efficiency of 1 man, 1 women and 1 child be m, w and c respectively.

$$2 \times 4m = 5c$$

$$\Rightarrow 8m = 5c$$

$$\Rightarrow m : c = 5 : 8$$

$$\Rightarrow w = 5/2 = 2.5$$

$$\text{Total work} = 8 \times 20 = 160$$

$$\text{Total work done by 12 men, 8 women, 10 children in 1 days} = 12 \times 5 + 8 \times 2.5 + 10 \times 8 = 160$$

$$\text{Required days} = 160/160 = 1 \text{ day}$$

Detailed method:

1 child can finish the job in = 20 days

5 child can finish the job in = $20/5 = 4$ days

10 children can finish is the job in = 2 days

4 men can finish the job in = $4 \times 2 = 8$ days

12 men can finish the job in = $8/3$ days

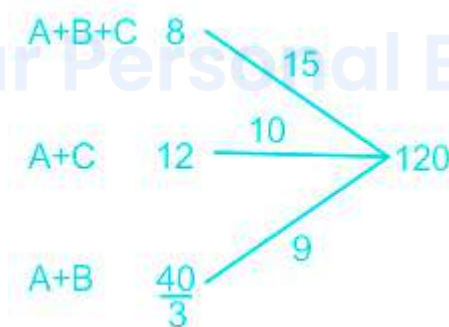
4 women can finish the job in = $8 \times 2 = 16$ days

8 women can finish the job in = 8 days

12 men, 8 women and 10 children complete the whole work in = $3/8 + 1/8 + 1/2 = (3 + 1 + 4)/8 = 8/8 = 1$ days

15. Answer: a

Explanation:



$$\Rightarrow 13\frac{1}{3} = \frac{40}{3}$$

As we know, money divided in their efficiency ratio.

From the following figure

$$A + B + C = 15, A + C = 10 \text{ and } A + B = 9$$

$$\text{Efficiency of B} = 15 - 10 = 5$$

$$\text{Efficiency of A} = 9 - 5 = 4$$

$$\text{Efficiency of C} = 10 - 4 = 6$$

$\therefore$ The money divided among A, B, and C in the ratio = 4 : 5 : 6

16. Answer: c

Explanation:

Short Trick:

$$\text{Total work} = 12$$

$$\text{Efficiency of A and B} = 1$$

$$\text{Work done by A and B in 5 days} = 5$$

$$\text{Remaining work} = 12 - 5 = 7$$

Let the efficiency of A be x , then

$$14x = 7$$

$$x = 7/14 = 1/2$$

$$\text{A alone can complete the whole work in} = 12/(1/2) = 24 \text{ days}$$

Detailed Method:

Let A alone can complete the whole work in x days, then

According to the question

$$5/12 + 14/x = 1$$

$$\Rightarrow 14/x = 1 - 5/12$$

$$\Rightarrow 14/x = 7/12$$

$$\Rightarrow x = 1/24$$

$\therefore$ A alone can complete the whole work in 24 days.

17. Answer: d

Explanation:

MP of the toy = Rs. 200

SP of the toy after getting two discount of 15% and 4% = $200 \times (85/100) \times (96/100) =$
Rs. 163.20

18. Answer: a

Explanation:

Cost price of the camera = Rs. 600

SP of the camera, if profit 20% = $600 \times (120/100) = 720$

$\therefore$ MP of the camera, if discount 10% = $720 \times (100/90) =$ Rs. 800

19. Answer: a

Explanation:

MP of the dinner set = Rs. 1500

SP of the dinner after getting first discount = $1500 \times (85/100) =$ Rs. 1275

SP of the dinner after getting second discount = Rs. 1173

Second discount = $1275 - 1173 = 102$

$$\therefore \text{Second discount percentage} = [102/1275] \times 100 = 8\%$$

20. Answer: c

Explanation:

Let total cost of 100 articles be 100%, then

CP of 100 articles for dishonest dealer = $(100\% - x\%)$

SP of 100 articles for dishonest dealer = $(100\% + x\%)$

$$\text{Profit} = 100\% + x\% - 100\% + x\% = 2x\%$$

$$\therefore \text{Profit percentage} = \left[\frac{2x}{100-x} \times 100 \right] \%$$

None of the option.

21. Answer: b

Explanation:

Total number of students = 48

$$\text{Number of boys} = 5/8 \times 48 = 30$$

$$\text{Number of girls} = 48 - 30 = 18$$

Let the added girls in the union be x , then

According to the question

$$30/(18 + x) = 6/5$$

$$\Rightarrow 150 = 108 + 6x$$

$$\Rightarrow 6x = 150 - 108$$

$$\Rightarrow 6x = 42$$

$$\Rightarrow x = 42/6$$

$$\Rightarrow x = 7$$

Number of girls be added is 7.

22. Answer: c

Explanation:

First bottle has 10 litres and ratio of syrup and water is 2 : 3

Amount of syrup in first bottle = $10 \times \frac{2}{5} = 4$ litres

Amount of water in first bottle = $10 - 4 = 6$ litres

Amount of syrup in second bottle = $21 \times \frac{3}{7} = 9$ litres

Amount of water in second bottle = $21 - 9 = 12$ litres

Let the amount of mixture in 3rd bottle be x litres

Amount of syrup in the third bottle = $\frac{7x}{12}$ litres

Amount of water in third bottle = $\frac{5x}{12}$ litres

According to the question

$$4 + 9 + \frac{7x}{12} = 6 + 12 + \frac{5x}{12}$$

$$\Rightarrow \frac{7x}{12} - \frac{5x}{12} = 18 - 13$$

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

$$\Rightarrow x = 30$$

23. Answer: c

Explanation:

Short Trick:

$$\text{Blue colour in lower part} = \frac{4}{7} - \frac{2}{(5 \times 2)} = \frac{4}{7} - \frac{1}{5} = \frac{13}{35}$$

$$\text{Yellow colour in lower part} = \frac{3}{7} - \frac{3}{(5 \times 2)} = \frac{3}{7} - \frac{3}{10} = \frac{9}{70}$$

$$\text{Ratio of blue to yellow in the lower half} = \frac{13}{35} : \frac{9}{70} = 26 : 9$$

With following option, Taking option 3.

$$\text{Ratio of blue to yellow in the lower half} = 26 : 9 \quad [26 + 9 = 35]$$

$$\text{Ratio of blue to yellow in the upper half} = 2 : 3 \quad \text{-----(1)}$$

Multiply by 7 in equation (1) so that quantity will be equal.

$$\text{Ratio of blue to yellow in the upper half} = 14 : 21 \quad [14 + 21 = 35]$$

$$\text{Ratio of blue to yellow in whole picture} = 26 + 14 : 9 + 21 = 40 : 30 = 4 : 3 \quad (\text{satisfied})$$

Detailed Solution :

Let the total quantity of blue and yellow colour in the picture be 70 unit

Let the the ratio of blue and yellow in whole picture = 40 : 30

$$\text{Upper and Lower part} = \frac{70}{2} = 35 \text{ unit}$$

$$\text{Quantity of blue in upper part} = 35 \times \left(\frac{2}{5}\right) = 14$$

$$\text{Quantity of blue in lower part} = 40 - 14 = 26$$

$$\text{Quantity of yellow in upper part} = 35 \times \left(\frac{3}{5}\right) = 21$$

$$\text{Quantity of yellow in lower part} = 30 - 21 = 9$$

$$\text{Ratio of blue to yellow in the lower half} = 26 : 9$$

24. Answer: d

Explanation:

Let 4000, 5000 and 2000 as 4, 5 and 2 respectively for easy calculation.

Total money invested by A at the end of the year = $4 \times 8 + 6 \times 4 = 56$

Total money invested by B at the end of the year = $5 \times 9 + 3 \times 3 = 54$

Ratio of profit of A to B at the end of the year = $56 : 54 = 28 : 27$

Total profit = 6700

Being active partner allowance of A = $12 \times 100 = 1200$

Remaining profit = $6700 - 1200 = 5500$

$28 + 27 = 55$ unit

$\Rightarrow 55 \text{ unit} = 5500$

$\Rightarrow 1 \text{ unit} = 5500/55 = 100$

$\therefore \text{Profit of B} = 27 \times 100 = 2700$

25. Answer: c

Explanation:

Total sum = 15525

Distributed sum = $15525 - 22 - 35 - 48 = 15420$

Remaining shares of Sunil, Annil and Jamil = $7 : 10 : 13$

$\Rightarrow 7 + 10 + 13 = 30$ unit

$$\Rightarrow 30 \text{ unit} = 15420$$

$$\Rightarrow 1 \text{ unit} = 514$$

$$\text{New share of Sunil} = 7 \times 514 + 22 + 16 = 3636$$

$$\text{New share of Anil} = 10 \times 514 + 35 + 77 = 5252$$

$$\text{New share of Jamil} = 13 \times 514 + 48 + 37 = 6767$$

$$\therefore \text{New ratio of share of Sunil, Anil and Jamil} = 3636 : 5252 : 6767 = 36 : 52 : 67$$

26. Answer: c

Explanation:

With the help of option.

Check which ratio has A's and C's income in 2 : 3 and B's and D's income in 1 : 2. Only option 3 and option 4 have correct ratio. Now check either option 3 or 4 has A's income 140 more than B. So correct option is 3.

Detailed method:

Ratio of A's and C's income is = $2x : 3x$

$$\text{B's income} = 2x - 140$$

$$\text{D's income} = 3x - 80$$

According to the question

$$(2x - 140)/(3x - 80) = 1/2$$

$$\Rightarrow 4x - 280 = 3x - 80$$

$$\Rightarrow 4x - 3x = 280 - 80$$

$$\Rightarrow x = 200$$

$$\text{Income of A} = 2 \times 200 = 400$$

$$\text{Income of B} = 400 - 140 = 260$$

$$\text{Income of C} = 3 \times 200 = 600$$

$$\text{Income of D} = 600 - 80 = 520$$

27. Answer: b

Explanation:

Short Trick:

$$\text{Average score of 12 inning} = 96 - 13 \times 5 = 96 - 65 = 31$$

$$\text{Average score of 13 inning} = 31 + 5 = 36$$

Detailed Method:

Let average score of 12 inning be x , then

$$\text{Sum of the runs of 12 inning} = 12x$$

According to the question

$$12x + 96 = (x + 5)13$$

$$12x + 96 = 13x + 65$$

$$13x - 12x = 96 - 65$$

$$x = 31$$

$$\text{Average score of 12 inning} = 31$$

$$\therefore \text{Average score of 13 inning} = 31 + 5 = 36$$

28. Answer: d

Explanation:

Let total score be x , then

$$(x + 92 - 85)/8 = 84$$

$$\Rightarrow x + 7 = 672$$

$$\Rightarrow x = 672 - 7$$

$$\therefore x = 665$$

29. Answer: c

Explanation:

Let the average price of Book is Rs. x each book.

According to the question

$$60x + 336 = 64(x - 1)$$

$$\Rightarrow 60x + 336 = 64x - 64$$

$$\Rightarrow 64x - 60x = 336 + 64$$

$$\Rightarrow 4x = 400$$

$$\Rightarrow x = 100$$

$\therefore$ Price of book was Rs. 100.

30. Answer: c

Explanation:

Average marks obtained by John in English, Maths, Hindi and Drawing = 50

Sum of marks in English, Maths, Hindi and Drawing = $50 \times 4 = 200$

Average marks in Maths, Science, Social Studies and Craft = 70

Sum of marks in Maths, Science, Social studies and Craft = $70 \times 4 = 280$

Average marks of English, Maths, Hindi and Drawing, science, Social studies and Craft = 58

Sum of marks of English, Maths, Hindi and Drawing, Science, Social studies and Craft = $58 \times 7 = 406$

$\therefore$ Marks scored in Maths = $406 - 280 - 200 = 74$

31. Answer: b

Explanation:

Sum of weight of A + B + C = $84 \times 3 = 252$ kg

Sum of weight of A + B + C + D = $80 \times 4 = 320$ kg

Weight of D = $320 - 252 = 68$ kg

E = D + 3 = $68 + 3 = 71$ kg

Sum of weight of B + C + D + E = (79×4) kg = 316 kg

Sum of weight of B + C = 316 kg - 71 kg - 68 kg = 177 kg

$\therefore$ Weight of A = 320 kg - 177 kg - 68 kg = 75 kg

32. Answer: b

Explanation:

Using allegation method:

15000 8000

8840

840 6160

Ratio of Officers to remaining employees = $840 : 6160 = 3 : 22$

Percentage of officers of total employees = $\frac{3}{25} \times 100 = 12\%$

33. Answer: a**Explanation:**

Given:

Ratio between CP to SP = 20 : 21

Concept used:

$$P = S.P - C.P$$

$$P\% = (P/C.P) \times 100$$

Where,

P → Profit

S.P → Selling price

C.P → Cost price

Calculations:

Ratio of CP to SP = 20 : 21

Let CP = 20 and SP = 21

Profit = 20 - 21 = 1

Profit percentage = $\frac{1}{20} \times 100 = 5\%$

$\therefore$ The required profit% is 5%.

34. Answer: b

Explanation:

Ratio of CP to SP = 25 : 26

Let CP = 25 and SP = 26

Profit = 25 - 26 = 1

$\therefore$ Profit percentage = $\frac{1}{25} \times 100 = 4\%$

35. Answer: b

Explanation:

Let Cost of 1000 gm (1 Kg) product = Rs. 150

15% of product was damaged, then quantity of remaining product = $1000 \times \frac{85}{100} = 850$ g

SP of 850 gm product = $150 \times \frac{6}{5} = 180$

SP of 1 gm product = $180/850$

$\therefore$ SP of 1000 gm (1 kg) = $[180/850] \times 1000 = Rs. 211\frac{13}{17}$

36. Answer: c

Explanation:

Let cost of each cycles = Rs. 100

SP of first cycles = $100 \times (106/100) = \text{Rs. } 106$

SP of second cycles = $100 \times (96/100) = \text{Rs. } 96$

Total CP of both cycles = $100 + 100 = 200$

Total SP of both cycles = $106 + 96 = 202$

Total profit = $202 - 200 = 2$

Profit Percentage = $2/200 \times 100 = 1\%$

37. Answer: c**Explanation:**

Let cost price of the article be Rs. x

According to the question

$$108x/100 - 92x/100 = 28$$

$$16x/100 = 28$$

$$x = 28 \times (100/16)$$

$$\therefore x = \text{Rs. } 175$$

Short Trick:

$$8\% + 8\% = 28$$

$$16\% = 28$$

$$\therefore 100\% = 28/16 \times 100 = \text{Rs. } 175$$

38. Answer: c

Explanation:

Let total wire be 200 m and total cost of 100 m wire be Rs. 200

According to question

$$\text{SP of 100 m wire} = 100 \times (105/100) = 105$$

$$\text{Total SP of 200 m wire} = 200 \times (110/100) = 220$$

$$\text{So remaining 100 m wire should sell on} = 220 - 105 = 115$$

$$\text{Profit on remaining 100 m wire} = 115 - 100 = 15$$

$$\text{Profit percentage} = 15/100 \times 100 = 15\%$$

Short Trick:

Let there are 2 unit.

First sell on 10% and second on x% and whole on 10%, then

$$(5 + x)/2 = 10$$

$$5 + x = 20$$

$$x = 20 - 5$$

$$x = 15$$

39. Answer: b

Explanation:

A line of length 1.5 metres was measured as 1.55 metres.

Correct length = 1.5

Wrong length = 1.55

Error = $1.55 - 1.5 = 0.05$

Error percentage = $0.05/1.5 \times 100 = 3\frac{1}{3}\%$

40. Answer: b

Explanation:

Worth of Laptops = Rs. 210000

Duty on laptops = $210000 \times (10/100) = 21000$

Worth of Mobile phones = Rs. 100000

Duty on Mobile phones = $100000 \times 8/100 = 8000$

Worth of Television sets = Rs. 150000

Duty on Television sets = $150000 \times (5/100) = 7500$

Total duty on all three items = $21000 + 8000 + 7500 = 36500$

41. Answer: c

Explanation:

$7\frac{1}{2}\% = \frac{3}{40}$ and $75\% = 3/4$

Let the income of the man be Rs. x

according to question,

At first, the man spent $3/40$ of x money

So, the left money with him = $(1 - 3/40)x$

$$\Rightarrow (37/40)x$$

and then he spent $3/4$ th of the remaining money

So, the left amount of money will be $1/4$ th of the remaining money

$$\text{So, } x \times (37/40) \times (1/4) = 370$$

$$\Rightarrow x = 370 \times (4/1) \times (40/37)$$

$$\therefore x = 1600$$

42. Answer: b

Explanation:

Let a total of $10x$ match is played between Pakistan and India.

$$\text{Pakistan won} = 10x \times (60/100) = 6x$$

$$\text{India won} = 10x - 6x = 4x$$

According to the question,

If next 30 ODIs India won 30 matches, then India's success percentage increase to 70%

$$\text{Total match} = 10x + 30$$

$$4x + 30 = (10x + 30) \times (70/100)$$

$$\Rightarrow 4x + 30 = 7x + 21$$

$$\Rightarrow 3x = 9$$

$$\Rightarrow x = 3$$

$$\therefore \text{Total match} = 10 \times 3 + 30 = 60.$$

43. Answer: b

Explanation:

Distance between two donkeys = 400 m

Speed of first donkey = 3 m/s

Speed of second donkey = 2 m/s

Relative speed, if both running opposite direction = $3 + 2 = 5$ m/s

$\therefore$ Time taken to bump into each other = $400/5 = 80$ sec

44. Answer: a

Explanation:

Short Trick:

Distance between starting point and multiplex = $[(3 \times 4)/(4 - 3)] \times (5 + 5)/60 = 12 \times (10/60) = 2$ km

Detailed Method:

Let distance between starting point and multiplex be x

As we know

Time = Distance/Speed

According to the question

$$x/3 - x/4 = (5 + 5)/60$$

$$\Rightarrow x/3 - x/4 = 10/60$$

$$\Rightarrow x/12 = 1/6$$

$$\therefore x = 2 \text{ km}$$

45. Answer: b

Explanation:

The distance is = $[(9 \times 12)/(12 + 9)] \times 7/3 = 12 \text{ km}$

Detailed Method:

$$2 \text{ hr } 20 \text{ min} = 2 + 1/3 = 7/3$$

Let the total distance be $x \text{ km}$.

According to the question

$$x/12 + x/9 = 7/3$$

$$\Rightarrow (4x + 3x)/36 = 7/3$$

$$\Rightarrow 7x/36 = 7/3$$

$$\Rightarrow x = 7/3 \times (36/7)$$

$$\therefore x = 12$$

46. Answer: b

Explanation:

Let Speed of A be $A \text{ km/hr}$ and speed of B be $B \text{ km/hr}$

Relative speed, when opposite sides = $A + B$

Relative speed, when same sides = $A - B$

According to the question

$$A + B = 15/(1/2)$$

$$A + B = 30 \quad \text{--- (1)}$$

$$A - B = 15/(5/2)$$

$$A - B = 6 \quad \text{--- (2)}$$

From equation (1) and equation (2)

$$A = 18 \text{ and } B = 12$$

$\therefore$ Speed of faster = 18 km/hr

47. Answer: c

Explanation:

CI = Rs. 3225, $r = 15\%$ and time = 2 years

As we know,

$$CI = P [(1 + r/100)^t - 1]$$

$$\Rightarrow 3225 = P [(1 + 15/100)^2 - 1]$$

$$\Rightarrow 3225 = P [(23/20)^2 - 1]$$

$$\Rightarrow 3225 = P [529/400 - 1]$$

$$\Rightarrow 3225 = P [(529 - 400)/400]$$

$$\Rightarrow 3225 = P \times (129/400)$$

$$\Rightarrow P = 3225 \times (400/129)$$

$$\therefore P = 10000$$

Short Trick:

If rate 15%, and we know, $15\% = \frac{3}{20}$

Ratio of A to P after 2 years = $20^2 : 23^2 = 400 : 529$

CI = $529 - 400 = 129$ unit

129 unit = 3225

1 unit = $3225/129 = 25$

$\therefore 400 \text{ unit} = 400 \times 25 = 10000$

48. Answer: b

Explanation:

Given:

A = Rs. 3993, P = 3000, r = x% and time = 3 years

Calculations:

$$A = P (1 + r/100)^t$$

$$\Rightarrow 3993 = 3000 (1 + x/100)^3$$

$$\Rightarrow (1 + x/100)^3 = 3993/3000$$

$$\Rightarrow (1 + x/100) = \sqrt[3]{3993/3000} = \sqrt[3]{1331/1000}$$

$$\Rightarrow 1 + x/100 = 11/10$$

$$\Rightarrow x/100 = 11/10 - 1$$

$$\Rightarrow x/100 = 1/10$$

$$\Rightarrow x = 10$$

$\therefore$ The value of x is 10

★ Shortcut Trick

Ratio of A to P

$$\Rightarrow \sqrt[3]{3339} : \sqrt[3]{3000}$$

$$\Rightarrow 11 : 10$$

$$CI = 11 - 10 = 1$$

$$\therefore \text{Rate percentage} = 1/10 \times 100 = 10\%$$

49. Answer: d

Explanation:

A = Rs. 4410, $r = 5\%$ and time = 2 years

As we know,

$$A = P \left(1 + \frac{r}{100}\right)^t$$

$$\Rightarrow 4410 = P \left(1 + \frac{5}{100}\right)^2$$

$$\Rightarrow 4410 = P \times \frac{21}{20} \times \frac{21}{20}$$

$$\Rightarrow P = 4410 \times \frac{20}{21} \times \frac{20}{21}$$

$$\Rightarrow P = 4000$$

Again,

A = Rs. 3150, $r = 5\%$ and time = 1 years

As we know,

$$A = P \left(1 + \frac{r}{100}\right)^1$$

$$\Rightarrow 3150 = P \left(1 + \frac{5}{100}\right)^1$$

$$\Rightarrow 3150 = P \times 21/20$$

$$\Rightarrow P = 3150 \times 20/21$$

$$\Rightarrow P = 3000$$

$$\therefore \text{Total sum} = 4000 + 3000 = 7000$$

Short trick:

If rate 5%, then

$$\text{Ratio of A to P after 2 years} = 20^2 : 21^2 = 400 : 441$$

$$441 \text{ unit} = 4410$$

$$1 \text{ unit} = 4410/441 = 10$$

$$\text{Hence, 40 unit} = 400 \times 10 = 4000$$

Again

$$\text{Ratio of A to P after 1 year} = 20 : 21$$

$$21 \text{ unit} = 3150$$

$$1 \text{ unit} = 150$$

$$\text{Hence, 20 unit} = 150 \times 20 = 3000$$

$$\therefore \text{Total sum} = 4000 + 3000 = 7000$$

50. Answer: a

Explanation:

$$R = 4\%$$

Let the share of Ram be Rs. x and share of shyam be Rs. y, then

As we know,

$$A = P \left(1 + \frac{r}{100}\right)^t$$

According to the question

$$x \left(1 + \frac{4}{100}\right)^3 = y \left(1 + \frac{4}{100}\right)^6$$

$$\Rightarrow x/y = \left[\left(1 + \frac{4}{100}\right)^6\right] / \left[\left(1 + \frac{4}{100}\right)^3\right]$$

$$\Rightarrow x/y = \left(\frac{26}{25}\right)^3$$

$$\text{Ratio of } x : y = 17576a : 15625a$$

$$15625a + 17576a = 33201a$$

$$\Rightarrow 33201a = 260200$$

$$\Rightarrow a = 260200/33201$$

$$\text{Ram's share} = 260200/33201 \times 17576 = 137745.104$$

51. Answer: c

Explanation:

As we know,

$$\text{Volume of a cylinder} = \pi r^2 h$$

$$\text{Ratio of radii of two cylinder } R_1 : R_2 = 2 : 3$$

$$\text{Ratio of height of two cylinder } H_1 : H_2 = 5 : 3$$

$$\therefore \text{Ratio of volume of two cylinder } V_1 : V_2 = \pi \times (R_1)^2 \times H_1 : \pi \times (R_2)^2 \times H_2 = 2^2 \times 5 : 3^2 \times 3 \\ = 20 : 27$$

Short Trick :

$$\therefore \text{Ratio volume of two cylinder} = 2^2 \times 5 : 3^2 \times 3 = 20 : 27$$

52. Answer: c

Explanation:

As we know,

$$\text{Volume of cube} = a^3$$

Three cubes of iron whose edges are 6 cm, 8 cm and 10 cm.

Let the edge of bigger cube be A

Volume of cube of bigger cube = Sum of volume of all three cubes

$$A^3 = 6^3 + 8^3 + 10^3 = 216 + 512 + 1000 = 1728$$

$$\Rightarrow A = \sqrt[3]{1728}$$

$$\Rightarrow A = 12$$

$\therefore$ Edge of bigger cube = 12 cm

53. Answer: c

Explanation:

The radii of two concentric circles are $R_1 = 68$ cm and $R_2 = 22$ cm.

$$\text{Area of the closed figure bounded by the boundaries of the circles is} = \pi [(R_1)^2 - (R_2)^2] = \pi \Rightarrow \Rightarrow (68^2 - 22^2) = \pi \times 90 \times 46 = 4140\pi$$

54. Answer: d

Explanation:

Radius of sphere $R = 6$ cm

Radius of wire $r = 0.2$ cm and Let the length of wire be h cm

Volume of wire = volume of sphere

As we know,

Volume of cylinder = $\pi r^2 h$

Volume of sphere = $(4/3) \pi R^3$

$$\Rightarrow \pi r^2 h = (4/3) \pi R^3$$

$$\Rightarrow 0.2 \times 0.2 \times h = (4/3) \times 6 \times 6 \times 6$$

$$\Rightarrow h = 72 \text{ m}$$

55. Answer: b**Explanation:**

Formula used:

Volume of cylinder = $\pi(\text{radius})^2 \times \text{height}$

Calculation :

Volume of cylinder = $\pi r^2 h$

New radius of cylinder $R = r/3$

Let the new length of the cylinder be l unit, then

According to the question, volume remains the same

$$\Rightarrow \pi r^2 l_1 = \pi \times (r/3)^2 \times l_2$$

$$\Rightarrow l_1 = l_2/9$$

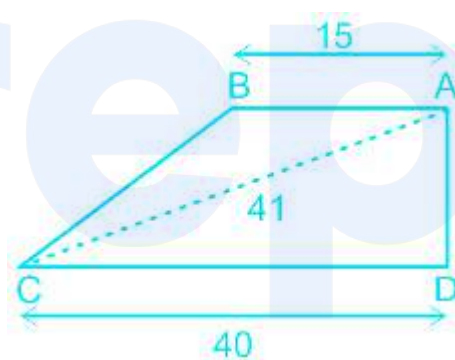
$$\Rightarrow l_2 = 9l_1$$

If volume remains the same, the length will increase by 9 times.

56. Answer: b

Explanation:

Given,



AB = 15 cm, AC = 41 cm, CD = 40 cm

In right angled $\triangle ADC$

$$AC^2 = AD^2 + CD^2$$

$$\Rightarrow 41^2 = AD^2 + 40^2$$

$$\Rightarrow AD^2 = 1681 - 1600$$

$$\Rightarrow AD = \sqrt{81}$$

$$\Rightarrow AD = 9 \text{ cm}$$

As we know

Area of trapezium = $(1/2) \times (\text{sum of parallel sides}) \times \text{distance between parallel sides}$

$$\therefore \text{Area of trapezium} = (1/2) \times (15 + 40) \times 9 = (1/2) \times 55 \times 9 = 247.5 \text{ cm}^2$$

57. Answer: c

Explanation:

Given, $a = 10 \text{ cm}$, $d_1 = 12 \text{ cm}$ and $d_2 = ?$

As we know,

$$4a^2 = (d_1)^2 + (d_2)^2$$

$$\Rightarrow 4 \times 10^2 = 12^2 + (d_2)^2$$

$$\Rightarrow 4 \times 100 = 144 + (d_2)^2$$

$$\Rightarrow (d_2)^2 = 400 - 144 = 256$$

$$\Rightarrow d_2 = \sqrt{256}$$

$$\Rightarrow d_2 = 16$$

As we know,

$$\therefore \text{Area of rhombus} = (1/2) \times (d_1) \times (d_2) = (1/2) \times 12 \times 16 = 96 \text{ cm}^2$$

58. Answer: c

Explanation:

Cost of levelling a circular field in 50 paise. (Rs. $1/2$) = 1 square meter

$$\text{Cost of levelling a circular field in Rs. 7700} = 2 \times 7700 = 15400 \text{ m}^2$$

Total area of circular field = 15400 m^2

Area of circular field = πr^2

$$\left(\frac{22}{7}\right) \times r^2 = 15400$$

$$\Rightarrow r^2 = 15400 \times \left(\frac{7}{22}\right)$$

$$\Rightarrow r^2 = 7 \times 7 \times 10 \times 10$$

$$\Rightarrow r = 7 \times 10 = 70$$

Circumference of circular field = $2\pi r = 2 \times \left(\frac{22}{7}\right) \times 70 = 440 \text{ m}$

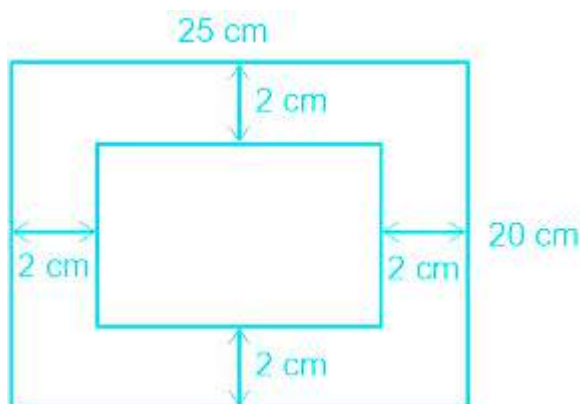
Cost of fencing 1 m = Rs. 1.20

$\therefore$ Cost of fencing 440 m = $440 \times 1.20 = \text{Rs. } 528$

59. Answer: d

Explanation:

Dimensions of rectangular sheet = 25 cm $\times$ 20 cm. If square of side 2 cm is cut off from corners.



Height of box = 2 cm

Length of box = $25 - 4 = 21 \text{ cm}$

$$\text{Breadth of box} = 20 - 4 = 16 \text{ cm}$$

$$\therefore \text{Volume of box} = l \times b \times h = 21 \times 16 \times 2 = 672 \text{ cm}^3$$

60. Answer: c

Explanation:

Given:

Height of the cylinder $h = 4 \text{ cm}$

Total surface area of cylinder $= 8\pi \text{ sq.cm.}$

Formula used:

$$\text{Total surface area of cylinder} = 2\pi r(r + h)$$

Calculation:

$$\text{Total surface area of cylinder} = 2\pi r(r + h)$$

$$2\pi r(r + h) = 8\pi$$

$$\Rightarrow r(r + 4) = 4$$

$$\Rightarrow r^2 + 4r - 4 = 0$$

Comparing on $ax^2 + bx + c = 0$

As we know,

$$\Rightarrow x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$\Rightarrow x = \frac{-4 \pm \sqrt{16 + 16}}{2}$$

$$\Rightarrow x = \frac{-4 \pm 4\sqrt{2}}{2}$$

$$\Rightarrow x = 2\sqrt{2} - 2$$

$$\therefore \text{Radius of cylinder} = (2\sqrt{2} - 2) \text{ cm}$$

61. Answer: a

Explanation:

Formula used:

Total surface area of open cylindrical tank = $2\pi rh + \pi r^2$

Calculation:

Radius of the cylindrical milk container $r = h/2$

$$2\pi rh + \pi r^2 = 616$$

$$\Rightarrow \pi (2 \times h/2 \times h + h^2/4) = 616$$

$$\Rightarrow (22/7) [h^2 + h^2/4] = 616$$

$$\Rightarrow 5h^2/4 = 616 \times (7/22)$$

$$\Rightarrow h^2 = [28 \times 7 \times 4]/5$$

$$\Rightarrow h = 28/\sqrt{5}$$

$$\text{Volume of container} = \pi r^2 h = \pi \times (h^2/2) \times h = \pi h^3/4$$

$$\Rightarrow (22/7) \times (28 \times 28 \times 28)/(5 \sqrt{5} \times 4)$$

$$\Rightarrow (22 \times 28 \times 28 \times \sqrt{5})/25$$

$$\Rightarrow (22 \times 28 \times 28 \times 2.23)/25 \times 10^3 \text{ litres}$$

$$\Rightarrow 1.53 \text{ litres}$$

62. Answer: a

Explanation:

$$2.1 \text{ dm} = 21 \text{ cm}$$

$$\text{Radius of sphere } R = 21 \text{ cm}$$

$$\text{Height of cylinder } r = 7 \text{ cm}$$

$$\text{Let the radius of the cylinder} = r \text{ cm}$$

$$\text{Volume of cylinder} = \text{volume of sphere}$$

$$\pi r^2 h = \left(\frac{4}{3}\right) \pi R^3$$

$$\Rightarrow r^2 \times 7 = \left(\frac{4}{3}\right) \times 21 \times 21 \times 21$$

$$\Rightarrow r^2 = 2 \times 2 \times 21 \times 21$$

$$\Rightarrow r = 2 \times 21 = 42 \text{ cm}$$

$$\therefore \text{Ratio of total surface area of rod to sphere} = 2\pi r (r + h) : 4\pi R^2 = 2 \times 42 \times (42 + 7) : 4 \times 21 \times 21 = 7 : 3$$

63. Answer: c

Explanation:

$$\text{Let the length of the rectangle be } x \text{ cm and breadth of rectangle} = (6 - x)$$

$$\text{Side of the square} = \text{diagonal of the rectangle} = a \text{ cm}$$

$$\text{Area of square} = a^2 \text{ and area of rectangle} = x(6 - x)$$

According to the question

$$a^2 = x^2 + (6 - x)^2$$

$$\Rightarrow a^2 = x^2 + 36 + x^2 - 12x$$

$$\Rightarrow a^2 = 2x^2 - 12x + 36$$

According to the question

$$(2x^2 - 12x + 36)/(6x - x^2) = 5/2$$

$$\Rightarrow 4x^2 - 24x + 72 = 30x - 5x^2$$

$$\Rightarrow 9x^2 - 54x + 72 = 0$$

$$\Rightarrow x^2 - 6x + 8 = 0$$

$$\Rightarrow x^2 - 4x - 2x + 8 = 0$$

$$\Rightarrow x(x - 4) - 2(x - 4) = 0$$

$$\Rightarrow (x - 4)(x - 2) = 0$$

$$\Rightarrow x = 4 \text{ and } x = 2$$

$$\therefore \text{Area of square } a^2 = x^2 + (6 - x)^2 = 2^2 + 4^2 = 20 \text{ cm}^2$$

64. Answer: c

Explanation:

Side of the equilateral triangle = 8 cm

Radius of circum - circle $R = 8/\sqrt{3}$ cm

Radius of in - circle $r = 8/2\sqrt{3} = 4/\sqrt{3}$ cm

Area between the circum - circle and in - circle $= \pi (R^2 - r^2) = \pi (R + r) (R - r) =$
 $(22/7) \times (8/\sqrt{3} + 4/\sqrt{3}) (8/\sqrt{3} - 4/\sqrt{3}) = (22/7) \times 12/\sqrt{3} \times 4/\sqrt{3} = 352/7 = 50\frac{2}{7} \text{ cm}^2$

65. Answer: c

Explanation:

Given,

External radius of cylinder $R = 5$ cm

Height of cylinder = 4 cm

Radius of the sphere $R_1 = 3$ cm

According to the question

Volume of cylinder = volume of sphere

$$\pi (R^2 - r^2) h = \left(\frac{4}{3}\right) \pi (R_1)^3$$

$$\Rightarrow (5^2 - r^2) \times 4 = \left(\frac{4}{3}\right) \times 3 \times 3 \times 3$$

$$\Rightarrow 25 - r^2 = 9$$

$$\Rightarrow r^2 = 25 - 9 = 16$$

$$\Rightarrow r = 4 \text{ cm}$$

Thickness of cylinder = $5 - 4 = 1$ cm

As we know,

Volume of Hollow cylinder = $\pi (R^2 - r^2) h$

$\therefore$ Volume of sphere = $\left(\frac{4}{3}\right) \pi r^3$

66. Answer: a

Explanation:

$$(x + 1/x)^2 = x^2 + 1/x^2 + 2$$

$$\Rightarrow (x + 1/x)^2 = 98 + 2 = 100$$

$$\Rightarrow x + 1/x = 10$$

$$\Rightarrow (x + 1/x)^3 = x^3 + 1/x^3 + 3(x + 1/x)$$

$$\Rightarrow 10^3 = x^3 + 1/x^3 + 3 \times 10$$

$$\Rightarrow x^3 + 1/x^3 = 1000 - 30 = 970$$

67. Answer: c

Explanation:

$$a + 1/b = 1 \text{ and } b + 1/c = 1$$

$$\Rightarrow a = 1 - 1/b = (b - 1)/b$$

$$\Rightarrow 1/a = b/(b - 1) \text{ or } -b/(1 - b)$$

$$\Rightarrow b + 1/c = 1$$

$$\Rightarrow 1/c = 1 - b$$

$$\Rightarrow c = 1/(1 - b)$$

Now,

$$c + 1/a$$

$$\Rightarrow 1/(1 - b) - b/(1 - b)$$

$$\Rightarrow (1 - b)/(1 - b)$$

$$\Rightarrow 1$$

68. Answer: c

Explanation:

As we know,

$$\text{If } x + y + z = 0, \text{ then } x^3 + y^3 + z^3 = 3xyz$$

Similarly,

$$\Rightarrow x = y + z$$

$$\Rightarrow x - y - z = 0$$

$$\therefore x^3 - y^3 - z^3 = 3x(-y)(-z) = 3xyz$$

69. Answer: a

Explanation:

$a + b + c + d = 4$, then

$$\Rightarrow \frac{1}{(1-a)(1-b)(1-c)} + \frac{1}{(1-b)(1-c)(1-d)} + \frac{1}{(1-c)(1-d)(1-a)} + \frac{1}{(1-d)(1-a)(1-b)}$$

$$\Rightarrow \frac{(1-d)}{(1-a)(1-b)(1-c)(1-d)} + \frac{(1-a)}{(1-a)(1-b)(1-c)(1-d)} + \frac{(1-b)}{(1-c)(1-d)(1-a)(1-b)} + \frac{(1-c)}{(1-d)(1-a)(1-b)(1-c)}$$

$$\Rightarrow \frac{1-a + 1-b + 1-c + 1-d}{(1-a)(1-b)(1-c)(1-d)}$$

$$\Rightarrow \frac{4-4}{(1-a)(1-b)(1-c)(1-d)}$$

$$\Rightarrow 0$$

70. Answer: d

Explanation:

Given:

We have to find the simplified value of

$$\frac{\sqrt{3}-\sqrt{2}}{\sqrt{12}-\sqrt{18}} - \frac{1}{3} \times \sqrt{27} - \frac{1}{2} \times \sqrt[3]{27}$$

Concept Used:

Concept of rationalisation: When an irrational number came in denominator in a fraction then it becomes difficult in the calculation. To avoid this problem we multiply something with both numerator and denominator so that the denominator part become rational. This process is known as rationalisation.

In general, the process to make an irrational number to a rational number is called rationalisation.

Calculation:

$$\begin{aligned} & \frac{\sqrt{3}-\sqrt{2}}{\sqrt{12}-\sqrt{18}} - \frac{1}{3} \times \sqrt{27} - \frac{1}{2} \times \sqrt[3]{27} \\ \Rightarrow & \frac{(\sqrt{3}-\sqrt{2})(\sqrt{12}+\sqrt{18})}{(\sqrt{12}-\sqrt{18})(\sqrt{12}+\sqrt{18})} - \frac{1}{3} \times \sqrt{27} - \frac{1}{2} \times \sqrt[3]{27} \\ \Rightarrow & \frac{\sqrt{36}+\sqrt{54}-\sqrt{24}-\sqrt{36}}{12-18} - \frac{1}{3} \times \sqrt{3 \times 3 \times 3} - \frac{1}{2} \times \sqrt[3]{3 \times 3 \times 3} \\ \Rightarrow & \frac{3\sqrt{6}-2\sqrt{6}}{-6} - \frac{1}{3} \times 3\sqrt{3} - \frac{1}{2} \times 3 \left[\because \sqrt{54} = \sqrt{9 \times 6} \Rightarrow 3\sqrt{6} \text{ and } \sqrt{24} = \sqrt{4 \times 6} = 2\sqrt{6} \right] \\ \Rightarrow & -\frac{\sqrt{6}}{6} - \sqrt{3} - \frac{3}{2} \\ \Rightarrow & -\left[\frac{1}{\sqrt{6}} + \sqrt{3} + \frac{3}{2} \right] \\ \Rightarrow & -\left[\sqrt{3} + 1 + \frac{1}{2} + \frac{1}{\sqrt{6}} \right] \end{aligned}$$

$\therefore$ Option number 4.

71. Answer: d

Explanation:

$$x^5 - 12x^4 + 12x^3 - 12x^2 + 12x - 1$$

$$\Rightarrow x^5 - 11x^4 - x^4 + 11x^3 + x^3 - 11x^2 - x^2 + 11x + x - 1$$

$$\Rightarrow x = 11, \text{ then}$$

$$\Rightarrow 11^5 - 11(11)^4 - 11^4 + 11(11)^3 + 11^3 - 11(11)^2 - 11^2 + 11(11) + 11 - 1$$

$$\Rightarrow 11^5 - 11^5 - 11^4 + 11^4 + 11^3 - 11^4 - 11^2 + 11^2 + 11 - 1$$

$$\Rightarrow 11 - 1$$

$$\Rightarrow 10$$

72. Answer: b

Explanation:

$$a = 1/(a - 5)$$

$$\Rightarrow a^2 - 5a = 1$$

Divide by a

$$\Rightarrow a - 5 = 1/a$$

$$\Rightarrow a - 1/a = 5$$

As we know

$$\Rightarrow (a + 1/a)^2 - (a - 1/a)^2 = 4$$

$$\Rightarrow (a + 1/a)^2 - 5^2 = 4$$

$$\Rightarrow (a + 1/a)^2 = 25 + 4$$

$$\therefore (a + 1/a) = \sqrt{29}$$

73. Answer: c

Explanation:

$$a + 1/b = b + 1/c$$

$$\Rightarrow (a - b) = (b - c)/bc \quad \text{---- (1)}$$

$$a + 1/b = c + 1/a$$

$$\Rightarrow (a - c) = (b - a)/ba \quad \text{---- (2)}$$

$$b + 1/c = c + 1/a$$

$$\Rightarrow (b - c) = (c - a)/ac \quad \text{---- (3)}$$

(1) $\times$ (2) $\times$ (3), we get

$$1 = 1/(abc)^2$$

$$\Rightarrow (abc)^2 = 1$$

$$\Rightarrow abc = \pm 1$$

$\therefore$ The value of abc is +1 & -1.

74. Answer: a

Explanation:

Given:

$$ax + by - 1 = 0, \text{ and}$$

$$(bx + ay - 2ab)/(a^2 + b^2) = 0$$

Calculation:

Cross multiplication rule

$$\Rightarrow \frac{x}{\frac{-2ab^2}{a^2+b^2} + a} = \frac{y}{-b + \frac{2a^2b}{a^2+b^2}} = \frac{1}{a^2-b^2}$$

$$\Rightarrow \frac{x}{\frac{-2ab^2+a^3+ab^2}{a^2+b^2}} = \frac{y}{\frac{-a^2b-b^3+2a^2b}{a^2+b^2}} = \frac{1}{a^2-b^2}$$

$$\Rightarrow \frac{x}{\frac{a^3-ab^2}{a^2+b^2}} = \frac{y}{\frac{a^2b-b^3}{a^2+b^2}} = \frac{1}{a^2-b^2}$$

$$\Rightarrow \frac{x}{\frac{a(a^2-b^2)}{a^2+b^2}} = \frac{y}{\frac{b(a^2-b^2)}{a^2+b^2}} = \frac{1}{a^2-b^2}$$

$$\Rightarrow \frac{x}{\frac{a(a^2-b^2)}{a^2+b^2}} = \frac{1}{a^2-b^2}$$

$$\Rightarrow x = \frac{a}{a^2+b^2}$$

Similarly,

$$\Rightarrow \frac{y}{\frac{b(a^2-b^2)}{a^2+b^2}} = \frac{1}{a^2-b^2}$$

$$\Rightarrow y = \frac{b}{a^2+b^2}$$

$$\Rightarrow x^2 + y^2 = \left(\frac{a}{a^2+b^2}\right)^2 + \left(\frac{b}{a^2+b^2}\right)^2 = \frac{a^2}{(a^2+b^2)^2} + \frac{b^2}{(a^2+b^2)^2} = \frac{1}{(a^2+b^2)}$$

$$\therefore (x^2 + y^2)(a^2 + b^2) = 1$$

★ Important Points

In a cross multiplication method, we multiply the numerator of one fraction to the denominator of other and denominator of the first term to the numerator of another term.

★ Alternate Method:

$$ax + by = 1 \text{ -----(1)}$$

$$bx + ay = 2ab/(a^2 + b^2) \text{ -----(2)}$$

On dividing eq (1)/(2) we get,

$$\Rightarrow (ax + by)/(bx + ay) = (a^2 + b^2)/2ab$$

$$\Rightarrow 2a^2xb + 2ab^2y = a^2bx + b^3x + a^3y + ab^2y$$

$$\Rightarrow a^2xb + ab^2y = b^3x + a^3y$$

$$\Rightarrow a^2bx - b^3x = a^3y - ab^2y$$

$$\Rightarrow x(a^2b - b^3) = y(a^3 - ab^2)$$

$$\Rightarrow x/y = (a^3 - ab^2)/(a^2b - b^3)$$

$$\Rightarrow x/y = a(a^2 - b^2)/b(a^2 - b^2)$$

$$x/y = a/b \text{ -----(3)}$$

Now putting value of x and y from eq (3) in eq (1) we get,

$$y = b/(a^2 + b^2)$$

$$x = a/(a^2 + b^2)$$

$$\Rightarrow x^2 + y^2 = a^2/(a^2 + b^2)^2 + b^2/(a^2 + b^2)^2$$

$$\Rightarrow x^2 + y^2 = 1/(a^2 + b^2)$$

$$(x^2 + y^2)(a^2 + b^2) = 1$$

75. Answer: c

Explanation:

$$a^3 - 7a - 6$$

$$\Rightarrow a^3 - a - 6a - 6$$

$$\Rightarrow a(a^2 - 1) - 6(a + 1)$$

$$\Rightarrow a(a + 1)(a - 1) - 6(a + 1)$$

$$\Rightarrow (a + 1)[a(a - 1) - 6]$$

$$\Rightarrow (a + 1)[a^2 - a - 6]$$

$$\Rightarrow (a+1) [a^2 - 3a + 2a - 6]$$

$$\Rightarrow (a+1) [a(a-3) + 2(a-3)]$$

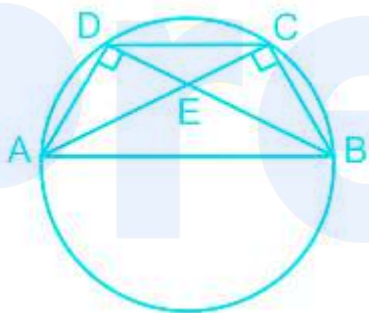
$$\Rightarrow (a+1) (a-3) (a+2)$$

$$\text{Let } x = (a+1), y = (a-3) \text{ and } z = (a+2)$$

$$\therefore x + y + z = a + 1 + a - 3 + a + 2 = 3a$$

76. Answer: c

Explanation:



As we know,

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

In $\triangle BEC$

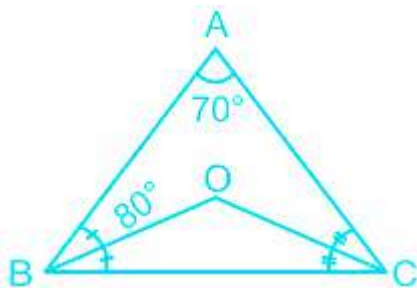
$$\angle ECB + \angle EBC + \angle BEC = 180^\circ$$

$$\Rightarrow \angle BEC = 180^\circ - 90^\circ - 35^\circ = 55^\circ$$

$$\Rightarrow \angle BEC = \angle AED = 55^\circ \text{ [Vertically opposite angle]}$$

77. Answer: d

Explanation:



In $\triangle ABC$,

$$\angle A + \angle B + \angle C = 180$$

$$\Rightarrow 70 + 80 + \angle C = 180$$

$$\Rightarrow \angle C = 180 - 150 = 30$$

$$\angle ACB = 30$$

$$\Rightarrow 2x = 30^\circ$$

$$\Rightarrow x = 15^\circ$$

As we know,

$$\angle OBC = \angle B/2 = 80/2 = 40$$

$$\angle OCB = \angle C/2 = 30/2 = 15$$

In $\triangle BOC$

$$\angle OBC + \angle OCB + \angle BOC = 180$$

$$\Rightarrow 40 + 15 + \angle BOC = 180$$

$$\angle BOC = 180^\circ - 55^\circ = 125^\circ$$

$$\Rightarrow y = 125^\circ$$

78. Answer: d

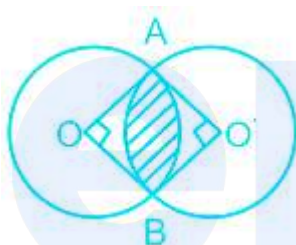
Explanation:

As we know,

Median of right angled triangle = $EF/2 = 12/2 = 6$ cm

79. Answer: a

Explanation:



Square = AOBO'

Side of the square $a = 1$ cm

Area of the square = 1 cm^2

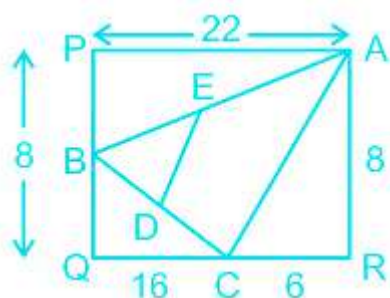
Area of sector AOB = $\pi r^2 \times 90/360 = \pi/4$

Area of sector AO'B = $\pi r^2 \times 90/360 = \pi/4$

$\therefore$ Area of the portion that is common to the circles = $\pi/4 + \pi/4 - 1 = \pi/2 - 1$

80. Answer: a

Explanation:



PQRA is a rectangle, then

QR = AP = 22 cm and AR = PQ = 8 cm, BQ = 2 cm and QC = 16 cm

RC = QR – QC = 22 – 16 = 6 cm

In $\triangle ARC$

$$AC^2 = AR^2 + RC^2$$

$$\Rightarrow AC^2 = 8^2 + 6^2$$

$$\Rightarrow AC^2 = 64 + 36$$

$$\Rightarrow AC = \sqrt{100} = 10 \text{ cm}$$

Let D and E are mid – point of AB and AC, then

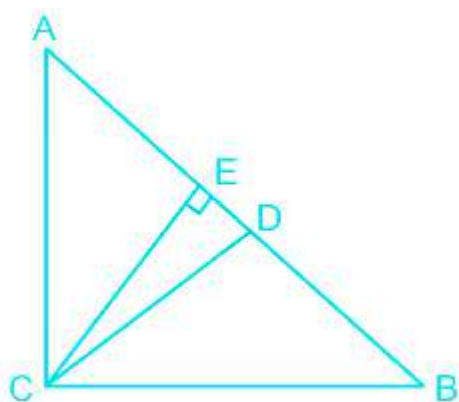
BD = DC and BE = EA

As we know,

$$\Rightarrow DE = AC/2 = 10/2 = 5 \text{ cm}$$

81. Answer: b

Explanation:



$$AC^2 + CB^2 = AB^2$$

$$\Rightarrow 2BC^2 = (AD + DB)^2$$

$$2BC^2 = AD^2 + DB^2 + 2AD \times BD \quad \text{----- (1)}$$

In right angled $\triangle CED$

$$CD^2 = CE^2 + ED^2 \quad \text{----- (2)}$$

In right angled $\triangle CEB$

$$BC^2 = CE^2 + BE^2 \quad \text{----- (3)}$$

From equation (3) and equation (2)

$$BC^2 - CD^2 = BE^2 - ED^2$$

$$\Rightarrow BC^2 - CD^2 = (BE + DE)(BE - DE)$$

$$\Rightarrow BC^2 - CD^2 = (AE + DE)(BE - DE)$$

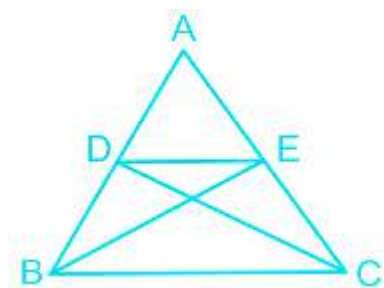
$$\Rightarrow BC^2 - CD^2 = AD \times BD \quad \text{----- (4)}$$

From equations (1) and equation (4)

$$\therefore AD^2 + DB^2 = 2CD^2$$

82. Answer: b

Explanation:



In $\triangle ABC$ and In $\triangle ADE$

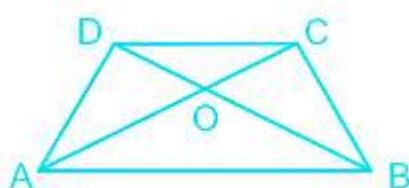
$$\frac{AD}{AB} = \frac{DE}{BC}$$

$$\Rightarrow \frac{DE}{BC} = \frac{4}{9}$$

$$\text{Area of } \triangle DEF : \text{Area of } \triangle BFC = DE^2 : BC^2 = 4^2 : 9^2 = 16 : 81$$

83. Answer: c

Explanation:



$$AB = 2CD$$

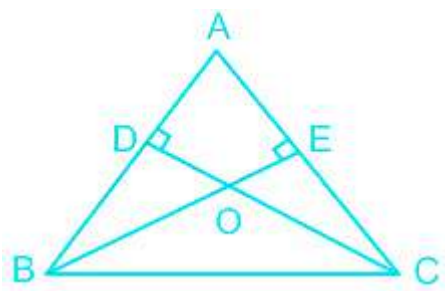
$$AB : CD = 2 : 1$$

In $\triangle ABO$ and In $\triangle DOC$

$$\therefore \text{Area of } \triangle AOB : \text{Area of } \triangle COD = AB^2 : CD^2 = 2^2 : 1^2 = 4 : 1$$

84. Answer: c

Explanation:



From the following figure

$$\angle ODA = \angle OEA = 90 \text{ and } \angle BOC = \angle DOE = 100$$

In quadrilateral ADOE

$$\angle ADO + \angle DOE + \angle OEA + \angle DAE = 360$$

$$\Rightarrow 90 + 100 + 90 + \angle DAE = 360$$

$$\Rightarrow \angle DAE = 360 - 280 = 80$$

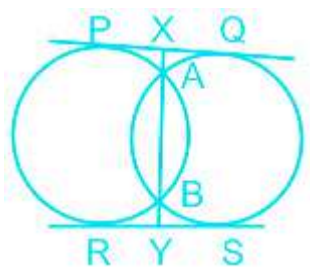
Short Trick:

$$\angle BOC + \angle BAC = 180$$

$$\Rightarrow \angle BAC = 180 - 100 = 80$$

85. Answer: d

Explanation:



Given,

$$XY = 5 \text{ cm and } AB = 3 \text{ cm}$$

As we know,

$$\Rightarrow XA = YB$$

$$\Rightarrow XY = XA + AB + BY$$

$$\Rightarrow 5 = 2XA + 3$$

$$\Rightarrow 2XA = 5 - 3 = 2$$

$$\Rightarrow XA = 1$$

$$XB = XA + AB = 1 + 3 = 4$$

As we know,

$$PX^2 = XA \times XB$$

$$\Rightarrow PX^2 = 1 \times 4$$

$$\Rightarrow PX = 2 \text{ cm}$$

Similarly,

$$XQ = 2 \text{ cm}$$

$$\Rightarrow PQ = PX + XQ = 2 + 2 = 4 \text{ cm}$$

86. Answer: d

Explanation:

$$\sec A + \tan A = a \quad \text{-----(1)}$$

As we know,

$$\sec^2 A - \tan^2 A = 1$$

$$\Rightarrow (\sec A - \tan A) (\sec A + \tan A) = 1$$

$$\Rightarrow \sec A - \tan A = 1/a \quad \text{-----(2)}$$

from equation (1) and equation (2)

$$2 \sec A = a + 1/a$$

$$\Rightarrow \sec A = (a^2 + 1)/2a$$

$$\Rightarrow \cos A = 2a/(a^2 + 1)$$

87. Answer: a

Explanation:

$$\sin P + \operatorname{cosec} P = 2$$

$$\text{Put } P = 90$$

$$\sin 90 + \operatorname{cosec} 90 = 2$$

$$\Rightarrow 1 + 1 = 2$$

$$\Rightarrow 2 = 2 \text{ (satisfied)}$$

$$\sin^7 P + \operatorname{cosec}^7 P$$

$$\Rightarrow \sin^7 90 + \operatorname{cosec}^7 90$$

$$\Rightarrow 1 + 1$$

$$\Rightarrow 2$$

88. Answer: d

Explanation:

$$\cos x \cdot \cos y + \sin x \cdot \sin y = -1$$

$$\Rightarrow \cos(x - y) = -1$$

$$\Rightarrow \cos(x - y) = \cos 180$$

$$\Rightarrow x - y = 180$$

Let $x = 180$ and $y = 0$, then

$$\cos x + \cos y$$

$$\Rightarrow \cos 180 + \cos 0$$

$$\Rightarrow -1 + 1$$

$$\Rightarrow 0$$

89. Answer: a

Explanation:

$$2(\sin^6 \theta + \cos^6 \theta) - 3(\sin^4 \theta + \cos^4 \theta) + 1$$

Put $\theta = 0$, then

$$\Rightarrow 2(0 + 1) - 3(0 + 1) + 1$$

$$\Rightarrow 2 - 3 + 1$$

$$\Rightarrow 0$$

90. Answer: d

Explanation:

$$\cos \theta = \frac{x^2 - y^2}{x^2 + y^2}$$

Perpendicular = P, Hypotenuse = H and Base = B.

$$\cos \theta = B/H = (x^2 - y^2)/(x^2 + y^2)$$

$$\Rightarrow H = x^2 + y^2 \text{ and } B = x^2 - y^2$$

As we know,

$$H^2 = P^2 + B^2$$

$$\Rightarrow (x^2 + y^2)^2 = P^2 + (x^2 - y^2)^2$$

$$\Rightarrow P^2 = (x^2 + y^2)^2 - (x^2 - y^2)^2$$

$$\Rightarrow P^2 = 4x^2y^2$$

$$\Rightarrow P = 2xy$$

$$\Rightarrow \cot A = B/P = (x^2 - y^2)/2xy$$

Short Trick:

$$\cos \theta = B/H = (x^2 - y^2)/(x^2 + y^2)$$

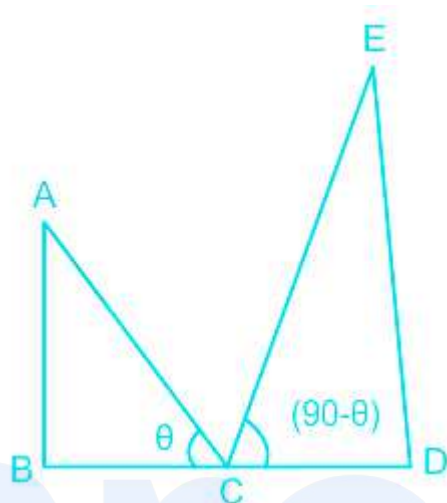
$$\Rightarrow \cot \theta = B/H$$

$$\text{As we know, } B = (x^2 - y^2)$$

Only option 4 has in numerator $(x^2 - y^2)$

91. Answer: d

Explanation:



From the following figure,

$$BD = 120 \text{ and } BC = CD = 120/2 = 60$$

$$\text{Let } AB = x \text{ and } DE = 3x$$

In $\triangle ABC$

$$\tan \theta = AB/BC$$

$$\Rightarrow \tan \theta = x/60 \quad \text{-----(1)}$$

$$\Rightarrow \tan (90 - \theta) = DE/CD$$

$$\Rightarrow \cot \theta = 3x/60 \quad \text{-----(2)}$$

Multiply by (1) and (2)

$$\tan \theta \cot \theta = (x/60) \times (3x/60)$$

$$\Rightarrow 1 = 3x^2/(60 \times 60)$$

$$\Rightarrow x^2 = (60 \times 60)/3 = 20 \times 20 \times 3$$

$$\Rightarrow x = 20\sqrt{3}$$

$$\text{Length of taller pillar DE} = 3 \times 20\sqrt{3} = 60 \times 1.732 = 103.92$$

92. Answer: b

Explanation:

$$x = \operatorname{cosec} \theta - \sin \theta \text{ and } y = \sec \theta - \cos \theta$$

$$\text{Put } \theta = 45$$

$$\Rightarrow x = \operatorname{cosec} 45 - \sin 45$$

$$\Rightarrow x = \sqrt{2} - 1/\sqrt{2}$$

$$\Rightarrow x = 1/\sqrt{2}$$

$$\Rightarrow y = \sec 45 - \cos 45$$

$$\Rightarrow y = \sqrt{2} - 1/\sqrt{2}$$

$$\Rightarrow y = 1/\sqrt{2}$$

Now, check option one by one.

$$x^2 y^2 (x^2 + y^2 + 3) = 1$$

$$\Rightarrow (1/\sqrt{2})^2 (1/\sqrt{2})^2 [(1/\sqrt{2})^2 + (1/\sqrt{2})^2 + 3] = 1$$

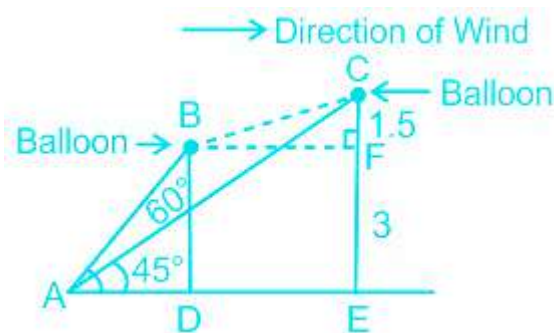
$$\Rightarrow 1/2 \times 1/2 [1/2 + 1/2 + 3] = 1$$

$$\Rightarrow 1/4 \times 4 = 1$$

$$\Rightarrow 1 = 1 \text{ (satisfied)}$$

93. Answer: c

Explanation:



According to question,

After 10 minutes balloon will be at Point B and after 15 minutes balloon will be at point C.

Now,

$$BD = \text{Time} \times \text{Speed}$$

$$\Rightarrow \frac{10}{60} \times 18 \Rightarrow 3\text{km}$$

$$\text{Also, } CE = \text{Time} \times \text{Speed}$$

$$\Rightarrow \frac{15}{60} \times 18 \Rightarrow 4.5\text{km}$$

$$CF = CE - BD \Rightarrow 4.5 - 3 = 1.5 \text{ km}$$

Now, In $\triangle BDA$

$$\tan 60^\circ = \frac{BD}{AD}$$

$$\Rightarrow \sqrt{3} = \frac{3}{AD}$$

$$\Rightarrow AD = \sqrt{3}$$

In $\triangle CAE$

$$\tan 45^\circ = \frac{CE}{AE}$$

$$\Rightarrow AE = 4.5$$

$$DE = AE - AD = 4.5 - \sqrt{3}$$

Also $DE = BF$

As are know

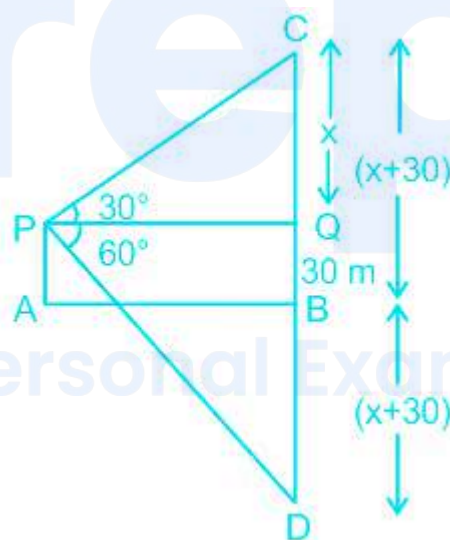
$$Speed = \frac{Distance}{Time} = \frac{BF}{5 \text{ minutes}}$$

$$\Rightarrow \frac{4.5 - \sqrt{3}}{5/60} \Rightarrow \frac{4.5 - 1.732}{5 \div 60} \Rightarrow \frac{2.768}{5} \times 60$$

$$\Rightarrow 33.216 \approx 33 \text{ km/hr}$$

94. Answer: c

Explanation:



From the following figure,

Height of aeroplane $CQ = x$ cm

$AP = BQ = 30$ cm

$$\Rightarrow CB = x + 30$$

$$\Rightarrow CB = BD = x + 30$$

$$\Rightarrow QD = 30 + x + 30 = x + 60$$

In ΔPCQ

$$\tan 30 = CQ/PQ$$

$$\Rightarrow 1/\sqrt{3} = x/PQ$$

$$\Rightarrow PQ = \sqrt{3} x \quad \text{-----(1)}$$

In ΔPDQ

$$\tan 60 = QD/PQ$$

$$\Rightarrow \sqrt{3} = (x + 60)/PQ$$

$$PQ = (x + 60)/\sqrt{3} \quad \text{-----(2)}$$

From equation (1) and equation (2)

$$\sqrt{3} x = (x + 60)/\sqrt{3}$$

$$\Rightarrow 3x = x + 60$$

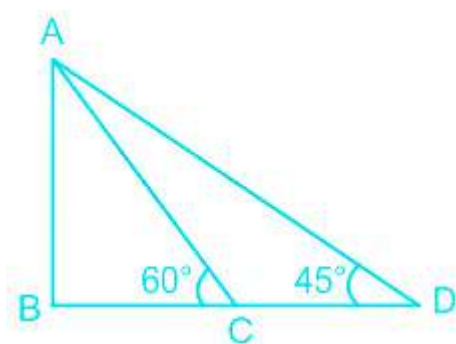
$$\Rightarrow 2x = 60$$

$$\Rightarrow x = 30$$

$\therefore$ Height of aeroplane from the surface of lake = $CQ + QB = 30 + 30 = 60$ m

95. Answer: d

Explanation:



In $\triangle ABC$

$$\tan 60 = AB/BC$$

$$\Rightarrow \sqrt{3} = AB/BC$$

$$AB = \sqrt{3} BC \quad \text{-----(1)}$$

In $\triangle ABD$

$$\tan 45 = AB/BD$$

$$\Rightarrow 1 = AB/BD$$

$$AB = BD \quad \text{-----(2)}$$

$$\Rightarrow BD = \sqrt{3} BC$$

$$\Rightarrow BD = BC + CD$$

$$\Rightarrow \sqrt{3} BC = BC + 300$$

$$\Rightarrow BC (\sqrt{3} - 1) = 300$$

$$\Rightarrow BC = 300/(\sqrt{3} - 1) \times [(\sqrt{3} + 1)/(\sqrt{3} + 1)]$$

$$\Rightarrow BC = 300/2 \times (\sqrt{3} + 1)$$

$$\Rightarrow BC = 150 (\sqrt{3} + 1)$$

From equation (1)

$$AB = 150 (\sqrt{3} + 1) \times \sqrt{3}$$

$$\therefore AB = 150 (3 + \sqrt{3})$$

96. Answer: a

Explanation:

$$\text{Total number of males} = 3500 + 4500 + 4750 + 2250 + 3250 = 18250$$

$$\text{Total number of females} = 3000 + 3500 + 4000 + 1500 + 3750 = 15750$$

$$\therefore \text{Required difference} = 18250 - 15750 = 2500$$

97. Answer: b

Explanation:

$$\text{Total number of females} = 3000 + 3500 + 4000 + 1500 + 3750 = 15750$$

$$\text{Average number of all females} = 15750/5 = 3150$$

$$\text{Number of males in organization D} = 2250$$

$$\therefore \text{Required percentage} = [(3150 - 2250)/2250] \times 100 = 40\%$$

98. Answer: c

Explanation:

$$\text{Number of females from the organisations B and C} = 3500 + 4000 = 7500$$

$$\text{Number of males from the organisations D and E} = 2250 + 3250 = 5500$$

$$\text{Required ratio} = 7500 : 5500 = 15 : 11$$

99. Answer: b

Explanation:

Total number of males from organisations A and B = $3500 + 4500 = 8000$

Total number of males from organisations C, D and E = $4750 + 2250 + 3250 = 10250$

$\therefore$ Required percentage = $8000/10250 \times 100 = 78.04\%$

100. Answer: c

Explanation:

Average number of females from the organisations A, B and C = $(3000 + 3500 + 4000)/3 = 10500/3$

Average number of males from the organisation C, D and E = $(4750 + 2250 + 3250)/3 = 10250/3$

$\therefore$ Required average = $10500/3 : 10250/3 = 42 : 41$

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