Prepp.in

Prepp

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
- UPTET
- IBPS RRB
- IBPS CLERK
- IES
- UPSC CAPF
- SSC Stenogr..
- RRB NTPC
- SSC GD
- RBI GRADE B
- RBI Assistant
- DSSSB

SSC CGL 2021 (Tier-II: Quant) Prev. Year Paper (08-Aug-2022)

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.

Quantitative Aptitude

1. The cost price of an article is Rs. 2800. Profit as a percentage of selling price is 20 percent. What is the actual profit (in Rs.) ? **(+2, -0.5)**

   a. Rs. 700

   b. Rs. 560

   c. Rs. 616

   d. Rs. 504

---

2. The sum of the curved surface area and total surface area of a solid cylinder is 2068 cm^2. If radius of its base is 7 cm, then what is the volume of this cylinder ? (use $\pi = 22/7$) **(+2, -0.5)**

   a. 2760 cm 3

   b. 3080 cm 3

   c. 2480 cm 3

   d. 2060 cm 3

---

3. If $\sin\theta = (9/41)$, $0° < \theta < 90°$ then what is the value of $\cot\theta$? **(+2, -0.5)**

   a. 39/9

   b. 47/8

   c. 35/8

   d. 40/9

4. Two circles each of radius 36 cm are intersecting each other such that each circle is passing through the centre of the other circle. What is the length of common chord to the two circles ? **(+2, -0.5)**

a. 24 $\sqrt{3}$ cm

b. 12 $\sqrt{3}$ cm

c. 36 $\sqrt{3}$ cm

d. 16 $\sqrt{3}$ cm

---

5. ABC is an isosceles right angle triangle. Angle ABC = 90 degree and AB = 12 cm. What is the ratio of the radius of the circle inscribed in it to the radius of the circle circumscribing triangle ABC ? **(+2, -0.5)**

a. 2 - $\sqrt{2}$: $\sqrt{2}$

b. 6 - 3 $\sqrt{2}$: 1 $\sqrt{2}$

c. 6 - $\sqrt{2}$: 3 $\sqrt{2}$

d. 6 - 3 $\sqrt{2}$: 6 $\sqrt{2}$

---

6. A, B and C started a business with initial investments of Rs. 20000, Rs. 25000 and Rs. 10000, respectively. After 5 months from start, A invested Rs. 4000 more. After 6 months from start, C invested Rs. 8000 more. After 4 months from start, B withdrew Rs. 8000. At the end of the year, they will receive a profit of Rs. 'x'. In what ratio they will share the profits ? **(+2, -0.5)**

a. 71 : 57 : 42

b. 71 : 59 : 42

c. 59 : 68 : 42

d. 67 : 59 : 42

---

7. Which fraction among the following is the least ? **(+2, -0.5)**

$\frac{5}{11}, \frac{7}{12}, \frac{8}{13}, \frac{9}{17}$

a. $\frac{5}{11}$

b. $\frac{7}{12}$

c. $\frac{9}{17}$

d. $\frac{8}{13}$

---

8. What is the value of $99\frac{11}{99} + 99\frac{13}{99} + 99\frac{15}{99} + \ldots + 99\frac{67}{99}$? **(+2, -0.5)**

a. 94220/33

b. 95120/33

c. 97120/33

d. 96220/33

---

9. What is the value of 5 $\sin^2 60°$ + 7 $\sin^2 45°$ + 8 $\cos^2 45°$? **(+2, -0.5)**

a. 10

b. 57/4

c. 25

d. 45/4

---

10. A bus covered a distance of 162 km. If speed of this bus is 15 m/s, then what will be the time taken ? **(+2, -0.5)**

a. 4 hours

b. 2 hours

c. 3 hours

d. 5 hours

---

11. What is the difference between the average of first 148 even positive numbers and the average of first 129 odd positive numbers ? **(+2, -0.5)**

a. 21

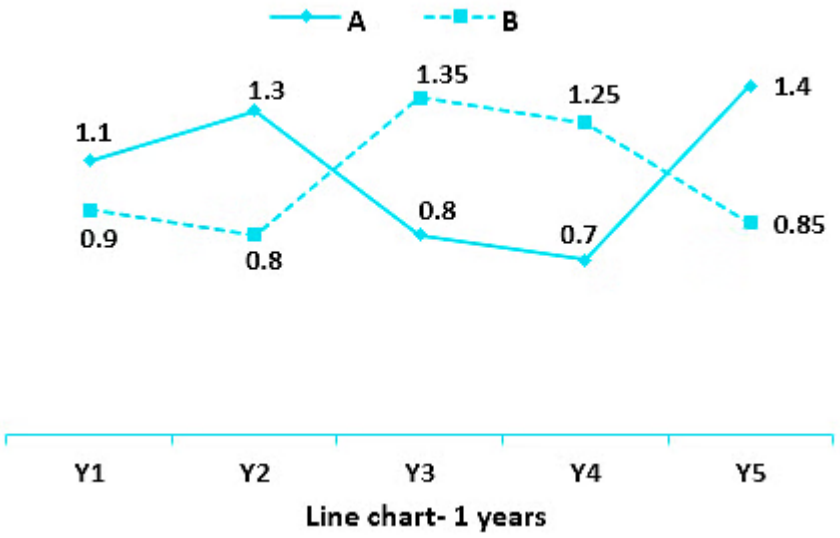
b. 20

c. 23

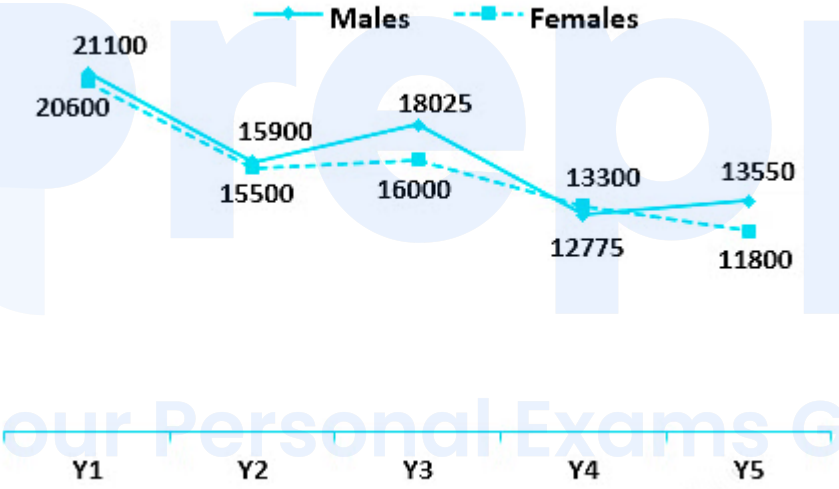
d. 19

---

12. Two line charts are given below. Line chart 1 shows the ratio of number of males to the number of females in two companies A and B for the 5 years. Line chart 2 shows the total number of males (both companies A and B) and total number of females (both companies A and B) for the 5 years. **(+2, -0.5)**



Line chart- 1 years



Line chart- 2 years

What is the ratio of number of males of company B in Y1 to the total number of females of company A in Y3 and Y5 ?

a. 117 : 215

b. 119 : 218

c. 117 : 218

d. 129 : 215

13. What is the value of $\frac{\sqrt{7}+\sqrt{5}}{\sqrt{7}-\sqrt{5}} \div \frac{\sqrt{14}+\sqrt{10}}{\sqrt{14}-\sqrt{10}} + \frac{\sqrt{10}}{\sqrt{5}}$? **(+2, -0.5)**

a. $\sqrt{2}$ + 2

b. 2 $\sqrt{2}$ + 2

c. $\sqrt{2}$ + 1

d. 2 $\sqrt{2}$ + 1

14. The ratio of milk to water in a 100 litres mixture is 2 : 3. 10 litres of this mixture is withdrawn and replaced with milk. This process is repeated 2 more times, What is the percentage of milk in final mixture ? **(+2, -0.5)**

a. 56.26 percent

b. 54.27 percent

c. 58.21 percent

d. 51.24 percent

15. ABC is an equilateral triangle. If the area of the triangle is 36 √ 3 , then what is the radius of circle circumscribing the triangle ABC ? **(+2, -0.5)**

a. 2 √ 3

b. 3√3

c. 4 √ 3

d. 6 √ 3

16. ABC is a right angle triangle and angle ABC = 90 degrees. BD is a perpendicular on the side AC. What is the value of BD^2? **(+2, -0.5)**

a. AD × DC

b. BC × AB

c. BC × CD

d. AD × AC

---

17. If $\sqrt[3]{N}$ lies between 6 and 7, where N is an integer then how many values N can take ? **(+2, -0.5)**

a. 126

b. 127

c. 128

d. 125

---

18. An article is sold at 25 percent loss. If its cost price is doubled and selling price is increased by Rs. 660, then there is a profit of 20 percent. What is the original cost price of the article ? **(+2, -0.5)**

a. Rs. 480

b. Rs. 500

c. Rs. 400

d. Rs. 360

---

19. Average age of 7 students of a class is 28 years. Average age of first three students is 30 years. Age of fourth student is 4 years less than the age of fifth student. Ages of last two students is same and is 5 more than the average age of first three students. What is the average age of fourth and fifth student ? **(+2, -0.5)**

a. 20 years

b. 36 years

c. 16 years

d. 18 years

---

20. The compound interest (compounding annually) on a certain sum at the rate of 8 percent per annum for two years is Rs. 6656. What would be the simple interest on the same sum at the same rate of interest for two years ? **(+2, -0.5)**

a. Rs. 5600

b. Rs. 6224

c. Rs. 6400

d. Rs. 6336

---

21. Salaries of B, C, D and E are in the ratio of 2 : 3 : 4 : 5 respectively. Their salaries are increased by 20 percent, 30 percent, 40 percent and 50 percent respectively. If the increased salary of D is Rs. 560, then what is the sum of the original salaries of B, C, D and E ? **(+2, -0.5)**

a. Rs. 1400

b. Rs. 1560

c. Rs. 1820

d. Rs. 1260

---

22. A person sells an article for a loss of 18 percent. If he increases the selling price by Rs. 144 and decreases the cost price by 30 percent, then there is profit of 20 percent. What is the original selling price ? **(+2, -0.5)**

a. Rs. 5068

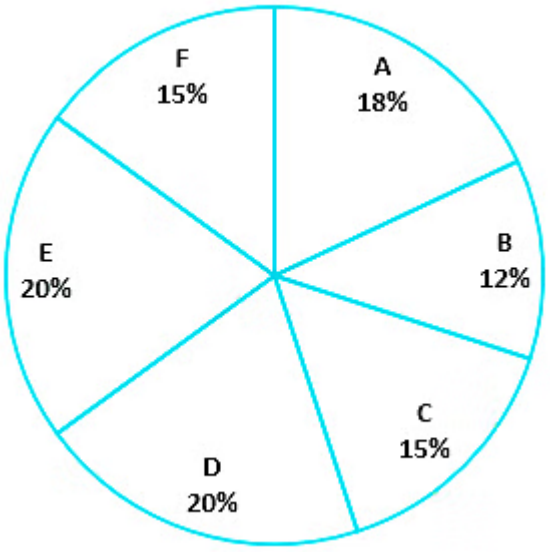
b. Rs. 6036

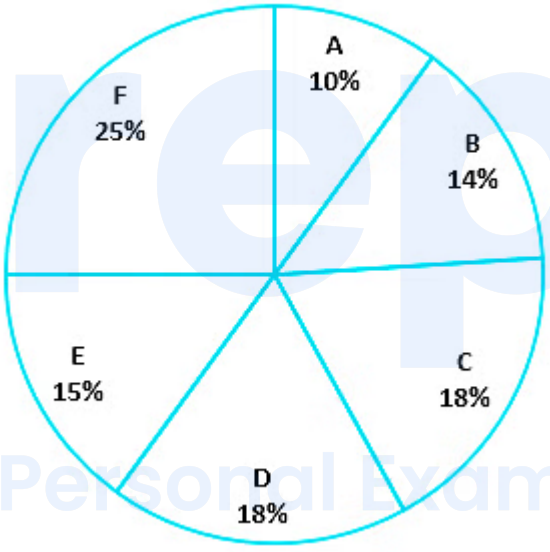
c. Rs. 5904

d. Rs. 6124

---

23. Two pie charts are given below. There are 6 departments in a office. Pie chart 1 shows the number of males in these 6 departments. Number of males in a particular department is shown as a percentage of total number of males in these 6 departments. Pie chart 2 shows the number of females in these 6 departments. Number of females in a particular department is shown as a percentage of total number of females in these 6 departments. **(+2, -0.5)**





Difference between the number of males in B and C is 600 and difference between the number of females in D and E is 900. What is the sum of number of females in A, B, F and number of males in D, E, A ?

a. 26300

b. 29400

c. 26800

d. 25700

24. The slant height of a cone is 20 cm. If area of its base is 616 cm^2, then what is the curved surface area of this cone ? (use $\pi = 22/7$) **(+2, -0.5)**

a. 960 cm 2

b. 440 cm 2

c. 1760 cm 2

d. 880 cm 2

---

25. The height of a cylinder is 6 cm more than the radius of its base. If its radius is 14 cm, then what will be volume of this cylinder ? (use $\pi = 22/7$) **(+2, -0.5)**

a. 13560 cm 3

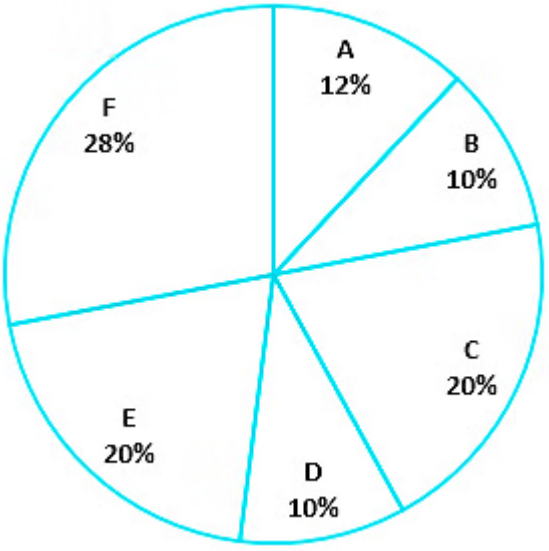
b. 14340 cm 3

c. 10440 cm 3

d. 12320 cm 3

---

26. The pie chart given below shows the number of tyres of 6 companies. Number of tyres of a particular company are shown as a percentage of total number of tyres of these 6 companies. **(+2, -0.5)**



What is the sum of central angles formed by the sectors representing tyres of company F and A ?

a. 84 degrees

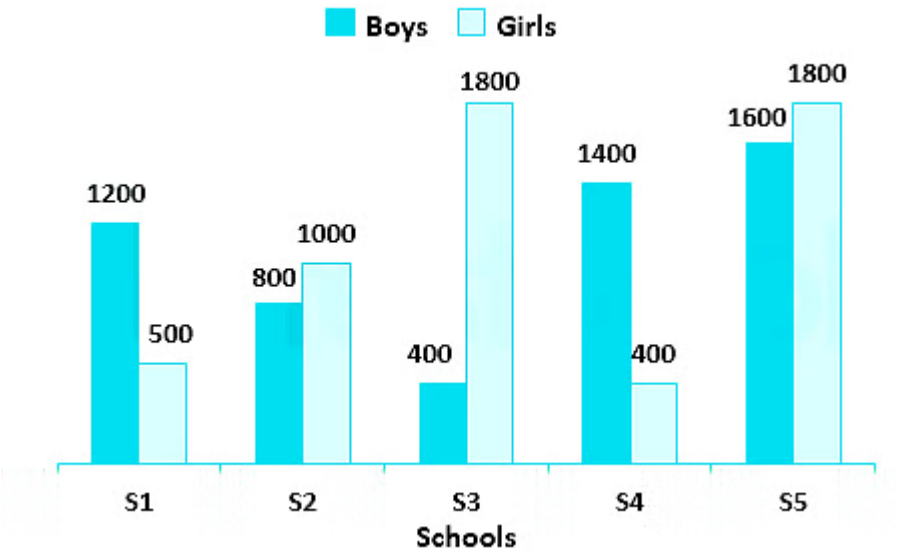
b. 108 degrees

c. 144 degrees

d. 112 degrees

---

27. The bar chart given below shows the number of boys and girls in 5 schools. **(+2, -0.5)**



If the number of boys in school S6 are 30 percent more than the number of girls in school S1, then number of girls in schools S3 and S4 is what percentage of number of boys in schools S6 and S1 ? (correct to two decimal places)

a. 110.92

b. 140.48

c. 124.62

d. 118.92

---

28. Volume of a cuboid is 4800 cm^3. If the height of this cuboid is 20 cm, then what will be the area of the base of cuboid ? **(+2, -0.5)**

a. 150 cm^2

b. 240 cm^2

c. 480 cm^2

d. 120 cm^2

---

29. Radius of a large solid sphere is 14 cm. If is melted to form 8 equal small solid sphere. What is the sum of total surface areas of all the 8 small solid spheres ? (use $\pi = 22/7$) **(+2, -0.5)**

a. 3648 cm^2

b. 4928 cm^2

c. 4244 cm^2

d. 4158 cm^2

---

30. Which of the following is equal to sec A - cos A ? **(+2, -0.5)**

a. sin A.cot A

b. cot A.cos A

c. tan A.sin A

d. cos A.sin A

---

31. ABC and PQR are two triangles. AB = PQ = 6 cm, BC = QR = 10 cm and AC = PR = 8 cm. If angle ABC = x degree, then what is the value of angle PRQ ? **(+2, -0.5)**

a. (180 - x) degree

b. x degree

c. (90 - x) degree

d. (90 + x) degree

---

32. ABCD is a quadrilateral. The length of the diagonal AC is 24 cm. The sum of the perpendicular drawn from vertex B and D on the diagonal AC is 10 cm. What is the area of the quadrilateral? **(+2, -0.5)**

a. 240 cm^2

b. 180 cm^2

c. 120 cm^2

d. 90 cm^2

---

33. The ratio of monthly incomes of A and B is 4 : 5 respectively. The ratio of monthly savings of A and B is 14 : 19 respectively. If the monthly expenditure of A and B is Rs. 1200 each, then what is the difference between the monthly incomes of A and B? **(+2, -0.5)**

a. Rs. 2000

b. Rs. 4000

c. Rs. 1000

d. Rs. 5000

---

34. If $\left(x+\frac{1}{x}\right)^2 = 3$, then what is the value of $x^6 + x^{-6}$? **(+2, -0.5)**

a. -6

b. 6

c. 2

d. -2

---

35. What is the simplified value of $\frac{(x+y+z)(xy+yz+zx)-xyz}{(x+y)(y+z)(z+x)}$? **(+2, -0.5)**

a. y

b. z

c. 1

d. x

---

36. Which of the following is equal to $\left[\frac{\cos\theta}{\sin\theta}+\frac{\sin\theta}{\cos\theta}\right]$? **(+2, -0.5)**

a. cot θ.sec θ

b. cosec θ.tan θ

c. cosec θ.sec θ

d. sec θ.tan θ

---

37. x, y and z are the sides of a triangle. If z is the largest side and $x^2+y^2>z^2$, then the triangle is a : **(+2, -0.5)**

a. Obtuse angled triangle

b. Acute angled triangle

c. Isosceles right angled triangle

d. Right angled triangle

38. If a + b = 6 and ab = 5, then what is the value of $a^3 + b^3$? **(+2, -0.5)**

a. 116

b. 106

c. 136

d. 126

39. The bar chart given below shows the discount percentage offered by a shopkeeper on seven articles. Selling price of these seven articles: A1, A2, A3, A4, A5, A6 and A7 is Rs. 420, Rs. 600, Rs. 816, Rs. 825, Rs. 425, Rs. 800 and Rs. 840. **(+2, -0.5)**

Selling price = Marked price $\left[1 - \frac{\text{Discount percent}}{100}\right]$

What is the sum of the marked price of these seven articles ?

a. Rs. 6500

b. Rs. 6200

c. Rs. 8000

d. Rs. 7000

---

40. What is the value of $3 \sin^2 30° + \frac{3}{5} \cos^2 60° - 2 \sec^2 45°$? **(+2, -0.5)**

a. $\frac{-5}{8}$

b. $\frac{-25}{17}$

c. $\frac{-31}{10}$

d. $\frac{-5}{2}$

---

41. What is the value of $\frac{\sqrt{29.16}}{\sqrt{1.1664}} + \frac{\sqrt{0.2916}}{\sqrt{116.64}} + \frac{\sqrt{0.0036}}{\sqrt{0.36}}$? **(+2, -0.5)**

a. 103/20

b. 27/5

c. 101/20

d. 26/5

---

42. If the digits of a two digit number is reversed, then the number is decreased by 36. Which of the following is correct regarding the number ? **(+2, -0.5)**

I. The difference of the digits is 4.

II. The value of number can be 84.

III. Number is always a composite number.

a. I, II and III

b. II and III

c. I and II

d. I and III

---

43. What is the value of $\frac{\cos 50^\circ}{\sin 40^\circ} + \frac{3 \operatorname{cosec} 80^\circ}{\sec 10^\circ}$ - 2 cos 50°.cosec 40° ? **(+2, -0.5)**

a. 5

b. 4

c. 3

d. 2

---

44. If $\sqrt{3}$ tan θ = 3 sin θ, then what is the value of $\sin^2\theta - \cos^2\theta$? **(+2, -0.5)**

a. 1/5

b. 1/3

c. 1/4

d. 1/2

---

45. The base of a prism is a right angle triangle whose sides are 9 cm, 12 cm and 15 cm. Volume of this prism is 648 cm^3. What will be the height of prism ? **(+2, -0.5)**

a. 12 cm

b. 14 cm

c. 16 cm

d. 9 cm

---

46. The cost of a diamond is directly proportional to the square of its weight. The cost of a 14 gm diamond is Rs. 2560. This diamond got broken down into two pieces in the ratio of 5 : 9. How much loss percent is incurred due to this breakage ? (Correct to two decimal places) **(+2, -0.5)**

a. 49.71 percent

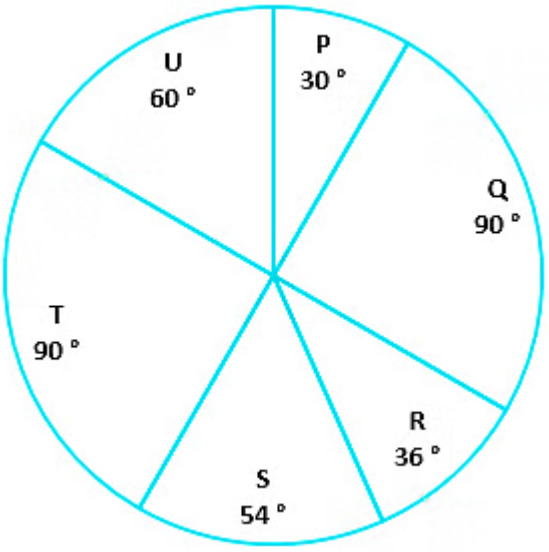
b. 55.41 percent

c. 53.47 percent

d. 45.92 percent

---

47. The pie chart given below shows the number of males in 6 departments. Number of males in a particular department are shown in the terms of degrees with respect to the total number of males in all the 6 departments. Number of males in department S are 1080. **(+2, -0.5)**



J = Total number of males in T and P

K = Difference between the number of males in P and Q

What is the value of J + K ?

a. 2400

b. 3600

c. 1200

d. 4800

---

48. ABCDEF is a regular hexagon. Side of the hexagon is 36 cm. What is the area of the triangle AOB ? **(+2, -0.5)**

a. 324 $\sqrt{3}$ cm^2

b. 192 $\sqrt{3}$ cm^2

c. 240 $\sqrt{3}$ cm^2

d. 360 $\sqrt{3}$ cm^2

---

49. The selling prices of articles A and B are the same. A is sold at a profit of 28 percent and B is sold at a loss of 24 percent. If the total selling price of the both articles is Rs. 48640, then what is the cost price of A and B, respectively ? **(+2, -0.5)**

a. Rs. 19000, Rs. 32000

b. Rs. 26000, Rs. 40000

c. Rs. 17000, Rs. 28000

d. Rs. 24000, Rs. 38000

---

50. What is the sum of all the common terms between the given series S1 and S2 ? **(+2, -0.5)**

S1 = 2, 9, 16, ..., 632

S2 = 7, 11, 15, ..., 743

a. 7140

b. 6750

c. 6860

d. 6974

---

51. A alone can do 2/5 of a work in 12 days. B is 25 percent more efficient than A. C alone can do the same work in 12 days less than B. D is 25 percent less efficient than C. If they all work together, then the work will be completed in how many days ? **(+2, -0.5)**

a. 300/47

b. 180/43

c. 200/51

d. 240/53

---

52. Which of the following given value is greater than $\sqrt[3]{12}$? **(+2, -0.5)**

a. $\sqrt[6]{121}$

b. $\sqrt[12]{33214}$

c. $\sqrt[5]{60}$

d. $\sqrt[9]{1500}$

---

53. If A = $\frac{\sqrt{0.0004}\times\sqrt[3]{0.000008}}{\sqrt[4]{16000}\times\sqrt[3]{125000}\times\sqrt[4]{810}}$ and B = $\frac{\sqrt[3]{0.729}\times\sqrt[4]{0.0016}}{\sqrt{0.16}}$, then what is A × B ? **(+2, -0.5)**

a. $\left(\frac{7}{3}\right) \times 10^{-7}$

b. 7×10^{-7}

c. $\left(\frac{7}{4}\right) \times 10^{-8}$

d. 6×10^{-8}

---

54. Which of the following is equal to $\frac{1}{\tan\theta}$ + tan θ ? **(+2, -0.5)**

a. $\frac{\text{cosec}\,\theta}{\sec\theta}$

b. sec θ.cosec θ

c. 1

d. $\tan^2\theta$

---

55. A, B and C started a business with the investment of Rs. 100000, Rs. 140000 and Rs. 200000 respectively. After 3 months, C left the business. 7 months after C left the business, B also left the business. B and C took their investments with them. At the end of the year, C received his share of profit as Rs. 1155. What is the total share of profits of A and B ? **(+2, -0.5)**

a. Rs. 6150

b. Rs. 5005

c. Rs. 4995

d. Rs. 5555

---

56. Sum Rs. 20000 and Rs. 40000 are given on simple interest at the rate of 10 percent and 15 percent per annum respectively for three years. What will be the total simple interest ? **(+2, -0.5)**

a. Rs. 28000

b. Rs. 24000

c. Rs. 36000

d. Rs. 32000

---

57. Which of the following is equal to $\left[\frac{\tan\theta+\sec\theta-1}{\tan\theta-\sec\theta+1}\right]$? **(+2, -0.5)**

a. $\frac{1+\tan\theta}{\cot\theta}$

b. $\frac{1+\cot\theta}{\tan\theta}$

c. $\frac{1+\sin\theta}{\cos\theta}$

d. $\frac{1+\cos\theta}{\sin\theta}$

---

58. What is the sum of first 20 terms of the following series ? **(+2, -0.5)**

1 × 2 + 2 × 3 + 3 × 4 + 4 × 5 + ...

a. 3080

b. 2940

c. 3240

d. 3160

---

59. When an article is sold at 5 percent discount, then there is a profit of 14 percent. If the discount is 11 percent, then what will be the profit ? **(+2, -0.5)**

a. 7.6 percent

b. 8.4 percent

c. 7.2 percent

d. 6.8 percent

---

60. The height of a solid cylinder is 35 cm. The circumference of its base is 37 cm more than the radius. What will be the volume of this cylinder ? **(+2, -0.5)**

a. 4740 cm 3

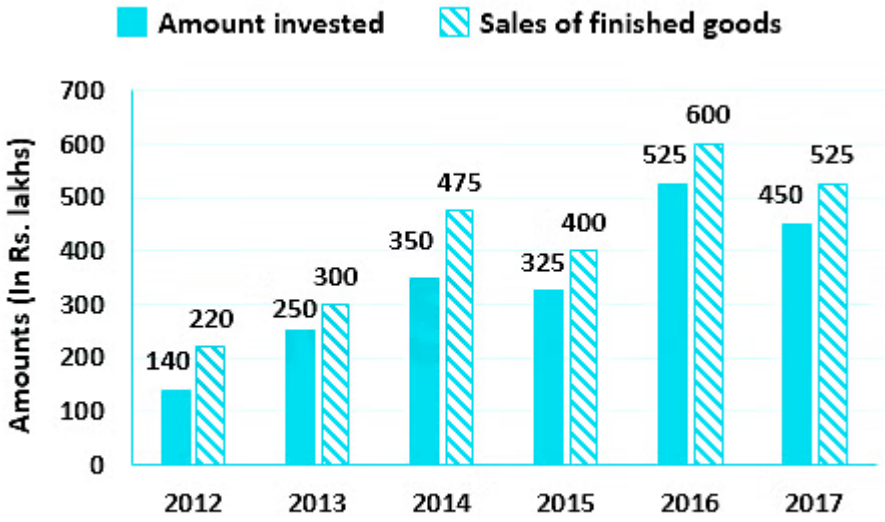
b. 4850 cm 3

c. 5390 cm 3

d. 4420 cm 3

---

61. The following bar graph shows the amounts (in Rs. lakhs) invested by a company in purchasing raw materials and the values (in Rs. lakhs) of finished goods sold by the company, from 2012 to 2017. **(+2, -0.5)**



The difference between the average amount invested in purchasing raw materials during 2012 to 2017 and the average value of sales of finished goods during the same period 2012 to 2017 is :

a. Rs. 86 lakhs

b. Rs. 90 lakhs

c. Rs. 80 lakhs

d. Rs. 85 lakhs

---

62. Vipul and Manish invested the sum of Rs. 15000 and Rs. 20000 at the rate of 20 percent p.a and 30 percent p.a. respectively on compound interest (compounding annually). If time period is 3 years for both, then what will be the total compound interest earned by Vipul and Manish ? **(+2, -0.5)**

a. Rs. 32480

b. Rs. 31688

c. Rs. 34860

d. Rs. 29460

---

63. Raju spends 10 percent and 20 percent of his income on transport and food respectively. He spends 30 percent of the remaining income on clothing. He saves rest of his income. If his saving is Rs. 26460, then what will be total expenditure on food and clothing together ? **(+2, -0.5)**

a. Rs. 22140

b. Rs. 24480

c. Rs. 23440

d. Rs. 26420

---

64. A alone can do a work in 14 days. B alone can do the same work in 28 days. C alone can do the same work in 56 days. They start the work together and completed the work such that B was not working on last 2 days and A did not work in last 3 days. In how many days (total) was the work completed ? **(+2, -0.5)**

a. 72/7 days

b. 79/7 days

c. 82/7 days

d. 65/7 days

---

65. PQR is an equilateral triangle and the centroid of triangle PQR is point A. If the side of the triangle is 12 cm, then what is the length of PA ? **(+2, -0.5)**

a. $2\sqrt{3}$ cm

b. $4\sqrt{3}$ cm

c. $8\sqrt{3}$ cm

d. $\sqrt{3}$ cm

---

66. The base of a right prism is an equilateral triangle whose side is 10 cm. If height of this prism is 10 $\sqrt{3}$ cm, then what is the total surface area of prism ? **(+2, -0.5)**

a. 325 $\sqrt{3}$ cm^2

b. 125 $\sqrt{3}$ cm^2

c. 150 $\sqrt{3}$ cm^2

d. 350 $\sqrt{3}$ cm^2

---

67. A mixture of acid and water contains 20 percent acid. When 10 litres of water is added to the mixture, then the percentage of acid becomes 15 percent. What is the original quantity of mixture ? **(+2, -0.5)**

a. 35 litres

b. 30 litres

c. 25 litres

d. 40 litres

---

68. Triangle BAC is similar to triangle PQR. The area of triangle BAC and triangle PQR is 25 cm^2 and 36 cm^2 respectively. If BA = 4 cm, then what is the length of PQ ? **(+2, -0.5)**

a. 5 cm

b. 5.8 cm

c. 4.8 cm

d. 4.2 cm

---

69. What is the value of $\frac{7}{2}+\frac{11}{3}+\frac{7}{6}+\frac{11}{15}+\frac{7}{12}+\frac{11}{35}+\ldots..+\frac{7}{156}+\frac{11}{575}$? **(+2, -0.5)**

a. 3816/325

b. 3216/315

c. 3714/345

d. 3917/355

---

70. The ratio of the three sides of the triangle are 5 : 13 : 12. What is the largest angle of the triangle ? **(+2, -0.5)**

a. 120 degrees

b. 80 degrees

c. 135 degrees

d. 90 degrees

---

71. Price of rice is decreased by 25 percent and therefore a person can purchase 30 kg more rice in the same expenditure. If expenditure is Rs. 5400, then what was the original price of rice per kg ? **(+2, -0.5)**

a. Rs. 60 per kg

b. Rs. 75 per kg

c. Rs. 50 per kg

d. Rs. 90 per kg

---

72. x, y and z are distinct prime numbers where x < y < z. If x + y + z = 70, then what is the value of z ? **(+2, -0.5)**

a. 29

b. 43

c. 31

d. 37

---

73. Rohit's income is Rs. 32000. If his expenses is 30 percent of total income, then what will be the saving of Rohit ? **(+2, -0.5)**

a. Rs. 22400

b. Rs. 18600

c. Rs. 19200

d. Rs. 24600

---

74. How many numbers are there from 400 to 700 in which the digit 6 occurs exactly twice ? **(+2, -0.5)**

a. 19

b. 18

c. 21

d. 20

---

75. The difference between the areas of two concentric circles is 264 cm^2. What is the difference between the square of their radius ? (use $\pi = \frac{22}{7}$) **(+2, -0.5)**

a. 140 cm^2

b. 84 cm^2

c. 64 cm^2

d. 70 cm^2

---

76. What is the value of $\frac{3 \sin 58^\circ}{\cos 32^\circ} + \frac{3 \sin 42^\circ}{\cos 48^\circ}$? **(+2, -0.5)**

a. 8

b. 9

c. 6

d. 7

---

77. What is the solution of the following equations ? **(+2, -0.5)**

$2x + 3y = 12$ and $3x - 2y = 5$

a. $x = 2, y = 3$

b. $x = 3, y = 2$

c. $x = 3, y = -2$

d. x = -2, y = 3

---

78. A sum of Rs. 1250 has to distributed among A, B, C and D. Total share of B and D is equal to (14/11) of total share of A and C. Share of D is half of share of A. Share of C is 1.2 of share of A. What are the shares of A, B, C and D respectively ? **(+2, -0.5)**

a. Rs. 250, Rs. 575, Rs. 300, Rs. 125

b. Rs. 250, Rs.575, Rs. 300, Rs. 175

c. Rs. 250, Rs. 525, Rs. 300, Rs. 125

d. Rs. 350, Rs. 525, Rs. 300, Rs. 125

---

79. Volume of a cone whose radius of a base and height are r and h respectively, is 400 cm^3. What will be the volume of a cone whose radius of base and height are 2r cm and h cm respectively ? **(+2, -0.5)**

a. 1600 cm^3

b. 100 cm^3

c. 800 cm^3

d. 1200 cm^3

---

80. An person 1.8 metre tall is 30 $\sqrt{3}$ metre away from a tower. If the angle of elevation from his eye to the top of the tower is 30 degree, then what is the height (in m) of the tower ? **(+2, -0.5)**

a. 31.8

b. 32.5

c. 37.8

d. 30.5

---

81. If $x + y = 1$, then what is the value of $x^3 + 3xy + y^3$? **(+2, -0.5)**

a. 0

b. -1

c. 1

d. 2

---

82. Marked price of an article is Rs. 28000. It can be sold at one of the following ways : **(+2, -0.5)**

Way A: A single discount of 24 percent.

Way B: Two successive discounts of 16 percent and 10 percent.

Which way will have lowest selling price and what will be the value of it ?

a. Way A, Rs. 21168

b. Way B, Rs. 21280

c. Way B, Rs. 21168

d. Way A, Rs. 21280

---

83. If xy = -6 and $x^3 + y^3 = 19$ (x and y are integers), then what is the value of $\frac{1}{x^{-1}} + \frac{1}{y^{-1}}$? **(+2, -0.5)**

a. 2

b. -1

c. -2

d. 1

---

84. If $A = 0.3\overline{12}$, $B = 0.4\overline{15}$ and $C = 0.30\overline{9}$ then what is the value of A + B + C ? **(+2, -0.5)**

a. 1141/1100

b. 1097/1100

c. 1043/1100

d. 1211/1100

---

85. Length of a train is 330 metres and it is moving at the speed of 72 km/hr. In how much time will it takes cross a platform of length 710 metres ? **(+2, -0.5)**

a. 72 seconds

b. 56 seconds

c. 64 seconds

d. 52 seconds

---

86. Two trains whose lengths are 450 metres and 300 metres are moving towards each other at the speed of 162 km/hr and 108 km/hr respectively. If distance between trains is 300 metres, then in how much time, these trains will cross each other ? **(+2, -0.5)**

a. 28 seconds

b. 14 seconds

c. 21 seconds

d. 35 seconds

---

87. A can do 1/4 part of a work in 9 days. B can do 2/3 part of the same work in 28 days. Working together, in how many days can A and B complete the whole work ? **(+2, -0.5)**

a. 198/17 days

b. 262/11 days

c. 261/15 days

d. 252/13 days

---

88. An article is sold for Rs. 54120 after two successive discounts of 12 percent and 18 percent. What is the marked price of the article ? **(+2, -0.5)**

a. Rs. 78000

b. Rs. 75000

c. Rs. 81000

d. Rs. 72000

---

89. What will be the simple interest on a sum of Rs. 12000 at the rate of 15 percent per annum for three years ? **(+2, -0.5)**

a. Rs. 4500

b. Rs. 6000

c. Rs. 7200

d. Rs. 5400

---

90. The curved surface area of a solid hemisphere is 22 cm^2. What is the total surface area of the hemisphere ? (use $\pi = 22/7$) **(+2, -0.5)**

a. 33 cm^2

b. 30 cm^2

c. 66 cm^2

d. 44 cm^2

---

91. Vinay and Mahesh are 250 metres apart from each other. They are moving towards each other with the speed of 36 km/hr and 54 km hr respectively. In how much time will they meet each other ? **(+2, -0.5)**

a. 10 seconds

b. 12 seconds

c. 15 seconds

d. 20 seconds

---

92. ABC is an equilateral triangle with side 12 cm. What is the length of the radius of the circle inscribed in it ? **(+2, -0.5)**

a. 8 $\sqrt{3}$ cm

b. 6 $\sqrt{3}$ cm

c. 4 $\sqrt{3}$ cm

d. 2 $\sqrt{3}$ cm

---

93. Salary of Mohit is 60 percent more than Vijay. Salary of Vijay is how much percent less than Mohit ? **(+2, -0.5)**

a. 45

b. 47.5

c. 37.5

d. 42.5

---

94. AB is the chord of a circle such that AB = 10 cm. If the diameter of the circle is 20 cm, then the angle subtended by the chord at the centre is _ _ _ _ _ _ _ _.

a. 60 degree

b. 90 degree

c. 45 degree

d. 30 degree

---

95. The radius of a solid sphere is 42 cm. It is melted to form identical small solid spheres whose radius is 7 cm. What is the number of small solid spheres obtained ? **(+2, -0.5)**

a. 36

b. 64

c. 216

d. 125

---

96. The graph of the equation x = a (a ≠ 0) is a _ _ _ _ _ _ _ _ _. **(+2, -0.5)**

a. line parallel to x axis

b. line parallel to y axis

c. line at an angle of 45 degree to x axis

d. line at an angle of 45 degree to y axis

---

97. Three years ago, Raman's salary was Rs. 45000. His salary is increased by 10 percent, A percent and 20 percent in first, second and third year respectively. Raman's present salary is Rs. 83160. What is the value of A ? **(+2, -0.5)**

a. 40

b. 30

c. 50

d. 54

---

98. The height of a cylinder is 45 cm. If circumference of its base is 132 cm, then what is the curved surface of this cylinder ? (use π = 22/7) **(+2, -0.5)**

a. 6360 cm^2

b. 5720 cm^2

c. 5940 cm^2

d. 6270 cm^2

---

99. How many composite numbers are there from 53 to 97 ? **(+2, -0.5)**

a. 35

b. 36

c. 38

d. 37

---

100. A alone can do a work in 11 days. B alone can do the same work in 22 days. C alone can do the same work in 33 days. **(+2, -0.5)**

They work in the following manner :

Day 1: A and B work.

Day 2: B and C work.

Day 3: C and A work.

Day 4: A and B work. And so on.

In how many days will the work be completed ?

a. 9 days

b. 3 days

c. 12 days

d. 6 days

Answers

1. **Answer: a**

Explanation:

GIVEN:

Cost price is Rs2800

Profit as a % of selling price is 20%

FORMULA USED:

Profit = (S.P. - C.P.)

Profit% as of Selling Price = (Profit/ S.P.) × 100

Where, S.P. = Selling price, C.P. = Cost price

CALCULATION:

Here, Cost price = Rs2800, P% as Selling Price = 20

As, according to the question,

Profit as a percentage of Selling price = (Profit/ S.P.) × 100

⇒ 20 = (Profit /S.P.) × 100

⇒ 20 = (S.P. - 2800)/S.P. × 100 [As Profit = S.P. - C.P.]

⇒ 20 S.P. = 100 S.P. - 280000

⇒ 280000 = 80 S.P.

⇒ S.P. = Rs3500

Now,

Actual Profit = (S.P. - C.P.) = Rs(3500 - 2800) = Rs700

Hence, the actual profit is Rs 700.

---

2. **Answer: b**

Explanation:

Given:

The sum of the curved surface area and total surface area of a solid cylinder is 2068 cm 2 .

Radius of its base is 7 cm

Formula used:

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

Curved surface area of cylinder = $2\pi rh$

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

Calculations:

According to the question,

$2068 = 2\pi rh + 2\pi r(r + h)$

$\Rightarrow 2068 = 2\pi r(h + r + h)$

$\Rightarrow 1034 = (22/7) \times 7 \times (7 + 2h)$

$\Rightarrow 1034/22 = 7 + 2h$

$\Rightarrow 47 = 7 + 2h$

$\Rightarrow 2h = 47 - 7$

$\Rightarrow h = 40/2 = 20$ cm

Now the volume,

⇒ V = (22/7) × (7) 2 × (20)

⇒ V = 22 × 7 × 20 = 3080 cm 3

∴ T he volume of this cylinder is 3080 cm 3 .

---

3. Answer: d

Explanation:

Given:

sin θ = 9/41

0° < θ < 90°

Formula used:

cosec ^{2} θ - cot ^{2} θ = 1

Calculation:

sin θ = 9/41

⇒ cosec θ = 41/9

⇒ cot ^{2} θ = cosec ^{2} θ - 1 = (41/9) ^{2} - 1

⇒ cot 2 θ = 1681/81 - 1

⇒ cot 2 θ = (1681 - 81)/81 = 1600/81

⇒ cot ^{2} θ = (40/9) ^{2}

∴ cot θ = 40/9.

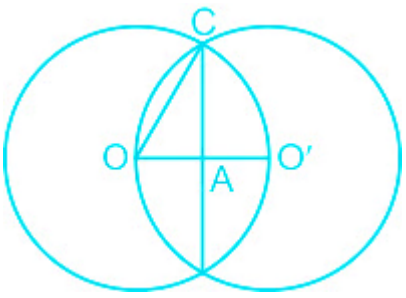
---

4. Answer: c

Explanation:

Given:

Radius of two circle = 36cm



Formula used:

$A^2 + B^2 = C^2$

Solution:

OO' = OC = 36cm

∴ Triangle OO'C is an equilateral triangle.

OA = AO' = 36/2 = 18cm

Using Pythagoras' theorem,

$CA^2 = OC^2 - OA^2 = 36^2 - 18^2 = 1296 - 324 = 972$

$CA = 18\sqrt{3}$

Length of the Chord = 2 x CA = $36\sqrt{3}$ cm.

---

5. **Answer: a**

Explanation:

GIVEN:

ABC is an isosceles triangle

Angle ABC is 90 degree

AB is 12 cm

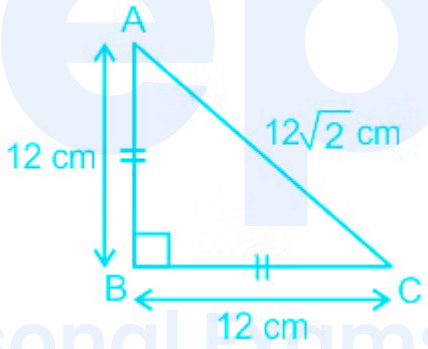
FORMULA USED:

In-radius of inscribed circle of right angled triangle = (P + B - H)/2

Circum-radius of circumscribed circle of right angle triangle = H/2

Where, P = Perpendicular , B = Base , H = Hypotenuses

CALCULATION:



Here, we have an isosceles triangle ABC

As, we know that in an isosceles triangle,

Two sides are equal i.e AB = BC = 12 cm and as angle B = 90 degree.

So, it is a right-angled isosceles triangle ABC [where, Perpendicular = AB = 12, Base = BC = 12 and AC= Hypotenuse]

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

$\Rightarrow H^2 = 12^2 + 12^2 = (144 + 144) = 288$

$\Rightarrow H = \sqrt{288} = 12\sqrt{2}$

In- radius of inscribed circle of triangle = (P + B - H) /2 = (12 + 12 - 12 $\sqrt{2}$) /2 = 12 (2 - $\sqrt{2}$)/2 = 6 (2 - $\sqrt{2}$)

Circum-radius of circumscribed circle of triangle = H/2 = 12 $\sqrt{2}$ /2 = 6 $\sqrt{2}$

Now,

In radius : Circum radius = 6 (2 - $\sqrt{2}$) : 6 $\sqrt{2}$ = (2 - $\sqrt{2}$) : $\sqrt{2}$

Hence, required ratio is (2 - $\sqrt{2}$) : $\sqrt{2}$.

---

6. Answer: d

Explanation:

Solution:

	A	B	C
Capital invested	(20000 x 5) + (24000x7)	(25000x4) + (17000 x 8)	(10000x6) + (18000x6)
	268000	236000	168000

Profit Ratio = A : B : C = 268 : 236 : 168 = 67 : 59 : 42

---

7. Answer: a

Explanation:

Fact used:

The fraction, whose numerator is the least, is the least, provided the same denominators.

Solution:

Let's make the denominators the same,

LCM(11, 12, 13, 17) = 29172 = D

5/11= (5 x 12 x 13 x 17) / D = 13260/D

7/12 = (7x11x13x17)/D = 17017/D

8/13 = (8x11x12x17)/D = 17952/D

9/17 = (9x11x12x13)/D = 15444/D

From the above, we can say that 5/11 is the least fraction.

---

8. **Answer: b**

Explanation:

Formula used:

$S_n = [n \times (a + a_n)] / 2$

$a_n = a + (n-1)d$

d = difference

a = initial term

a_n = last term

n = number of terms

S_n = Sum of n terms

Solution:

The series can be written as:

$\frac{1}{99}$ [99x99+11 + 99x99+13 + ... + 99x99+67]

= $\frac{1}{99}$ [9812 + 9814 + 9816+ ... + 9868]

Now, our series is, 9812, 9814,...,9868.

a = 9812

a_n = 9868

d = 9814 -9812 = 2

9868 =9812 + (n-1) x 2

n - 1 = 56/2 = 28

n = 29

S_n = 29 x (9812 +9868) / 2 = (29 x 19680)/2 = 570720/2 = 285360

Hence, the sum of the series = 285360/99 = 95120/33

---

9. **Answer: d**

Explanation:

Given:

5 sin 2 60° + 7 sin 2 45° + 8 cos 2 45°

Values used:

sin 60° = $\sqrt{3}$ /2

sin 45° = 1/ $\sqrt{2}$

cos 45° = 1/ $\sqrt{2}$

Solution:

Now, let's put the values in the given question,

$5 \sin 2\,60° + 7 \sin 2\,45° + 8 \cos 2\,45° = 5(\sqrt{3}/2)^2 + 7(1/\sqrt{2})2 + 8(1/\sqrt{2})2$

$5 \sin 2\,60° + 7 \sin 2\,45° + 8 \cos 2\,45° = 5(3/4) + 7(1/2) + 8(1/2)$

$5 \sin 2\,60° + 7 \sin 2\,45° + 8 \cos 2\,45° = 15/4 + 7/2 + 8/2$

$5 \sin 2\,60° + 7 \sin 2\,45° + 8 \cos 2\,45° = (15+14+16)/4$

$5 \sin 2\,60° + 7 \sin 2\,45° + 8 \cos 2\,45° = 45/4$

---

10. **Answer: c**

Explanation:

Given:

Distance = 162km

Speed = 15m/s = 54km/h

Formula used:

Speed = Distance/Time

1 hour = 60 minutes

1 minute = 60 seconds

1km = 1000m

Solution:

Time = Distance/Speed = 162/54 = 3hours.

---

11. **Answer: b**

Explanation:

Given:

148 even number

129 odd number

Formula used:

Sum of first n even numbers = n(n+1)

Sum of first odd n numbers = n x n

Average = Sum/total number

Solution:

Sum of first 148 even numbers = 148 (148 +1) = 148 x149

Average of Sum of first 148 even numbers = (148 x149) / 148 = 149

Sum of first odd 129 numbers = 129 x129

Average of Sum of first odd 129 numbers = (129 x 129)/129 = 129

Difference = 149–129 = 20

12. **Answer: a**

Explanation:

Concept used:

If **Ratio** of two numbers is given as *1.1* , then the numbers would be written as 11x and 10x where x is **HCF** of both numbers.

Calculations:

Let the number of males and females in company A in Y1 be 11k and 10k respectively and the number of males and females in company B in Y2 be 9m and 10m

respectively.Then,

11k + 9m = 21100 ---------(1)

And 10k + 10m = 20600 ----(2)

On solving (1) and (2), we get:

m = 780

So, The number of males in Company B in Y1 is 9m = 9(780) = 7020

Similarly let is assume the number of males and females in company B in Y3 be 27t and 20t respectively and the number of males and females in company A in Y3 be 16l and 20l respectively. Then,

27t + 16l = 18025

And 20t + 20l = 16000

On solving (3) and (4), we get:

t = 475 and l = 325

So, Total number of females in company A in Y3 = 20l = 20(325) = 6500

Now, Let the number of males and females in company A in Y5 be 28x and 20x respectively and the number of males and females in company B in Y5 be 17y and 20y respectively.Then,

28x + 17y = 13550 ------------(5)

And 20x + 20y = 11800 ------(6)

On solving equations (5) and (6) , we get :

x = 320

So, The number of females in company A in Y5

= 20x

= 20(320)

= 6400

Now, required ratio

= 7020 : (6500 + 6400)

= 7020 : 12900

= 117 : 215

Hence, The Required value is 117 : 215.

---

13. Answer: c

Explanation:

Solution:

$\frac{\sqrt{7}+\sqrt{5}}{\sqrt{7}-\sqrt{5}} \div \frac{\sqrt{14}+\sqrt{10}}{\sqrt{14}-\sqrt{10}} + \frac{\sqrt{10}}{\sqrt{5}}$

$\Rightarrow \frac{\sqrt{7}+\sqrt{5}}{\sqrt{7}-\sqrt{5}} \div \frac{\sqrt{14}+\sqrt{10}}{\sqrt{14}-\sqrt{10}} + \frac{\sqrt{10}}{\sqrt{5}} = \frac{(\sqrt{7}+\sqrt{5})(\sqrt{14}-\sqrt{10})}{(\sqrt{7}-\sqrt{5})(\sqrt{14}+\sqrt{10})} + \frac{\sqrt{10}}{\sqrt{5}}$

$\Rightarrow \frac{7\sqrt{2}-\sqrt{70}+\sqrt{70}-5\sqrt{2}}{7\sqrt{2}+\sqrt{70}-\sqrt{70}-5\sqrt{2}} + \frac{\sqrt{10}}{\sqrt{5}}$

$\Rightarrow 1 + \frac{\sqrt{10}}{\sqrt{5}} = \sqrt{2} + 1$

---

14. Answer: a

Explanation:

Given:

Milk : Water = 2:3

Mixture = 100 litres

Solution:

Milk = 2/5 x 100 = 40 Litre = 40% milk in 100% mixture.

Now,

10 litre from 100 litres of mixture replaced by milk

⇒ 10L = 4% milk in the mixture and 6% water

100L - 10L(from mixture) + 10L(milk) = 40% - 4 + 10 = 46% milk in 100ml solution after 1st replacement.

For the second time,

⇒ 10L = 4.6% milk in the mixture

100L - 10L(from mixture) + 10L(milk) = 46% - 4.6% + 10% = 51.4%

For the third time,

⇒ 10L = 5.14% milk in the mixture

100L - 10L(from mixture) + 10L(milk) = 51.4% - 5.14% + 10% = 56.26%

Hence, the percentage of milk after the third replacement will be 56.26 percent.

15. **Answer: c**

Explanation:

Given:

Area(ABC) = 36√3 units square.

Formula used:

Area of equilateral triangle = $\frac{\sqrt{3}}{4}$ x side ^{2}

Radius of circumscribing circle to an equilateral triangle = side/√3

Solution:

$\frac{\sqrt{3}}{4}$ x side 2 = 36 √3

side ^{2} = 36 x 4 = 144

side = 12 units.

Radius = side /√3 = 12/ √3 = 4√3

∴ The radius of the circle circumscribing the tringle = 4√3

---

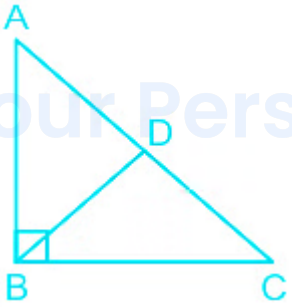
16. Answer: a

Explanation:

Given:

ABC = 90 degrees

BD is perpendicular to AC



Solution:

In triangle ADB & BDC
∠ ADB = ∠ BDC [BD ⊥ AC]

∠ ABD = ∠ BCD

BD = BD

Triangle ADB is similar to triangle BDC.

$\frac{AD}{DB} = \frac{BD}{DC}$

BD 2 = AD x DC

---

17. Answer: a

Explanation:

solution:

$6^3 = 216$

$7^3 = 343$

From the above, 216's cube root is 6 & 343's cube root is 7.

This means, all the integers in between 343 and 216 have cube roots between 6 & 7.

So, N can have values, 343 - 216 - 1 = 126.

---

18. Answer: c

Explanation:

Given:

$\frac{CP-SP}{CP}$ x 100 = 25 -----(1)

$\frac{(SP+660-2CP)}{2CP}$ x 100 = 20 -------(2)

Formula used:

Profit % = (Profit / Cost Price) x 100
Loss% = (Loss / Cost Price) x 100

Profit = SP - CP
Loss = CP - SP

CP = Cost price
SP = Selling price

Solution:

Let's solve the first equation,

1 - (SP/CP) =0.25

SP/CP = 0.75

SP = 0.75CP

Now, let's put the value of SP in the second equation,

$\frac{(0.75CP+660-2CP)}{2CP}$ x 100 = 20

(660 - 1.25CP) / 2CP = 0.2

660 - 1.25CP = 0.4CP

CP = 660/1.65

CP = 400

The original cost price is Rs.400.

---

19. **Answer: d**

Explanation:

Given:

m / 3 = 30

m = 90 [m = sum of age of first 3 students]

p = q - 4 [p = age of fourth student, q = age of fifth student]

r = s = 30 + 5 = 35 [r & s = age of last two students]

(m + p + q + r + s)/7 = 28

Formula used:

Average = sum of ages/ number of students

Solution:

m = 90

p = q - 4

r = s = 35

(90 + q-4 + q + 35 + 35)/7 = 28

(90 + 2q - 4 + 70)/7 = 28

156 + 2q = 196

2q = 40

q = 20

p = 20 - 4 = 16

Average(p, q) = (20 + 16)/2 = 36/2 = 18

Hence, the average age of fourth and fifth students is 18 years.

---

20. **Answer: c**

Explanation:

Given:

CI = Rs. 6656

Rate = 8%

Time = 2 years

Formula used:

$A = P \times [1 + (R /100)]^{T}$

$SI = (P \times R \times T) /100$

A = SI + P
A = CI + P
here,
A = Amount
CI = Compound Interest

SI = Simple Interest
P = Principle
R = Rate
T = Time

Solution:

$CI + P = P \times [1 + (R /100)]^{T}$

$6656 + P = P \times [1 + (8/100)]^{2}$

$6656 + P = P \times [1.08]^{2}$

1.1664P - P = 6656

P = 6656/0.1664

P = 40,000

Now,

SI = (40000 x 8 x 2) / 100

SI = 6400

The simple interest is Rs. 6400.

---

21. Answer: a

Explanation:

Given:

B : C : D : E = 2 : 3 : 4 : 5

% increase = 20%, 30% 40% & 50%

Solution:

If salary of D = 4m

4m + 0.4(4m) = 560

4m + 1.6m = 560

m = 560/5.6 = 100

Original salary of B, C, D, E = 2m + 3m + 4m + 5m = 14m

= 14 x 100 = 1400

Hence, the sum of the original salaries of B, C, D, and E is Rs. 1400.

---

22. Answer: c

Explanation:

Given:

18% = (CP - SP/ CP) x 100 ------(1)

20% = $\frac{(SP+144)-(CP-0.3CP)}{(CP-0.3CP)}$ x 100 ------(2)

Formula used:

Profit % = (Profit / Cost Price) x 100
Loss% = (Loss / Cost Price) x 100
Profit = SP - CP
Loss = CP - SP
CP = Cost price
SP = Selling price

Solution:

Let's solve equation (1)

0.18 = 1 - SP/CP

SP/CP = 0.82

SP = 0.82CP

Now, let's put the value from eq(1) to eq(2),

0.2 x 0.7CP = 0.82CP + 144 - CP + 0.3CP

0.14CP + CP - 0.82CP - 0.3CP = 144

0.02CP = 144

CP = 144/0.02 = 7200

SP = 0.82CP = 7200 x 0.82 = 5904

Hence, the original selling price is Rs. 5904.

---

23. **Answer: a**

Explanation:

Given:

Males(B% - C%) = 3% = 600 (∵ The value 3% is taken from given pie chart)

Females(D% - E%) = 3% = 900

Solution:

Male(1%) = 600/3 = 200 males

Females(1%) = 900/3 = 300 females

Now,

Female(A% + B% + F%) + Male(D% + E% + A%)

= Female(10% + 14% + 25%) + Male(20% + 20% + 18%)

= Female(49%) + Male(58%) = (49 x 300) + (58 x 200) = 26300

Hence, the sum of the number of females in A, B, and F and the number of males in D, E, and A is 26300.

---

24. Answer: d

Explanation:

Given:

Slant height, l = 20cm

base area = $616cm^2$

Formula used:

CSA(cone) = πrl

Base area = πr^2

Solution:

Base area = πr 2

⇒ 22/7 x r x r = 616

⇒ r^2 = 616 x 7/22

⇒ r = 14cm

CSA(cone) = πrl

⇒ 22/7 x r x l = 22/7 x 14 x 20 = 880

The curved surface area of this cone is 880 cm 2

---

25. Answer: d

Explanation:

Given:

h = r + 6

r = 14cm

Formula used:

Volume(Cylinder) = 22/7 x r^2 x h

Solution:

h = 14 + 6 = 20cm

Now, let's put the values in the formula,

Volume = 22/7 x 14^2 x 20 = 12320 cm 3

---

26. Answer: c

Explanation:

Given:

A% = 12%

F% = 28%

Formula used:

360° = 100%

Solution:

1% = 3.6 °

Now, the sum of central angle formed by A & F = 12% + 28% = 40%

40% = 40 x 3.6° = 144°

Hence, the sum of central angles formed by the sectors representing tyres of Company F and A is 144 degrees.

---

27. **Answer: d**

Explanation:

Given:

Boys(S6) = Girls(S1) + 0.3[Girls(S1)]

Girls(S1) = 500

Solution:

Boys(S6) = 500 + 0.3(500) = 650

Girls(S3 + S4) = m x Boys(S6 + S1)

From the graph,

1800 + 400 = m x (650 + 1200)

2200 = m x (1850)

m = 220/185 = 1.1892

m% = 118.92%

Hence, the number of girls in schools S3 and S4 is 118.92% of the number of boys in schools S6 and S1.
Confusion point - If the number of boys in school S6 are 30 percent more than the number of girls in school S1 (Clearly mentioned in the question) , S6 is not directly given we have to calculate the value of S6 From S1, and by the given relation between them.

---

28. **Answer: b**

Explanation:

Given:

Volume(Cuboid) = 4800 cm 3

h = 20cm

Formula used:

Volume(Cuboid) = l x b x h

Area of base = b x l

Solution:

Volume(Cuboid) = l x b x h = 4800

l x b x 20 = 4800

l x b = 4800/20 = 240

Hence, the area of the base of the cuboid is 240 cm 2

---

29. **Answer: b**

Explanation:

Given:

R = 14cm

large sphere melted to form 8 small spheres.

Formula used:

SA(Sphere) = 4 x 22/7 x r^2

Volume(sphere) = 4/3 x 22/7 x r^3

Solution:

the volume of the larger sphere;

4/3 x 22/7 x R^3 = 4/3 x 22/7 x 14^3 = 11499 cm^3

now, the volume gets divided into 8 small sphere = 11499/8 = 1437.4

Now, the volume of 1 small sphere = 1437.4 cm^3

⇒ 4/3 x 22/7 x r^3 = 1437.4

r^3= 343.015 ≈ 343

r = 7

Now, the total surface area of all 8 small spheres = 8 x 4 x 22/7 x r 2

= 32 x 22/7 x 7x 7 = 4928cm^2

---

30. **Answer: c**

Explanation:

Formula used:

sec A = $\frac{1}{cosA}$

$\sin^2 A + \cos^2 A = 1$

tan A = sin A/cos A

Solution:

sec A - cos A

$\frac{1}{cosA}$ - cos A = (1 - $\cos^2$ A) /cos A

= $\sin^2$ A/ cos A

= tan A.sin A

⇒ sec A - cos A = tan A.sin A

---

31. **Answer: c**

Explanation:

Given:

AB = PQ = 6 cm, BC = QR = 10 cm and AC = PR = 8 cm.

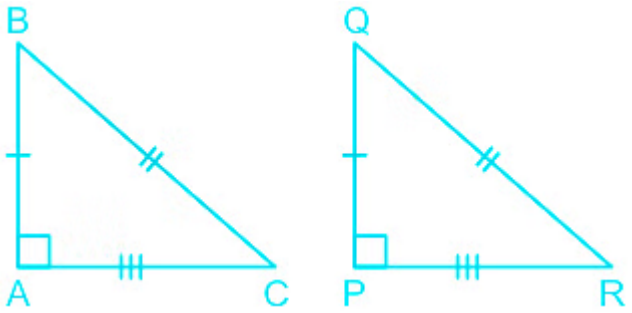
angle ABC = x degree

Concept used:

The sum of all interior angles of the triangle = 180°

Solution:

angle PRQ = angle ACB [congruent be SSS]



angle ABC = x degree,

ACB = 90 - x degree (linear pair)

Hence, angle PRQ = (90 - x) degree.

---

32. Answer: c

Explanation:

Given:

d = 24cm

$h_1 + h_2 = 10cm$

Formula used:

Area(Quadrilateral) = 1/2 x $(h_1 + h_2)$ x d

here,

d = diagonal

$(h_1 + h_2)$ = sum of heights

Solution:

Let's put the given values in the above formula,

Area(Quadrilateral) = 1/2 x (h 1 + h 2) x d = 1/2 x 10 x 24 = 120

Hence, the area of the quadrilateral is 120 cm 2

---

33. Answer: c

Explanation:

Given:

Salary(A/B) = 4m/5m

Saving(A/B) = 14s/19s

Expenditure(A) = Expenditure(B) = 1200

Formula used:

Salary = Saving + Expenditure

Solution:

4m = 14s + 1200

5m = 19s + 1200

Now, let's subtract the second equation by 1st.

m = 5s

Now, let's put the value in the first equation,

4(5s) = 14s + 1200

20s - 14s = 1200

6s = 1200

s = 200

m = 1000

Hence, the difference in both's monthly income = 5m - 4m = m = 1000Rs.

---

34. Answer: d

Explanation:

Given:

$(x+\frac{1}{x})^2 = 3$

Formula used:

$(a+b)^2 = a^2+b^2+2ab$

$(a+b)^3 = a^3+b^3+3ab(a+b)$

Calculation:

$(x+\frac{1}{x})^2 = x^2+\frac{1}{x^2}+2.x.\frac{1}{x}$

$\Rightarrow x^2+\frac{1}{x^2} = 3-2 = 1$

Now from,

$(x^2+\frac{1}{x^2})^3 = x^6+\frac{1}{x^6}+3.x^2.\frac{1}{x^2}(x^2+\frac{1}{x^2})$

$\Rightarrow 1 = x^6+x^{-6}+3(1)$

$\Rightarrow x^6+x^{-6} = 1-3 = -2$

∴ Required value of x^6+x^{-6} is -2.

---

35. Answer: c

Explanation:

Solution:

Let's first simplify the numerator,

$(x+y+z)(xy+yz+zx)-(xyz) = x^2y + xyz + x^2z + xy^2 + y^2z + xyz + xyz + yz^2 + xz^2 - xyz$

$(x+y+z)(xy+yz+zx)-(xyz) = x^2y + 2xyz + x^2z + xy^2 + y^2z + yz^2 + xz^2$

Now, let's simplify the denominator,

$(x+y)(y+z)(z+x) = (xy + xz + y^2 + yz)(z+x)$

$(x+y)(y+z)(z+x) = xyz + xz^2 + y^2z + yz^2 + x^2y + x^2z + xy^2 + xyz$

$(x+y)(y+z)(z+x) = 2xyz + xz^2 + y^2z + yz^2 + x^2y + x^2z + xy^2$

$(x+y)(y+z)(z+x) = x^2y + 2xyz + x^2z + xy^2 + y^2z + yz^2 + xz^2$

Now,

We can compare that both the denominator and the numerator are the same.

Hence, the simplification of the whole fraction will give 1.

⭐ Shortcut Trick

We need to do that type of question by value putting method in the examination.

By putting $x = y = z = 1$, you can get the answer easily.

---

36. Answer: c

Explanation:

FORMULA USED :

$\sin^2\theta + \cos^2\theta = 1$

$1/\sin\theta = \text{cosec}\,\theta$

$1/\cos\theta = \sec\theta$

CALCULATION:

$[\cos\theta/\sin\theta + \sin\theta/\cos\theta] = (\cos^2\theta + \sin^2\theta)/\cos\theta.\sin\theta$

$\Rightarrow 1/\cos\theta\sin\theta = \text{cosec}\,\theta\sec\theta$

Hence, the required value is $\text{cosec}\,\theta\sec\theta$.

---

37. Answer: b

Explanation:

GIVEN:

x , y and z are the sides of a triangle

CONCEPT USED :

If x, y and z are the sides of a triangle

And if z is the largest side

Then, if $x^2 + y^2 = z^2$,then the triangle is right-angled triangle

And, if $x^2 + y^2 > z^2$,then the triangle is acute-angled triangle

Also, if $x^2 + y^2 < z^2$ then the triangle is obtuse- angled triangle

CALCULATION:

Here, we have sides of a triangle given is x, y and z and also z is the largest side

The given condition is $x^2 + y^2 > z^2$

As, we know that the given condition satisfies the criteria of acute-angle triangle

Hence, the given triangle is Acute angled triangle.

---

38. Answer: d

Explanation:

GIVEN:

$a + b = 6$

$ab = 5$

FORMULA USED:

$a^3 + b^3 = (a + b)(a^2 + b^2 - ab)$

$(a + b)^2 = a^2 + b^2 + 2ab$

CALCULATION:

Here, we have $a + b = 6$ and $ab = 5$

$\Rightarrow (a + b) = 6$

On squaring both the sides we get,

$\Rightarrow (a + b)^2 = 6^2$

$\Rightarrow a^2 + b^2 + 2ab = 36$

$\Rightarrow a^2 + b^2 + 2(5) = 36$

$\Rightarrow a^2 + b^2 = 36 - 10 = 26$

Now, $a^3 + b^3 = (a + b)(a^2 + b^2 - ab) \Leftrightarrow 6 \times (26 - 5) = 6 \times 21 = 126$

Hence, the value of $a^3 + b^3$ is 126.

39. **Answer: d**

Explanation:

GIVEN:

Selling price and discount percentage of seven different articles from A_1 to A_7

FORMULA USED:

M.P. = 100 S.P. / (100 - d)

Where, S.P. = Selling price , M.P. = Marked price and d = discount%

CALCULATION:

Here, we have

S.P. of A1 = Rs420 and discount% = 30

⇒ M.P. = 100 S.P. / (100 -d)

⇒ M.P. = 100 × 420 / (100 - 30)

⇒ M.P. = 100 × 420/70 = Rs600

Now, S.P. of A2 = Rs600 and d% = 25

⇒ M.P. = 100 × 600 / 75 = Rs800

Now, S.P. of A3 = Rs816 and d = 32%

⇒ M.P. = 100 × 816 / 68 = Rs1200

Now, S.P. of A4 = Rs825 , d = 45%

⇒ M.P. = 100 × 825/55 = Rs1500

Now, S.P. of A5 = Rs425 ,d = 15%

⇒ M.P. = 100 × 425 /85 = Rs500

Now, S.P. of A6 = Rs800 , d = 20%

⇒ M.P. = 100 × 800/80 = Rs1,000

Now, S.P. of A7 = Rs840 ,d = 40%

⇒ M.P. = 100 × 840/60 = Rs1400

Total Marked Price from A1 to A7 = (600 + 800 + 1200 + 1500 + 500 + 1000 + 1400) = Rs7,000

Hence, sum of the marked price of the seven articles is Rs7,000

---

40. Answer: c

Explanation:

GIVEN:

$3 \sin^2 30^\circ + 3/5 \cos^2 60^\circ - 2 \sec^2 45^\circ$

FORMULA USED:

sin 30 = 1/2

cos 60 = 1/2

sec 45 = $\sqrt{2}$

CALCULATION:

Here, we have $3 \sin^2 30 + 3/5 \cos^2 60 - 2 \sec^2 45$

As, we know that sin 30 = 1/2 , cos 60 = 1/2 and sec 45 = $\sqrt{2}$

Hence, on putting these values , we get

⇒ $3 \times (1/2)^2 + 3/5 \times (1/2)^2 - 2 (\sqrt{2})^2 = 3 \times 1/4 + 3/5 \times 1`/4 - 2 \times 2$

⇒ (3/4 + 3/20 - 4) = (15 + 3)/20 - 4 ⇔ 9/10 - 4 = -31/10.

Hence, the required value is -31/10.

---

41. Answer: a

Explanation:

CALCULATION:

Here, we have $\frac{\sqrt{29.16}}{\sqrt{1.1664}} + \frac{\sqrt{0.2916}}{\sqrt{116.64}} + \frac{\sqrt{0.0036}}{\sqrt{0.36}}$

$\Rightarrow \frac{\sqrt{2916/100}}{\sqrt{11664/10000}} + \frac{\sqrt{2916/10000}}{\sqrt{11664/100}} + \frac{\sqrt{36/10000}}{\sqrt{36/100}}$

$\Rightarrow \frac{54/10}{108/100} + \frac{54/100}{108/10} + \frac{6/100}{6/10}$

⇒ 54/10 × 100/108 + 54/100 × 10/108 + 6/100 × 10/6

⇒ 5 + 1/20 + 1/10 = (100 + 1 + 2)/20 = 103/20

Hence, the required value is 103/20.

---

42. Answer: c

Explanation:

GIVEN:

If the digits of two- digit number is reversed, then number is decreased by 36

CALCULATION:

Let the two digit number be 10x + y

Where x and y are digits of the number

When digits are reversed then the number becomes 10y + x . Hence, the number gets decreased by 36

Then , according to the given question,

⇒ (10x + y) - (10y + x) = 36

⇒ 9x - 9y = 36

⇒ 9 (x - y) = 36

⇒ x - y = 4

On considering statement (1), we have

Difference of the digits is 4 .

As, x - y = 4 . Hence, statement 1 is correct

On considering statement (2), we have

The value of the number can be 84

⇒ If the number is 84 , then on reversing the digit it becomes 48

⇒ Difference on reversing the digits = (84 - 48) = 36 .

Since, the original number reduces to 36 on reversing. Hence, this statement is also correct

On considering statement (3), we have

The number is always a composite number

Now, let us take the number be prime whose difference in digits is 4

Let us assume 73 (As prime number is the whole number greater than 1 whose only factors are 1 and itself)

Now, on reversing the digits we get 37

⇒ Difference on reversing the digits = (73 - 37) = 36

Since, Prime number also satisfies the condition given in the question.

Hence, this statement is incorrect.

Hence, only statement I and II are correct regarding the number.

---

43. Answer: d

Explanation:

GIVEN:

Cos 50° / sin 40° + 3 cosec 80° /sec 10° - 2 Cos 50° . cosec 40°

FORMULA USED:

Cos (90 - θ) = sin θ

cosec (90 - θ) = sec θ

sin θ = 1/ cosec θ

CALCULATION:

Here, we have

Cos 50° / sin 40° + 3 cosec 80° / sec 10° - 2 Cos 50° . cosec 40°

⇒ Cos (90 - 40) /sin 40 + 3 cosec (90 - 10) /sec10 - 2 Cos (90 - 40) . cosec 40

⇒ sin 40° /sin 40° + 3 sec 10° / sec 10° - 2 sin 40° . cosec 40°

⇒ 1 + 3 × 1 - 2 sin 40° × 1/ sin 40°

⇒ 1 + 3 - 2 × 1 = (4 - 2) = 2

Hence, the required value is 2.

---

44. Answer: b

Explanation:

GIVEN:

$\sqrt{3}$ tan θ = 3 sin θ

FORMULA USED:

tan θ = sin θ / Cos θ

$\sin^2\theta + \cos^2\theta = 1$

CALCULATION:

Here, we have $\sqrt{3}\tan\theta$ = 3 sin θ

⇒ $\sqrt{3}$ sin θ / Cos θ = 3 sin θ

⇒ Cos θ = 1/ $\sqrt{3}$

Now, we know that $\sin^2\theta = 1 - \cos^2\theta$

⇒ $\sin^2\theta - \cos^2\theta = (1 - \cos^2\theta) - \cos^2\theta = 1 - 2\cos^2\theta$

⇒ $1 - 2 \times (1/\sqrt{3})^2 = 1 - 2 \times 1/3 = 1 - 2/3 = 1/3$

Hence, the required value is 1/3.

---

45. Answer: a

Explanation:

GIVEN:

Sides of a right angle triangle are 9 cm, 12 cm and 15 cm

Volume of the prism is 648 cm^3

FORMULA USED:

Volume of a prism = Base area × Height

CALCULATION:

As here base of a prism is right angle triangle

Now, $9^2 + 12^2 = 81 + 144 = 225$ which is equal to 15^2

As in right angle triangle we know that perpendicular ^{2} + base ^{2} = hypotenuse ^{2}

So, here perpendicular = 9 , base = 12 and hypotenuse = 15

⇒ Area of base = 1/2 × perpendicular × base = 1/2 × 9 × 12 = 54 cm^2

⇒ Volume = Base area × height

⇒ 648 = 54 × height

⇒ height = 12 cm

Hence,height of the prism is 12 cm.

---

46. **Answer: d**

Explanation:

GIVEN:

Cost of a diamond is directly proportional to the square of its weight

Cost of a 14 gm diamond is Rs2560

Ratio of pieces of broken diamond is 5 :9

CALCULATION:

Here, we have Cost of diamond = k (weight) ^{2}

⇒ 2560 = k (14) ^{2}

⇒ k = 2560/196 = 13.06

As diamond was broken into two pieces 5 :9

Let the ratio be 5x and 9x

This must be equal to 14 gm

⇒ 5x + 9x = 14

⇒ 14x = 14

⇒ x = 1

Ist part : 5x = 5

2nd part :9x = 9

Cost of 1st part = 13.06 ×25 = 326.5

Cost of 2nd part = 13.06 × 81 = 1057.86

⇒ Total cost = (326.5 + 1057.86) = 1384.36

So, loss = (2560 - 1384.36) = 1175.64

⇒ Loss% = (1175.64/2560) × 100 = 45.92%

Hence, loss of 45.92 percent is incurred due to this breakage .

---

47. Answer: b

Explanation:

GIVEN:

Pie chart shows number of males in six department

Number of males in S = 1080

CALCULATION:

As, number of males in S = 1080

$\Rightarrow 54^{\circ} = 1080$

$\Rightarrow 1^{\circ} = 20$

Now,

Number of males in T department is $90^{\circ} = 90 \times 20 = 1800$

Number of males in P department is $30^{\circ} = 30 \times 20 = 600$

Number of males in Q department is $90^{\circ} = 90 \times 20 = 1800$

As, J = Total number of males in T and P department = (1800 + 600) = 2400

Also, K = Difference of number of males in P and Q department = (1800 - 600) = 1200

Now, J + K = (2400 + 1200) = 3600

Hence, the required value is 3600.

---

48. Answer: a

Explanation:

GIVEN:

ABCDEF is a regular hexagon

Side of the hexagon is 36 cm

FORMULA USED:

Area of a regular hexagon = area of 6 equilateral triangles

Area of a hexagon = $6 \times \sqrt{3}/4\ a^2$

Where, a = side of a hexagon

CACULATION:

Here, we have Side of a regular hexagon = 36 cm

As, we know that

A regular hexagon is made up of 6 equilateral triangles

So, Area of 1 equilateral triangle AOB = 1/6 of 6 equilateral triangles

$\Rightarrow$ Area of triangle AOB = $1/6 \times 6 \times \sqrt{3}/4\ a^2 = \sqrt{3}/4 \times (36)^2$

$\Rightarrow$ Area = $\sqrt{3}/4 \times 1296 = 324\sqrt{3}$

Hence, the required area of triangle AOB is $324\sqrt{3}$ cm^2 .

---

49. **Answer: a**

Explanation:

GIVEN:

Selling price of both the articles A and B are same

Total Selling price is Rs48640

A is sold at a profit of 28%

B is sold at a loss of 24%

FORMULA USED:

Profit = S.P. - C.P.

Loss = C.P. - S.P.

Loss% = (Loss/ C.P.) × 100

Profit% = (Profit/C.P.) × 100

Where, S.P. = Selling price, C.P. = Cost price

CALCULATION:

Here, as Selling price of both the articles are same

So, 2 S.P. = Rs48640

⇒ S.P. = Rs24320 of each article

Now, consider article A

Profit = S.P. - C.P. = (24320 - C.P.)

⇒ Profit% = (Profit/C.P.) × 100

⇒ 28 = (24320 - C.P.) / C.P. × 100

⇒ 0.28 C.P. = 24320 - C.P.

⇒ 1.28 C.P. = 24320

⇒ C.P. = 19,000

Hence, C.P. of article A is Rs19,000

Now, consider article B

Loss = C.P. - S.P. = (C.P. - 24320)

⇒ Loss% = (Loss/C.P.) × 100

⇒ 24 = (C.P. - 24320)/ C.P.× 100

⇒ 0.24 C.P. = C.P. - 24320

⇒ 0.76 C.P. = 24320

⇒ C.P. = 32,000

Hence, C.P. of article B is Rs32,000.

Hence, Cost price of articles A and B are Rs19,000 and Rs32,000 respectively.

---

50. Answer: d

Explanation:

GIVEN:

Two series given i.e. S1 and S2

FORMULA USED:

$a_n = a + (n - 1) d$

$S_n = n/2 [2a + (n - 1) d]$

Where,

a_n = n^{th} term in the sequence , n= number of terms , a = first term in sequence, d = common difference , Sn = Sum

CALCULATION:

Here, given series S1 and S2 are in A.P.

So, series will move by adding a fixed common difference (second term - first term) in consecutive terms

S1 = 2 , 9 , 16 , 23, 30 , 37 , 44 , 51 ,..... 632 [As here d = 7 .So, add 7 in previous term to get next term]

S2 = 7, 11, 15, 19, 23, 27, 31, 35, 39, 43, 47, 51 , ... 743 [Here d = 4]

Now, let us take a third series S3 which is common series [It will contain common numbers of both series only]

So, from S1 and S2 series, we have 1st common term = 23 , 2nd common term = 51 , d = (51 - 23) = 28

So, add 28 in second term to get third term and so on

S3 = 23 , 51 , ... $\leq$ 632 [As, 632 is less than 743 so common between them should be less than 632]

Now, we have a = 23 , d = 28

$\Rightarrow a_n = a + (n - 1) d \leq 632$

$\Rightarrow 23 + (n - 1) \times 28 \leq 632$

$\Rightarrow (n - 1) \times 28 \leq (632 - 23)$

$\Rightarrow (n - 1) \times 28 \leq 609$

$\Rightarrow n - 1 \leq 609 / 28$

$\Rightarrow n - 1 \leq 21.75$

$\Rightarrow n \leq 22.75$

As, n should be equal to or less than 22.75 . So, take n = 22

Now, as we know that

$S_n = n/2 [2a + (n - 1) d]$

$\Rightarrow S_n = 22/2 [2 \times 23 + (22 - 1) 28] = 11 [46 + 21 \times 28]$

$\Rightarrow 11 [46 + 588] = 11 \times 634 = 6974$

Hence, Sum of all the common terms of the series are 6974 .

---

51. Answer: d

Explanation:

Given:

Time taken by A to complete 2/5 part of work is 12 days,

B is 25% more efficient than A,

C and alone do the work in 12 days less than B and D is 25% less efficient than C.

A is 25% more efficient than B

Formula used:

Total work = Efficiency × Number of days

Calculation:

A completes 2/5 part of work in 12 days

Therefore, A will complete 1 work in 12 × (5/2) days = 30 days

So, 1 day work of A is 1/30 part of work

As B is 25% more efficient than A.

So, B will complete the work in

= $\frac{100}{125}$ × 30

= 4/5 × 30

= 24 days

So, 1 day work of B is 1/24 part of work

C takes 12 days less than B i.e., 24 - 12 = 12 days

So, One day work of C is 1/12 part of work.

Now, As D is 25% less efficient than C.

So, D will complete the work in

$\frac{100}{75}$ × 12

= 16 days

Hence, One day work of D is 1/16 part of work.

Now, One day work of all together is

= $\frac{1}{30} + \frac{1}{24} + \frac{1}{12} + \frac{1}{16}$

= $\frac{8+10+20+15}{240}$

= $\frac{53}{240}$ part of work

So, The time taken by all together to complete the work is 240/53 days.

∴ **The Required time is $\frac{240}{53}$ days.**

---

52. Answer: b

Explanation:

Given:

$\sqrt[3]{12}$

Concept used:

If a > b , then:

$a^{1/3} > b^{1/3}$

Calculations:

Option(1): $\sqrt[6]{121} = (121)^{1/6}$

$\Rightarrow \sqrt[3]{12} = (12)^{1/3}$

⇒ LCM(6, 3) = 6

⇒ (12) 1/3 × 6 and (121) 1/6 × 6

I.e., (12) ^{2} and (121) 1

I.e., (12) 2 and (11) 2

Since, 12 > 11

⇒ (12) 1/3 > (121) 1/6

Option(2): $\sqrt[12]{33214}$ = (33214) 1/12

⇒$\sqrt[3]{12}$ = (12) 1/3

⇒ LCM(12, 3) = 12

⇒ (12) [1/3] × 12 and (33214) [1/12]× 12

I.e., (12) ^{4} and (33214) 1

I.e., (20736) 1 and (33214) 1

Since, 33214 > 20736

⇒ (12) 1/3 < (33214) 1/12

Option(3): $\sqrt[5]{60}$ = (60) 1/5

⇒$\sqrt[3]{12}$ = (12) 1/3

⇒ LCM(5, 3) = 15

⇒ (12) [1/3] × 15 and (60) [1/5] × 15

I.e., (12) ^{5} and (60) 3

12 ^{2} × 12 ^{3} and 12 ^{3} × 5 ^{3}

144 × 12 ^{3} and 125 × 12 ^{3}

12^3 is common in both but 144 > 125

⇒ Hence $12^5 > 60^3$ or $12^{1/3} > 60^{1/5}$

Option(4): $\sqrt[9]{1500} = (1500)^{1/9}$

$\Rightarrow \sqrt[3]{12} = (12)^{1/3}$

⇒ LCM(9, 3) = 9

⇒ $(12)^{1/3 \times 9}$ and $(1500)^{1/9 \times 9}$

I.e., $(12)^3$ and $(1500)^1$

I.e., (1728) and (1500)

Since, 1728 > 1500

⇒ $(12)^{1/3} > (1500)^{1/9}$

∴ The Required greatest value is $\sqrt[12]{33214}$.

---

53. Answer: d

Explanation:

Given:

A = $\frac{\sqrt{0.0004} \times \sqrt[3]{0.000008}}{\sqrt[4]{16000} \times \sqrt[3]{125000} \times \sqrt[4]{810}}$ and B = $\frac{\sqrt[3]{0.729} \times \sqrt[4]{0.0016}}{\sqrt{0.16}}$

Calculations:

A = $\frac{\sqrt{0.0004} \times \sqrt[3]{0.000008}}{\sqrt[4]{16000} \times \sqrt[3]{125000} \times \sqrt[4]{810}}$

$\Rightarrow$ A = $\frac{\sqrt{0.02 \times 0.02} \times \sqrt[3]{0.02 \times 0.02 \times 0.02}}{\sqrt[4]{2^4 \times 10^3} \times \sqrt[3]{5^3 \times 10^3} \times \sqrt[4]{3^4 \times 10}}$

$\Rightarrow$ A = $\frac{\sqrt{(0.02)^2} \times \sqrt[3]{(0.02)^3}}{\sqrt[4]{2^4 \times 10^3} \times \sqrt[3]{50^3} \times \sqrt[4]{3^4 \times 10}}$

$\Rightarrow$ A = $\frac{0.02 \times 0.02}{2 \times \sqrt[4]{10^3} \times 50 \times 3 \times \sqrt[4]{10}}$

$\Rightarrow A = \frac{0.02\times0.02}{(2\times50\times3)\times\sqrt[4]{10^3}\times\sqrt[4]{10}}$

$\Rightarrow A = \frac{0.02\times0.02}{300\times\sqrt[4]{10^3\times10}}$

$\Rightarrow A = \frac{0.0004}{3000}$

and $B = \frac{\sqrt[3]{0.729}\times\sqrt[4]{0.0016}}{\sqrt{0.16}}$

$\Rightarrow B = \frac{\sqrt[3]{(0.9)^3}\times\sqrt[4]{(0.2)^4}}{\sqrt{(0.4)^2}}$

$\Rightarrow B = \frac{0.9\times0.2}{0.4}$

$\Rightarrow B = \frac{0.9}{2}$

Now, A × B

$= \frac{0.0004}{3000} \times \frac{0.9}{2}$

$= \frac{4}{30000000} \times \frac{9}{20} = \frac{36}{600000000} = 6 \times 10^{-8}$

∴ The correct answer is 6×10^{-8}.

---

54. Answer: b

Explanation:

Given:

$\frac{1}{\tan\theta}$ + tan θ

Concept used:

1 + tan 2 θ = sec 2 θ

Sin θ = 1/Csc θ

Cos θ = 1/Sec θ

Tanθ = Sin θ/Cosθ

Calculations:

According to the question,

$1/\tan\theta + \tan\theta$

$\Rightarrow (1 + \tan 2\ \theta)/\tan\theta$

$\Rightarrow \sec 2\ \theta/\tan\ \theta$

$\Rightarrow \sec 2\ \theta \times 1/\tan\ \theta$

$\Rightarrow \sec 2\ \theta \times \cos\theta/\sin\theta$

$\Rightarrow$ $\sec 2\,\theta \times \text{cosec}\,\theta/\sec\theta$

$\Rightarrow \sec\ \theta.\text{cosec}\,\theta$

$\therefore$ The required value is $\sec\ \theta.\text{cosec}\,\theta$.

---

55. Answer: b

Explanation:

Given:

	A	B	C
	100000 x 12	140000 x 10	200000 x 3
Total	12,00,000	14,00,000	6,00,000

Solution:

A : B : C = 6 : 7 : 3

Profit(C) : 3m = 1155

m = 1155/3 = 385

Profit(A+B) = (6+7) x m = 13 x 385 = 5005

Hence, the profit of A & B is Rs. 5005.

---

56. Answer: b

Explanation:

Given:

Sum Rs. 20000 and Rs. 40000 are given on simple interest at the rate of 10 percent and 15 percent per annum respectively for three years

Formula used:

Simple Interest = (P × R × T)/100

Calculations:

According to the question,

SI of Scheme 1

⇒ SI = (20000 × 10 × 3)/100

⇒ SI = 2000 × 3 = Rs. 6000

SI of Scheme 2

⇒ SI = (40000 × 15 × 3)/100

⇒ SI = 400 × 45 = Rs. 18000

Total SI = 18000 + 6000 = Rs. 24000

∴ T he total simple interest will be Rs. 24000

---

57. Answer: c

Explanation:

Concept Used:

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

Calculation:

$\Rightarrow \left[\frac{\tan\theta+\sec\theta-1}{\tan\theta-\sec\theta+1}\right]$

⇒ Putting the values, we get

$\Rightarrow \frac{tan\theta+sec\theta-(sec^2\theta-tan^2\theta)}{tan\theta-sec\theta+1}$

$\Rightarrow \frac{tan\theta+sec\theta-(sec\theta+tan\theta)(sec\theta-tan\theta)}{tan\theta-sec\theta+1}$

$\Rightarrow \frac{(sec\theta+tan\theta)(1-(sec\theta-tan\theta))}{tan\theta-sec\theta+1}$

$\Rightarrow sec\theta + tan\theta = \frac{1}{cos\theta} + \frac{sin\theta}{cos\theta}$

$\Rightarrow \frac{1+sin\theta}{cos\theta}$

Therefore, the value of the expression equals to $\frac{1+sin\theta}{cos\theta}$.

---

58. Answer: a

Explanation:

Given:

1 × 2 + 2 × 3 + 3 × 4 + 4 × 5 + ... + 20

Concept used:

The sum of the first n consecutive no. is n(n+1)/2.

The sum of the square of the first n consecutive no. is n(n + 1)(2n + 1)/6.

Calculations:

According to question, we have:

1 × 2 + 2 × 3 + 3 × 4 + 4 × 5 + ...up to 20 terms

nth term = n(n + 1)

Sum = ∑ n (n + 1) = ∑ (n^2 + n)

Sum = ∑ n^2 + ∑ n

Sum = $\frac{n(n+1)(2n+1)}{6} + \frac{n(n+1)}{2}$

Sum = $\frac{n(n+1)}{2}\left[\frac{2n+1}{3} + 1\right]$

Sum = $\frac{n(n+1)}{2}\left[\frac{2n+4}{3}\right] = \frac{n(n+1)(2n+4)}{6}$

Substitute n = 20, we have

Sum = $\frac{20(20+1)(2\times20+4)}{6}$

⇒ Sum = $\frac{20\times21\times44}{6}$

⇒ Sum = $\frac{420\times44}{6}$

⇒ Sum = 3080

∴ T he sum of first 20 terms of the given series is 3080.

---

59. Answer: d

Explanation:

Given:

For Discount = 5%, Profit = 14%

Formula used:

S.P = M.P - Discount

C.P = $\frac{100}{100+Profit\%} \times S.P$

Profit% = $\frac{S.P - C.P}{C.P} \times 100$

Where, S.P = Selling Price

C.P = Cost Price

M.P = Marked Price

Calculation:

Let the M.P. of the article = Rs.100

Discount = 5% ⇒ S.P.= Rs.95

Profit = 14% ⇒ C.P. = Rs. $(\frac{100}{100+14}) \times 95$

C.P = Rs. $\frac{250}{3}$ = Rs. 83.3

For the discount of 11%, S.P.= Rs. 89

Then Profit % = $\frac{89-83.3}{83.3} \times 100$

Profit% = 6.84 ≈ 6.8%

Hence, **the correct answer is option 4)** .

---

60. Answer: c

Explanation:

Given:

The height of a solid cylinder is 35 cm.

The circumference of its base is 37 cm more than the radius.

Formula used:

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

Circumference of circle = $2\pi r$

Calculations:

Circumference = $2\pi r$

$\Rightarrow r + 37 = 2\pi r$

$\Rightarrow 37 = 2\pi r - r$

$\Rightarrow 37 = r(2\pi - 1)$

$\Rightarrow 37 = r[(2 \times 22/7) - 1]$

$\Rightarrow 37 = r[44/7 - 1]$

$\Rightarrow 37 = r(44 - 7)/7$

$\Rightarrow 37 = (37/7)r$

$\Rightarrow r = 7$ cm

According to the question,

Vol. = $\pi(7)\ 2\ (35)$

$\Rightarrow$ Vol. = $(22/7)(7)\ 2\ (35)$

$\Rightarrow$ Vol. = $(22)(7)\ (35)$

$\Rightarrow$ Vol. = $(154)(35) = 5390$ cm 3

∴ T he volume of this cylinder is 5390 cm 3 .

⭐ Shortcut Trick

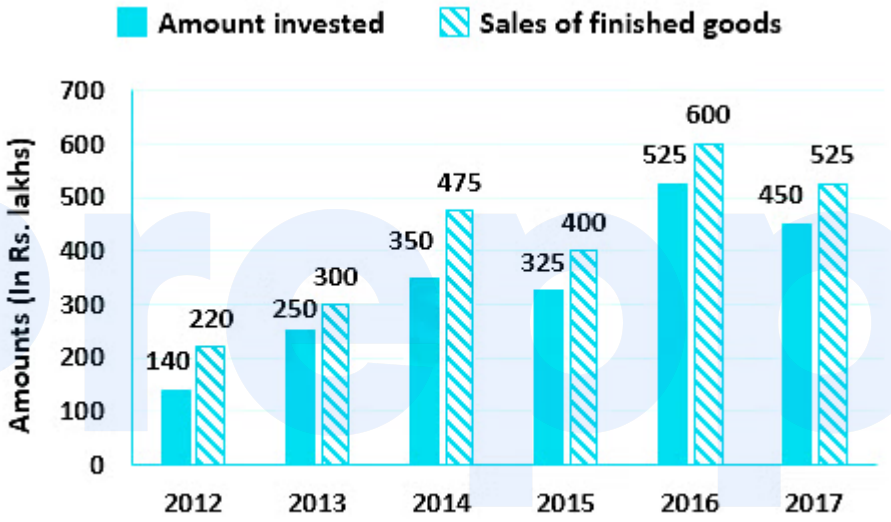
Volume of the cylinder is the multiple of π . and π is the multiple of 11. So the answer should be the multiple of 11. Only one option is the multiple of 11 which is 5390 cm^3.

---

61. **Answer: c**

Explanation:

Given:



Concept used:

Average = Sum of all the value/Total values

Calculations:

The average amount invested in purchasing raw materials during 2012 to 2017

⇒ A = (140 + 250 + 350 + 325 + 525 + 450)/6

⇒ A = 2040/6 = 340

The average value of sales of finished goods during the same period 2012 to 2017

⇒ A = (220 + 300 + 475 + 400 + 600 + 525)/6

⇒ A = 2520/6 = 420

The difference between the average = 420 - 340 = 80 lakhs

∴ The difference between the average of both purchasing and finished goods is 80 lakhs.

---

62. Answer: c

Explanation:

Given:

Vipul and Manish invested the sum of Rs. 15000 and Rs. 20000 at the rate of 20 percent p.a and 30 percent p.a. respectively on compound interest (compounding annually).

Time period is 3 years for both

Formula used:

Amount = $P(1 + R\%)^{T}$

CI = A - P

Calculations:

According to the question,

CI of earned by Vipul

⇒ A = $15000(1 + 20\%)^{3}$

⇒ A = 15000(1 + 0.20) 3

⇒ A = 15000(1.20) 3

⇒ A = 15000(1.728) = Rs. 25920

CI = 25920 - 15000 = Rs. 10920

CI of earned by Manish

⇒ A = 20000(1 + 30%) 3

⇒ A = 20000(1 + 0.30) 3

⇒ A = 20000(1.30) 3

⇒ A = 20000(2.197) = Rs. 43940

CI = 43940 - 20000 = Rs. 23940

Total CI earned by both of them = 23940 + 10920 = Rs. 34860

∴ T otal compound interest earned by Vipul and Manish is Rs. 34860.

---

63. Answer: a

Explanation:

Given:

Raju spends 10 percent and 20 percent of his income on transport and food respectively.

He spends 30 percent of the remaining income on clothing.

He saves rest of his income = Rs. 26460

Calculations:

Let the Income of Raju be 'x'

Transport expenses = 10% of x = 0.10x

Food expenses = 20% of x = 0.20x

Remaining income = x - (0.10x + 0.20x) = x - 0.30x = 0.70x

Clothing expenses = 30% of 0.70x = 0.30 × 0.70x = 0.21x

Remaining income = 0.70x - 0.21x = 0.49x

Since his 0.49x income is savings then

⇒ 0.49x = 26460

⇒ x = 26460/0.40 = Rs. 54000

Now, total expenditure on food and clothing together = 0.20x + 0.21x

⇒ 0.20(54000) + 0.21(54000)

⇒ 10800 + 11340 = Rs. 22140

∴ T otal expenditure on food and clothing together will be Rs. 22140.

---

64. Answer: a

Explanation:

Given:

A alone can do a work in 14 days.

B alone can do the same work in 28 days.

C alone can do the same work in 56 days.

B was not working on last 2 days

A did not work in last 3 days.

Calculations:

One-day work of A = 1/14 days .....(1)

One-day work of B = 1/28 days .....(2)

One-day work of C = 1/56 days .....(3)

Adding equations (1), (2) and (3), we get

One-day work of (A + B + C) = ((1/14) + (1/28) + (1/56)}

⇒ (A + B + C) = ((4 + 2 + 1)/56)

⇒ (A + B + C) = 7/56 = 1/8

One-day work of B and C = 1/28 + 1/56 = (2 + 1)/56 = 3/56

Two-day work of C = (1/56) × 2 = 2/56

Remaining work = 1 - [(2/56) + (3/56)] = 1 - 5/56 = 51/56

⇒ 51/56 work done by (A + B + C) in = (51/56 ÷ 1/8 = (51 × 8)/56 = 51/7 days

The total work will be completed in = (51/7) + 3 = (51 + 21)/7 = 72/7 days.

∴ **The total work will be completed in 72/7 days.**

⭐ **Shortcut Trick**

	Time	Efficiency	Total work
A	14	4	56
B	28	2	
C	56	1	

A did not work in last 3 days & B was not working on last 2 days its means C alone did the same work in last 3 days + B did work 1 day more than A
SO,Total work done by C & A
= 3(day) x 1 (Efficiency) + 2 x1 =5
Remaining work = 56 - 5 = 51
work done by (A + B + C) in = 51/7
The total work will be completed in = (51/7) + 3 = (51 + 21)/7 = 72/7 days.

65. **Answer: b**

Explanation:

Given:

Equilateral triangle PQR with side = 12 cm

Formula Used:

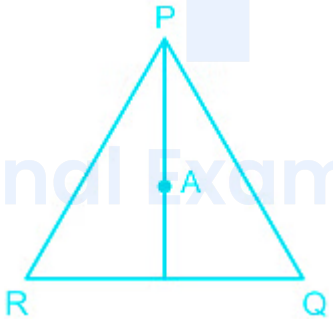
Circumradius of Equilateral triangle = side of equilateral triangle/√3

Concept Used:

Centroid Divide the median in the ratio 2:1

All the centers of the Equilateral triangle lie at the same point. Be it circumcenter, orthocenter, incentre, and centroid.

Calculation:



Since all the centers lie at the same point A,

PA is also the circumradius of Equilateral Triangle PQR

Using the above formula,

PA = PQ/ √ 3

⇒ PA = 12/√3

⇒ PA = (4 × 3)/ √ 3 = 4 √3

∴ The length of PA is 4 √ 3 cm.

---

66. **Answer: d**

Explanation:

Given:

The base of a right prism is an equilateral triangle whose side is 10 cm.

Height of this prism is 10 $\sqrt{3}$ cm

Concept used:

TSA of Prism = [2(area of triangular base)] + [3(Area of rectangular sides)]

Area of Equilateral Triangle = $(\sqrt{3}/4)a^2$

Area of rectangle = l × b

Calculation:

According to the concept,

⇒ Area of Equilateral Triangle = $(\sqrt{3}/4)(10)\ 2 = (100/4)\sqrt{3} = 25\sqrt{3}$

⇒ Area of rectangle = l × b = 10 × 10 √3 = 100√ 3

Then,

TSA = [2(25 √ 3)] + [3(100 √ 3)]

⇒ TSA = 50√ 3 + 300 √ 3

⇒ TSA = 350√ 3

∴ The total surface area of prism is 350 √ 3.

---

67. **Answer: b**

Explanation:

Given:

A mixture contains acid and water contains 20% acid

When 10 litres of water is added to the mixture, then the percentage of acid becomes 15 percent

Calculation:

Ratio of original mixture = (20% acid)/(80% water) = 20/80 = 1:4

Let the quantity of acid in the mixture be x litres And the quantity of water in the mixture be 4x litres

According to the question,

$x/(4x + 10) = 15/85$

$\Rightarrow x/(4x + 10) = 3/17$

$\Rightarrow 17x = 3(4x + 10)$

$\Rightarrow 17x = 12x + 30$

$\Rightarrow 17x - 12x = 30$

$\Rightarrow 5x = 30$

$\Rightarrow x = 30/5 = 6$ liters

The quantity of acid in the mixture = x = 6 liters

The quantity of water in the mixture = 4x = 4 × 6 = 24 liters

Total volume of original mixture = 6 + 24 = 30 liters

∴ Total volume of original mixture is 30 liters.

---

68. Answer: c

Explanation:

Given:

Triangle BAC is similar to triangle PQR.

The area of triangle BAC and triangle PQR is 25 cm 2 and 36 cm 2 respectively.

BA = 4 cm

Concept used:

We know that the area of similar triangles ae proportional to the squares of their corresponding sides

Calculations:

According to the question,

$\text{Area(PQR)}/\text{Area(BAC)} = (\text{PQ})^2/(\text{BA})^2$

Let, PQ = x cm. Then,

$\Rightarrow 36/25 = (x)^2/(4)^2$

$\Rightarrow x^2 = (36 \times 16)/25$

$\Rightarrow x = ((6 \times 4)/5)$

$\Rightarrow x = 24/5 = 4.8$ cm

∴ T he length of PQ is 4.8 cm.

---

69. **Answer: a**

Explanation:

Given:

7/2 + 11/3 + 7/6 + 11/15 + 7/12 + 11/35 +.....+ 7/156 + 11/575

Concept used:

In this equation 2 separate series are included we have to solve them seperately

Calculations:

Sum of 1st series = 7/2 + 7/6 + 7/12 +.....+ 7/156

⇒ Sum = 7(1/2 + 1/6 + 1/12 + ...+ 1/156)

This equation can be written as,

⇒ Sum = 7[1 -(1/2) + (1/2 - 1/3) + (1/3 - 1/4) + ...+ (1/12 - 1/13)]

⇒ Sum = 7[1 - 1/13]

⇒ Sum = 7[12/13] = 84/13

Sum of 2nd series = 11/3 + 11/15 + 11/35 +.....+ 11/575

⇒ Sum = 11(1/3 + 1/15 + 1/35 +..... + 1/575)

This equation can be written as,

Sum = 11/2[1 - (1/3) + (1/3 - 1/5) + (1/5 - 1/7) +.....+ (1/23 - 1/25)]

⇒ Sum = 11/2[1 - 1/25]

⇒ Sum = (11/2)[24/25] = 132/25

Now Total sum of equation = Sum of 1st series + Sum of 2nd series

Total sum = (84/13) + (132/25)

⇒ Total sum = [(84 × 25) + (132 × 13)]/325

⇒ Total sum = [2100 + 1716]/325 = 3816/325

∴ The value of of given equation is 3816/325.

---

70. Answer: d

Explanation:

Given:

The ratio of the three sides of the triangle are 5 : 13 : 12.

Concept used:

All triangles are 2 dimensional figures with three sides. Each side is called a length. In a right triangle, the longest side is always the hypotenuse , which is the line directly across from the 90 degree angle. Right triangles that have lengths equaling 3-4-5 or 5-12-13 , or even 7-24-25 , are special types of right triangles, because all three lengths are integers that together satisfy the Pythagorean theorem. Such triangles are called Pythagorean triplets .

Calculations:

Let the sides of triangle be 'x'

According to the concept,

⇒ $(13x)^2 = (5x)^2 + (12x)^2$

⇒ $169x^2 = 25x^2 + 144x^2$

⇒ $169x^2 = 169x^2$

⇒ 1 = 1

Hence RHS = LHS, the sides of this ratio makes a right angled triangle

So the largest angle possible in the right angled triangle is 90°

∴ T he largest angle of the triangle is 90°.

---

71. Answer: a

Explanation:

Given:

A reduction of 25% in the price of rice enables a person to buy 30 kg more rice for Rs. 5400

Formula Used:

Expenditure = Price × Quantity

Since expenditure is same, Price × Quantity = constant

Calculation:

Let the old price and old quantity of rice purchased be P and Q respectively.

We can write,

PQ = 0.75P × (Q + 30)

⇒ PQ = 0.75PQ + 22.5P

⇒ 0.25PQ = 22.5P

⇒ Q = 90 kg

So, The old quantity purchased = 90 kg

Total expense = Rs. 5400

New Price per kg = 5400/90 = Rs.60

∴ The old price is Rs. 60/kg.

72. **Answer: d**

Explanation:

Given:

$x < y < z$

$x + y + z = 70$

Solution:

Now, sum is 70, means, at least one of the number is even, because odd + odd+ odd = odd

As we know, only one even prime number exists, and that is 2.

2 is also the smallest prime number. means $x = 2$.

Now, $70 - 2 = 68 = y + z$

Now, let's use the options

Option1:

$z = 29$,

$y = 68 - 29 = 39$

(y is non prime)

Option 2:

$z = 43$

$y = 68 - 43 = 25$

(y is non prime)

Option 3:

z = 31

y = 68 - 31 = 37

(z < y)

Option 4:

z = 37

y = 68 - 37 = 31

(y < z, satisfies the requirement)

Hence, z = 37

---

73. Answer: a

Explanation:

Given:

Rohit's income is Rs. 32000.

His expenses is 30 percent of total income

Formula used:

Savings = Income(1 - Expense%)

Calculations:

According to the question,

Savings = 32000(1 - 30%)

⇒ S = 32000(1 - 0.30)

⇒ S = 32000(0.70) = Rs. 22400

∴ Rs. 22400 will be the saving of Rohit.

---

74. Answer: d

Explanation:

Solution:

In 400 - 500 = in **466** only = **1**time

In 500 - 600 = in **566** only = **1**time

In 600 - 700 = 660 - 669 - 1 = **9**times = **(660, 661, 662, 663, 664, 665, 667, 668, 669)**

6_6 - 666= 10 - 1= **9**times = **(606, 616, 626, 636, 646, 656, 676, 686, 696)**

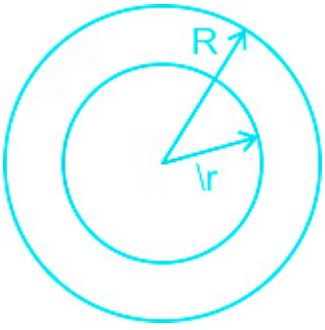
Hence, in between 400-700, in total 1 + 1+ 9 + 9 = 20 times 6 digit will appear twice.

---

75. Answer: b

Explanation:

Given:



The difference between the areas of two concentric circles is 264 cm 2 .

Formula used:

Area of circle = πR^2

Calculations:

According to the question,

$264 = \pi R^2 - \pi r^2$

$\Rightarrow \pi(R^2 - r^2) = 264$

$\Rightarrow (R^2 - r^2) = (264 \times 7)/22$

$\Rightarrow (R^2 - r^2) = 1848/22 = 84\ cm^2$

∴ The difference between the square of their radius is 84 cm^2.

---

76. Answer: c

Explanation:

GIVEN:

$3 \sin 58^\circ / \text{Cos}\ 32^\circ + 3 \sin 42^\circ / \text{Cos}\ 48^\circ$

FORMULA USED:

$\sin(90 - \theta) = \text{Cos}\ \theta$

CALCULATION:

Here, we have $3 \sin 58^\circ / \text{Cos}\ 32^\circ + 3 \sin 42^\circ / \text{Cos}\ 48^\circ$

$\Rightarrow 3 \sin(90^\circ - 32^\circ) / \text{Cos}\ 32^\circ + 3 \sin(90^\circ - 48^\circ) / \text{Cos}\ 48^\circ$

$\Rightarrow 3\ \text{Cos}\ 32^\circ / \text{Cos}\ 32^\circ + 3\ \text{Cos}\ 48^\circ / \text{Cos}\ 48^\circ$

$\Rightarrow 3 \times 1 + 3 \times 1 = 3 + 3 = 6$

Hence, the required value is 6.

---

77. **Answer: b**

Explanation:

GIVEN:

$2x + 3y = 12$

$3x - 2y = 5$

CALCULATION:

Here, we have

$2x + 3y = 12$ .....(1)

$3x - 2y = 5$ .....(2)

Now, on multiplying (1) with 2 and (2) with 3 we get,

$\Rightarrow 4x + 6y = 24$ .....(3)

$\Rightarrow 9x - 6y = 15$.....(4)

On adding (3) + (4) we get,

$\Rightarrow 13x = 39$

$\Rightarrow x = 3$

Now, put the value of x in (1) we get,

$\Rightarrow 2 \times (3) + 3y = 12$

$\Rightarrow 3y = 6$

$\Rightarrow y = 2$

Hence, the value of x and y are 3 and 2 respectively.

78. **Answer: a**

Explanation:

GIVEN:

Total sum = Rs1250

B + D = 14/11 (A + C)

D = A/2 and C = 1.2 A

CALCULATION:

Here, we have D = A/2 , C = 12/10 A = 6/5 A

Also, we have

⇒ B + D = 14/11 (A + C)

⇒ 11B + 11D = 14 (A + 6/5 A)

⇒ 11B + 11A/2 = 14 × 11A/5

⇒ 11 B = 154A/5 - 11A/2

⇒ 11B = 253 A/10

⇒ B = 23/10 A

Now, total sum of A, B ,C and D = Rs1250

⇒ A + B + C + D = 1250

⇒ A + 23/10 A + 6/5 A + A/2 = 1250

⇒ (20A + 46A + 24A + 10A)/20 = 1250

⇒ 100A/20 = 1250

⇒ 5A = 1250

⇒ A = 250

⇒ B = 23/10 A = 23/10 × 250 = 575

⇒ C = 6/5 A = 6/5 × 250 = 300

⇒ D = A/2 = 250/2 = 125

Hence, share of A = Rs250, B = Rs575, C = Rs300, D = Rs125 .

---

79. Answer: a

Explanation:

GIVEN:

Volume of a cone is $400cm^3$

FORMULA USED:

Volume of a cone = $1/3 \pi r^2 h$

Where, r = radius , h = height

CALCULATION:

Here, volume = 400

⇒ $1/3 \pi r^2 h = 400$

⇒ $1/3 \times 22/7 \times r^2 h = 400$

⇒ $r^2 h = 4200/11$

Now, when radius becomes 2r

⇒ $V = 1/3 \times \pi \times (2r)^2 \times h = 1/3 \times 22/7 \times 4 \times r^2 h$

⇒ $1/3 \times 22/7 \times 4 \times 4200/11 = 1600\ cm^3$ [As $r^2 h = 4200/11$]

Hence, the required volume is 1600 cm^3.

---

80. **Answer: a**

Explanation:

GIVEN:

A 1.8 m tall person is 30√3 m away from the tower

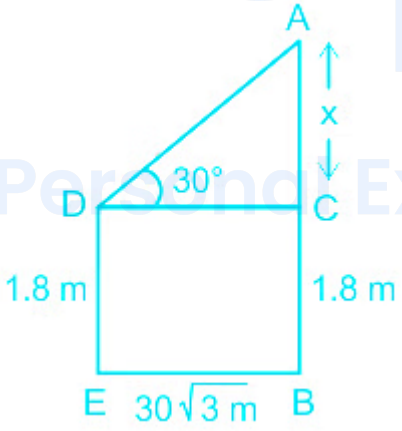
Angle of elevation is 30 degree

FORMULA USED:

tan 30° = $\frac{1}{\sqrt{3}}$

tan θ = Perpendicular/Base

CALCULATION:



Let AB be the height of tower and DE be the height of a person

Then in triangle ACD , AC/DC = tan 30°

⇒ $\frac{x}{30\sqrt{3}}$ = tan 30°

⇒ $\frac{x}{30\sqrt{3}}$ = $\frac{1}{\sqrt{3}}$

$\Rightarrow x = 30$ m

$\Rightarrow AB = 30 + 1.8 = 31.8$ m

Hence, height of the tower is 31.8m.

---

81. Answer: c

Explanation:

GIVEN:

$x + y = 1$

FORMULA USED:

$(x + y)^3 = x^3 + y^3 + 3xy(x + y)$

CALCULATION:

Here, we have

$x + y = 1$

On cubing both sides we get

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

$\Rightarrow x^3 + y^3 + 3xy(x + y) = 1$

$\Rightarrow x^3 + y^3 + 3xy \times 1 = 1$

$\Rightarrow x^3 + 3xy + y^3 = 1$

Hence, the required value is 1.

⭐ Shortcut Trick

$x + y = 1$

Let x =1 and y =0

Now put the value in the equation = 1 + 0 + 0 =1

---

82. Answer: c

Explanation:

GIVEN:

The marked price = Rs28000

FORMULA USED:

S.P. = (1- d1/100) × (1 - d2/100) × M.P.

Where, S.P. = Selling price , M.P. = Marked price

d1 = d2 = discount percentages respectively

CALCULATION:

Here, we have M.P. = Rs28000 and discount = 24%

Now, as we know that

S.P. = (1- d/100) × M.P. = (1- 24/100) × 28000

⇒ S.P. = 76/100 × 28000 = Rs 21,280

Now,, d1 = 16% and d2 = 10%

⇒ S.P. = (1- 16/100) × (1- 10/100) × 28000 = 84/100 × 90/100 × 28000

⇒ S.P. = Rs21,168

Now, it is clearly seen that when successive discounts are given then S.P. is lower

Hence, way B with a selling price of Rs21,168 is lower than way A.

83. **Answer: d**

Explanation:

GIVEN:

$xy = -6$

$x^3 + y^3 = 19$

CALCULATION:

Here, $xy = -6$

On cubing both the sides, we get

$\Rightarrow x^3 y^3 = (-6)^3$

$\Rightarrow x^3 = -216/y^3$ ..... (1)

Now, we have $x^3 + y^3 = 19$

Put the value of equation (1) in this we get ,

$\Rightarrow -216/y^3 + y^3 = 19$

Now, let us assume $y^3 = k$

$\Rightarrow -216/k + k = 19$

$\Rightarrow -216 + k^2 = 19k$

$\Rightarrow k^2 - 19k - 216 = 0$

$\Rightarrow k^2 - 27k + 8k - 216 = 0$

$\Rightarrow k(k - 27) + 8(k - 27) = 0$

$\Rightarrow (k + 8)(k - 27) = 0$

$\Rightarrow k+8=0$ and $k-27=0$

$\Rightarrow k=-8$ and $k=27$

Let us first take as $k=-8$

So, $k=y^3=-8 \Leftrightarrow y=-2$

$\Rightarrow xy=-6 \Leftrightarrow x\times(-2)=-6$

$\Rightarrow x=3$

So, when we take $k=-8$ then value of $x=3$ and $y=-2$

Now, we have to find the value of $1/x^{-1}+1/y^{-1}=1/(1/x)+1/(1/y)=x+y$

$\Rightarrow x+y=(3-2)=1$

Now, let us take $k=27$

$\Rightarrow k=y^3=27 \Leftrightarrow y=3$

$\Rightarrow xy=-6 \Leftrightarrow 3x=-6$

$\Rightarrow x=-2$

So, when we take $k=27$ then value of $x=-2$ and $y=3$

$\Leftrightarrow x+y=(3-2)=1$

So, value is 1 in both the cases

Hence, the required value of equation is 1.

---

84. Answer: a

Explanation:

GIVEN:

$A = 0.3\overline{12}$

$B = 0.4\overline{15}$

$C = 0.30\overline{9}$

CONCEPT USED:

Suppose XYZ is a three-digit number after the decimal

Then, if there is a bar on the first two digits i.e. $0.x\overline{yz}$ = (xyz- x)/990

And, if there is a bar on only one digit i.e. $0.xy\overline{z}$ = (xyz - xy)/900

CALCULATION:

Here, we have, $A = 0.3\overline{12}$,$B = 0.4\overline{15}$

As, we know that when the bar is on two-digit then,

⇒ A = (312 -3)/990 = 309/990

⇒ B = (415 -4)/990 = 411/990

Also, we have C = $0.30\overline{9}$

So, when the bar is on only one digit then,

⇒C = (309 - 30) / 900 = 279/900

Now, A + B + C = 309/990 + 411/990 + 279/900 = 720/990 + 279/900

⇒ (7200 + 3069) /9900 = 10269/9900 = 1141/1100

Hence, the value of A + B + C is 1141/1100 .

---

85. Answer: d

Explanation:

GIVEN:

The length of a platform is 330 metres and the speed is 72 km/h

The length of a platform is 710 metres

FORMULA USED:

Distance = Speed × Time

CALCULATION:

Here, we have the Length of the train = 330 metres

Length of platform = 710 metres

Total distance = Length of train + Length of platform = (330 + 710) = 1040 metres

Also, Speed of train = 72 km/h ⇔ 72 × 5/18 = 20 m/s [1m/s = 1 km/h × 5/18]

⇒ Distance = Speed × Time

⇒ 1040 = 20 ×Time

⇒ Time = 52 seconds

Hence, the time is taken to cross the platform is 52 seconds.

---

86. Answer: b

Explanation:

GIVEN:

Two trains of lengths 450 m and 300 m with speeds of 162km/h and 108 km/h

The distance between trains is 300 m

FORMULA USED:

Distance = Speed × Time

Relative Speed when two objects A and B move towards each other = Speed of A + Speed of B

CALCULATION:

Here, Speed of 1st train = 162 km/h , Speed of 2nd train = 108 km/h

Now, as per the question,

They are moving towards each other, So, using the relative speed concept add these two speeds

⇒ Relative Speed of the two trains = (162 + 108) km/h = 270 km/h

⇒ 270 × 5/18 = 75 m/s .....[As 1m/s = 1km/h × 5/18]

Now, total distance of the two trains = (450 + 300 + 300) m = 1050 m

⇒ Time = Distance/ Speed

⇒ Time = 1050 / 75 = 14 seconds

Hence, in 14 seconds these two trains will cross each other.

---

87. **Answer: d**

Explanation:

GIVEN:

A does 1/4 work in 9 days

B does 2/3 work in 28 days

CALCULATION:

As, A does 1/4 work in = 9 days

A does whole work in = 9 × 4 = 36 days

So, A 1 day's work = 1/36

Also, B does 2/3 days work in = 28 days

B does whole work in = 28 × 3/2 = 42 days

So, B 1 day's work = 1/42

⇒ (A + B) 's 1 day work = 1/ (1/36 + 1/42) = 1/[(7 + 6) /252] = 1/(13/252) = 252/13 days

Hence, A and B do the whole work in 252/13 days.

---

88. **Answer: b**

Explanation:

GIVEN:

The selling price is Rs54120

Successive discounts are 12% and 18%

FORMULA USED:

S.P. = (1 - d1/100) × (1- d2/100) × M.P.

Where, S.P. = Selling price , M.P. = Marked price ,

d1 and d2 are successive discount percent respectively

CALCULATION:

Here, we have S.P. = Rs54120 , d1 = 12% , d2 = 18%

We know that,

S.P. = (1- d1/100) × (1- d2/100) × M.P.

⇒ 54120 = (1- 12/100) × (1 - 18/100) × M.P.

⇒ 54120 = 88/100 × 82/100 × M.P.

⇒ M.P. = 54120 × 100/88 × 100/82 = 75,000

Hence, the Marked Price of an article is Rs75,000.

---

89. **Answer: d**

Explanation:

GIVEN:

Principal is Rs12000

Rate is 15%

Time is 3 years

FORMULA USED:

S.I. = (P × R × T) /100

Where, S.I. = Simple Interest , P = Principal , R = Rate of interest , T = Time in years

CALCULATION:

Here, we have P = Rs12000 , R = 15% , T = 3 years

Now, as we know that

S.I. = (P × R × T) /100

⇒ S.I. = (12000 × 15 × 3) /100 = Rs5,400

Hence, the Simple Interest is Rs5400.

---

90. **Answer: a**

Explanation:

GIVEN:

Curved Surface of a hemisphere is 22 cm^2

FORMULA USED:

For Hemisphere:

Curved Surface Area = $2\pi r^2$

Total Surface Area = $3\pi r^2$

CALCULATION:

Here, we have a Curved Surface Area = 22 cm^2

$\Rightarrow 2\pi r^2 = 22$

$\Rightarrow 2 \times \frac{22}{7} \times r^2 = 22$ [$\pi = 22/7$]

$\Rightarrow \frac{44}{7} \times r^2 = 22$

$\Rightarrow r^2 = 22 \times \frac{7}{44}$

$\Rightarrow r^2 = \frac{7}{2}$

Now,

Total Surface Area of a hemisphere = $3\ \pi\ r^2$

$\Rightarrow 3 \times \frac{22}{7} \times \frac{7}{2} = 33\ cm^2$

Hence, The Total surface area of a hemisphere is 33cm^2.

91. **Answer: a**

Explanation:

Given:

Vinay and Mahesh are 250 meters apart from each other

They are moving toward each other at the speed of 36 km/hr and 54 km hr respectively

Formula Used:

Distance= Speed x Time

Calculations:

⇒ Relative speed Vinay and Mahesh= 36km/h + 54km/h= 90km/h= 25m/s

According to the formula,

⇒ Time= $\frac{Distance}{Speed} = \frac{250}{25}$ = 10 s

Hence, The time taken to meet each other is 10 seconds

---

92. **Answer: d**

Explanation:

Given:

ABC is an equilateral triangle with side 12 cm

Formula Used:

Inradius of an equilateral triangle = $\frac{(side)}{2\times\sqrt{3}}$

Calculations:

According to the formula,

⇒ Inradius of an equilateral triangle = $\frac{(side)}{2\times\sqrt{3}}$ = $\frac{(12)}{2\times\sqrt{3}}$ = $2\sqrt{3}$ cm

Hence, The length of the radius of the circle is$2\sqrt{3}$ cm.

---

93. Answer: c

Explanation:

Given:

Salary of Mohit is 60 percent more than Vijay

Formula Used:

Percentage= $\frac{Difference}{Largervalue}\times 100$

Calculations:

Let the salary of Vijay= Rs. 100

⇒ So, The salary of Mohit= 100 + 60% of 100= 100 + 60= Rs. 160

According to the formula,

⇒ Percentage= $\frac{Difference}{Largervalue}\times 100 = \frac{160-100}{160}\times 100 = \frac{60}{160}\times 100$ = 37.5%

Hence, The salary of Vijay and less than Mohit's by 37.5%

---

94. Answer: a

Explanation:

Given:

AB is the chord of a circle such that AB = 10 cm

T he diameter of the circle is 20 cm

Concept Used:

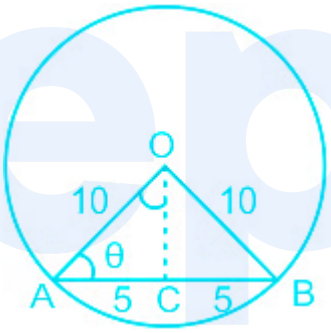
The chord of a circle can be defined as the line segment joining any two points on the circumference of the circle

Calculations:

Radius of circle= 10 cm

Length of chord= 10 cm

now, Draw a perpendicular on the chord from the center of the circle which divide the chord into two equal parts



In $\triangle$ AOC

$\Rightarrow$ AO= 10 cm

$\Rightarrow$ AC= 5 cm

$\Rightarrow$ $cos\theta = \frac{AC}{AO} = \frac{5}{10} = \frac{1}{2} = cos60$

$\Rightarrow$ $\theta = 60$

Hence, The angle subtended by the chord is 60°

---

95. **Answer: c**

Explanation:

Given:

The radius of a solid sphere(R) is 42 cm

It is melted to form identical small solid spheres whose radius(r) is 7 cm

Formula Used:

Volume of sphere= $\frac{4}{3} \times \pi \times r^3$

Calculations:

Let the number of spheres that can be formed be x

⇒ Volume of sphere= $\frac{4}{3} \times \pi \times R^3 = \frac{4}{3} \times \pi \times 42^3$

It is melted into the small sphere

The volume of sphere= Volume of the small sphere

⇒ $\frac{4}{3} \times \pi \times 42^3 = x \times \frac{4}{3} \times \pi \times 7^3$

⇒ x= 6 x 6 x 6=216

Hence, The identical small solid sphere that can be formed is 216

---

96. **Answer: b**

Explanation:

Given:

x = a(a ≠ 0)

Concept Used:

A diagram (such as a series of one or more points, lines, line segments, curves, or areas) that represents the variation of a variable in comparison with that of one or more other variables

Calculations:

The value of x=The value of a= 1, 2, 3, till infinity

The value of y= constant(say y= 2)

So the graph that is formed by these points will be a straight line that is parallel to the y-axis

Hence, The graph of equation x= a is a line which is parallel to the y-axis

---

97. Answer: a

Explanation:

Given:

Three years ago, Raman's salary was Rs. 45000

His salary is increased by 10 percent, A percent and 20 percent in a first, second and third year respectively

Raman's present salary is Rs. 83160

Concept Used:

A percentage is a number or ratio that can be expressed as a fraction of 100

Calculations:

Salary is increased by 10%= 110% of his salary

⇒ 110% of his salary= 45000 x $\frac{110}{100}$ = Rs. 49500

Now, In the second year

⇒ Salary is increased by A%= (100+ A)% of his salary

⇒ (100+ A)% of his salary= 49500 x $\frac{100+A}{100}$ = Rs. 49500 + 495A

Now, In the Third year or Present Salary

⇒ Salary is increased by 20%= 120% of his salary

⇒ 120% of his salary= (49500 + 495A) x $\frac{120}{100}$

Accoding to the question,

Salary after third year= present year

⇒ (49500 + 495A) x $\frac{120}{100}$ = 83160

⇒ 49500 + 495A= 69300

⇒ 495A= 19800

⇒ A= 40

Hence, The increment in the second year is 40%

---

98. **Answer: c**

Explanation:

Given:

The height of a cylinder is 45 cm

The circumference of its base is 132 cm

Formula Used:

Circumference of the base= $2 \times \pi \times r$

Curved Area of cylinder= $2 \times \pi \times r \times h$

Calculations:

Circumference of base= $2 \times \pi \times r$

⇒ 132= $2 \times \frac{22}{7} \times r$

⇒ r = 21 cm

⇒ Curved Surface Area of cylinder= $2 \times \pi \times r \times h = 2 \times \frac{22}{7} \times 21 \times 45$ = 44 x 135= 5940 cm^2

Hence, The curved surface area of cylinder is 5940 cm^2

---

99. Answer: a

Explanation:

Given:

The number from 53 to 97

Concept Used:

composite numbers can be defined as numbers that have more than two factors.

Calculations:

The composite numbers from 53 to 97 are

54, 55, 56, 57, 58, 60, 62, 63, 64, 65, 66, 68, 69, 70, 72, 74, 75, 76, 77, 78, 80, 81, 82, 84, 85, 86, 87, 88, 90, 91, 92, 93, 94, 95 and 96

Hence, The composite number from 53 to 97 is 35

---

100. Answer: a

Explanation:

Given:

A alone can do work in 11 days

B alone can do the same work in 22 days

C alone can do the same work in 33 days

They work in the following manner :

Day 1: A and B work.

Day 2: B and C work.

Day 3: C and A work.

Day 4: A and B work. And so on

Formula Used:

Total Work= Time x Efficiency

Calculations:

Let the total work be x

A can alone can do work in 11 days

⇒ A does work in one day= $\frac{x}{11}$

B alone can do work in 22 days

⇒ B does work in one day= $\frac{x}{22}$

C alone can do work in 33 days

⇒ C does work in one day= $\frac{x}{33}$

Work done on 1st day

⇒ A and B work together = $\frac{x}{11}+\frac{x}{22}=\frac{3x}{22}$

Work done on 2nd day

⇒ B and C work together = $\frac{x}{22}+\frac{x}{33}=\frac{5x}{66}$

Work done on 3rd day

⇒ C and A work together = $\frac{x}{33} + \frac{x}{11} = \frac{4x}{33}$

⇒ Total work done in 3 days= $\frac{3x}{22} + \frac{5x}{66} + \frac{4x}{33} = \frac{22x}{66}$

The total work will be completed in

⇒ $\frac{22x}{66}$ = 3 days

⇒ Total work(x)= 3 x $\frac{66}{22}$ = 3 x 3= 9 days

Hence, The total work will be completed in 9 days