1. If 5/16 of a tank is filled in 15 minutes, the rest of the tank can be filled in

1. 55 minutes 2. 60 minutes 3. 33 minutes 4. 70 minutes

Ans:3

Explanation

$\frac{5}{16}^{th}$ tank is filled in 15 minute

Balance to fill $=\frac{11}{16}$ part.∴ Time to fill this balance part $= \frac{15}{5/16} x \frac{11}{16} = 33$ minutes.

2. The sum of binary numbers 11111 and 00001 is given by:

1.100100 2. 100000 3. 100001 4. 100010

Ans: 2

2.1 The sum of binary numbers 1010 and 0011 is given by:

Ans: 1101

Table : Binary to decimal conversion

Decimal	Binary	Decimal	Binary
0	00000	11	01011
1	00001	12	01100
2	00010	13	01101
3	00011	14	01110
4	00100	15	01111
5	00101	16	10000
6	00110	17	10001
7	00111	18	10010
8	01000	19	10011
9	01001	20	10100
10	01010	21	10101

3. The number 14 is written in Binary code as

1. 1111 2. 1010 3. 1110 4. None of these

Ans: 3

3.1 The sum of binary numbers 100101 and 10101 is given by:

Ans: 111010

4. The cost of 10 apples and 20 mangoes is Rs.100/-. The cost of 20 apples and 40 mangoes is Rs.200/-. Their cost per piece is:

1. Rs.5.00 per apple and Rs.2.50 per mangoes
2. Rs.2.00 per apple and Rs.4.00 per mangoes
3. Rs.2.50 per apple and Rs.1.50 per mangoes
4. Rs.3.00 per apple and Rs.3.00 per mangoes

Ans: 1 and 2

Explanation

Given sum:
$10x + 20y = 100$ ……(1)
$20x + 40y = 200 \rightarrow \quad 10x + 20y = 100$……(2)
It is seen that both the equations are same; two unknowns but one equation to solve; this condition will lead to infinity solutions, i.e., there is no unique solution. But substitution of given values of 4 options, options (1) and (2) satisfy the price structure.

5. The mean/average of the first n natural numbers is

1. $\frac{n}{2}$ 2. $\frac{n+1}{2}$ 3. $\frac{n}{2}+1$ 4. $\frac{n^2+n+1}{2n}$

Ans: 2.

Explanation

The sum of first n natural numbers = $\frac{n(n+1)}{2}$

∴ Their average = $\frac{n(n+1)}{2} \div n = \frac{(n+1)}{2}$

6. A train travels from Chennai to Trichy at a constant speed of 60 kmph and return at a constant speed of 30 kmph. The average speed of the train is:

1. 40 kmph
2. 45 kmph
3. Cannot be determined
4. Data insufficient

Ans: 1

Explanation

Average speed for the trips of same distance: $\frac{2xy}{x+y} = \frac{2 \times 60 \times 30}{60+30} = 40$

7. A bus starts from rest with a constant acceleration of 10 m/s^2. At the same time car travelling with a constant velocity of 60 m/s overtakes the bus. At what distance will the bus overtake the car?

1. 360 m 2. 720 m 3. 1.4 km 4. Bus will never overtake the car

Ans: 2

Explanation
Assume that after time t, car over takes the bus.
As per this condition, the distance travelled by bus is equal to the car, say S.
For bus, the distance travelled, S =ut + $\frac{1}{2}$at^2 = $\frac{1}{2}$at^2(sincestarts from rest).
For car, the distance travelled, S=ut (since travels with constant speed u =60 m/s)
When the car overtakes the bus, the distance travelled by bus and car is the same:
i.e., $\frac{1}{2}$at^2=ut
i.e., $\frac{1}{2}$. 10.t^2=60 x t→ t = 12
$S = 60\ x\ 12 = 720$

8. In this equation $sin^2\ x - 2sin\ x + 1 = 0$, the value of x is:

1. $\pi/2$ 2. $\pi/4$ 3. $-\pi/2$ 4. π

Ans: 1

Explanation:
The given equation is of the form: (sin x-1)^2=0. ∴ sinx-1=0 →sinx = 1, ∴ x=90°

9. Two trains *A* and *B* are running on parallel tracks in the same direction at the same speed of 90kmph. After time't'the train *A* retards to half its speed and train *B* acceleration to double the speed. The relative velocity between the trains *A* and *B* after time't'kmph is:

1. 80 kmph 2. 60 kmph 3. 120 kmph 4. None of these.

Ans: 4

Explanation

It is given that initially the speeds of both the trains are same, i.e., $V_A = V_B$= 90 kmph
After time, t, V_A→ 45kmph and V_B→ 180kmph
∴ Relative velocity for moving in the same direction, $V_B - V_A$ = 135kmph

10. Two numbers are in the ratio 5:6 and their LCM is 150, then the numbers are

1. 25, 35 2. 35, 40 3. 25, 30 4. 20,30

Ans: 3

Explanation
Let the numbers be 5x and 6x.

Their LCM is 30x

∴The numbers are $\frac{5x}{30x} \times 150$, $\frac{6x}{30x} \times 150$ = 25, 30

11. If the two numbers are 20% and 30% more than a constant third number, what percent is the first number of the second number?

1.78.3 2. 62.3 3. 92.3 4. 108.33

Ans: 3

Explanation

Let the numbers be x_1, x_2 and x_3. Compare the values of $x_1$and $x_2$with x_3.
Assume $x_3 \rightarrow x$
∴ From the given condition, the respective numbers x_1, x_2 and $x_3 \rightarrow 1.2x$, 1.3x , x
Required = $\frac{x_1}{x_2} = \frac{1.2x}{1.3x} = 0.923 = 92.3\%$

12. A certain number of men can do a work in 50 days. If there were 10 men more it could be finished in 5 days less, the number of men is

1. 90 2. 70 3. 75 4. 85

Ans: 1

Explanation
For the same work, man-days (number of men x number of days taken) are equal. Let the number of men be x and number of days to complete the work be y.
For both the works, the condition to satisfy is $x_1y_1 = x_2y_2$
$x_1.50 = (x_1 + 10).45 \rightarrow 50x_1 = 45x_1 + 450 \rightarrow 5x_1 = 450$, $x_1 = 90$

I. When only 2 parameters are given, i.e., number of people working and the number of days are given, the statement of finishing the work under 2 conditions are given hereunder:

No. of Men	Number of days to finish the work
x_1 x_2	n_1 n_2

The relation to solve the given problem is $x_1 n_1 = x_2 n_2$.

If there is a unknown, the problem statements are given here under:

i.

No. of Men	Number of days taken
x_1 x_2	n_1 ?

The relation to solve the problem:$x_1 n_1 = x_2 .?$

ii.

No. of Men	Number of days taken
x_1 ?	n_1 n_2

The relation to solve the problem:$x_1 n_1 = ? . n_2$

Box 2:Time-Man hours relations

II When 3 parameters are given, i.e., number of people working, the number of days taken and the number of hours spent in a day are given, the statement to finish the work is:

No.of Men	Number of days to finish the work	Number of hours spent in a day
x_1 x_2	n_1 n_2	t_1 t_2

The relation to solve the problem:$x_1 n_1 t_1 = x_2 n_2 t_2$

If there is an unknown, the problem statements are given here under:

i.

No. of Men	Number of days taken	Number of hours spent in a day
x_1 x_2	n_1 n_2	t_1 ?

The relation to solve the problem:$x_1 n_1 t_1 = x_2 n_2 .?$

ii.

No. of Men	Number of days taken	Number of hours spent in a day
x_1 x_2	n_1 ?	t_1 t_2

The relation to solve the problem:$x_1 n_1 t_1 = x_2 .?. t_2$

iii.

o. of Men	umber of days taken	umber of hours spent in a day
x_1 ?	n_1 n_2	t_1 t_2

The relation to solve the problem:$x_1 n_1 t_1 = ?. n_2 t_2$

13. B can complete a work in 6 hours, B and C can do it in 4 hours and A, B, and C in $2\frac{2}{3}$ hours. The number of hours taken by A and B to do it together will be

1. $3\frac{3}{7}$ 2. 3 3. 5 4. 6

Ans: 1

Explanation

Reassign the number of hours A, B and C take to complete the work as a, b and c hours respectively.

i. B's one hour work: 1/b → 1/6

ii. A, B and C's combined one hour work: 1/a +1/b +1/c = $\frac{1}{2\frac{2}{3}} = \frac{3}{8}$

iii. B and C's one hour work: 1/b + 1/c = ¼,

i.e., $\frac{1}{6} + \frac{1}{c} = \frac{1}{4} \rightarrow \frac{1}{c} = \frac{1}{4} - \frac{1}{6} = \frac{1}{12} \therefore$ c =12 hrs.

Now values of b and c are known.

Given A, B and C's combined one hour work: $\frac{1}{6} + \frac{1}{12} + \frac{1}{a} = \frac{3}{8} \rightarrow \frac{1}{a} = \frac{3}{8} - (\frac{1}{6} + \frac{1}{12})$

$\rightarrow \frac{3}{8} - \frac{1}{4} = \frac{1}{8} \rightarrow a = 8$.

So A can do the work in 8 hrs.

A and B's combined one hour work $= \frac{1}{8} + \frac{1}{6} = \frac{7}{24}$

Therefore, the number of hours for A and B to complete the work = $\frac{24}{7} = 3\frac{3}{7}$ hrs.

14. A train moves 25 m in a second. The speed in km per hour is

1. 120 2. 112 3. 75 4. 90

Ans: 4

Explanation

Given speed, V = 25 m/s
∴Speed V in kmph = $\frac{18}{5} \times 25 = 90$.

15. A man standing on a 50 m. long railway platform observes that a train cleared the Platform in 4.5 second, but himself in 2 second, then the length of train in meters is

1. 32 2. 55 3. 40 4. 61

Ans: 3

Explanation
Let the train length be L_tm and the platform length be L_p = 50m,
Let Vbe the train speed in m/s.
Therefore the given sum:

i. Time to cross the platform: $\frac{L_t+L_p}{V} = \frac{L_t+50}{V} = 4.5$ ……(1)

ii. Time to cross the man: $\frac{L_t}{V} = 2$ …… (2)

Eqn. (1)/ Eqn.(2) → $\frac{L_t+50}{L_t} = \frac{4.5}{2}$ → $2L_t + 100 = 4.5L_t$ → $L_t = 40$

16. If 24 cm length of a brass pipe weighs 1/8 kg., what length of pipe weighs 1 kg?

1. 122.5 cm 2. 232 cm 3. 186 cm 4. 192 cm

Ans: 4

Explanation

As per given sum : $\frac{24}{1/8}$ x 1=192

17. A's salary is 25% below B's salary. By how much percent is B's salary above A's?

1. 31 2/3 2. 25 3. 28 4. $33\frac{1}{3}$

Ans: 4

Explanation

Let B's salary = 100 and therefore A's salary will be 75.
Compared to A's salary, B's salary is more by Rs.25, i.e., the ratio =25/75= 33.33%

18. The price of milk increases by 25%. If a housewife wants to spend on milk the same amount of money as before, how much percent less milk she must get?

1. 20 2. 25 3.16 2/3 4. 33 1/3

Ans: 1

Explanation

For the fixed amount of money spent, $x_1y_1 = x_2y_2$(i.e., $\frac{x2}{x1} = \frac{y1}{y2}$) where x is the unit price and y is the unit cost.

It is given that: $x_2 \rightarrow 1.25\ x_1$,thereforethe quantity of purchase will be less (i.e., indirect variation)

$x_1y_1 = 1.25\ x_1y_2$

$\therefore \frac{y2}{y1} = \frac{1}{1.25} = \frac{100}{125} = 80\%$, i.e., $y_2 = 80\%\ y_1$, i.e., y_2 is less by 20% compared to y_1.

19. By selling 36 articles, a shopkeeper gains the selling price of 9 articles. His gain is

1. 33 1/3% 2. 24% 3. 25% 4. 32%

Ans: 1

Explanation

Cost price is selling price of 27 articles and profit is selling price of 9 articles.

∴ Profit 9/27= $33\frac{1}{3}$%

20. A sold his watch for Rs.180/- thus bearing a loss of 10%.The cost price of the article is

1. Rs.250 2. Rs 225/- 3. Rs.220/- 4. Rs.200/-

Ans: 4

Explanation

Loss 10%. ∴ SP = 90 whereas CP =100. For SP = 180, CP= $\frac{100}{90} \times 180 = 200$

21. Which of the following is not equal to $\left(\frac{-5}{4}\right)^4$?

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

Ans: 3.

22. A mixture of 70 litres of alcohol and water, contains 10% of water. How much water must be added to it to make the water 12½% of the resulting mixture?

1. 3 litre 2. 3.5 litre 3. 4 litre 4. 2 litre

Ans: 4

Explanation

In the given mixture, let the quantity of water be x liter→ 7 litre (as per given condition).

∴ Alcohol quantity is 70 – x = 63 litre.

Assume the quantity of water to be added to make the resulting mixture contains 12.5% water is y litre.

∴ The total quantity of mixture after adding y liter water = 70 + y litrer and the resulting water quantity in the new mixture is 7 +y litre.

As per given condition, 12½% of (70+y) =7+y → y = 2.

23. $1\frac{3}{8}$ x $1\frac{1}{7}$= ?

1. $2\frac{1}{56}$ 2. 2 ¼ 3. $2\frac{3}{56}$ 4. $1\frac{4}{7}$

Ans: 4

Explanation

The given sum = $\frac{11}{8} \times \frac{8}{7} = 1\frac{4}{7}$

24. 3.70 x ? = 111

1. 1 2.30 3. 300 4. none of these.

Ans: 2

Explanation

Answer: $\frac{111}{3.7} = 30$

25. 777777/11

1. 70707 2. 77071 3. 70707 4. 70070

Ans:1

26. The side of a square is doubled. By what percentage does the area increase?

1. 200% 2. 300% 3. 100% 4. 400%

Ans:2

Explanation

Area, A of square of side a = a^2
As per the given condition, a→ 2a
∴ A →$4a^2$, i.e., the area has become 4 times
∴ Increase in area is 3 times = 300%

27. Which of the following is not true?

1) $3^2 > 2^3$ 2) $4^3 = 2^6$ 3)$3^3 = 9$ 4)$2^5 > 5^2$

Ans:3

The values of given options:

1) $3^2 > 2^3$, i.e., 9>8 2) $4^3 = 2^6$ 3)$3^3 = 9x3 = 27 \neq 9$ 4)$2^5 > 5^2$, i.e., 32>25

28. The product of two numbers is 24. Their average is 6. The cube of their sum is

1. 1628 2. 1728 3. 1528 4. None of these

Ans: 2

Explanation
Let the numbers be x and y.

Given: x y = 24 and $\frac{x+y}{2}$ =6→ x + y = 12, $(x+y)^3$=1728

29. 4 ×[3+{4 ×(3+(3×5))}] is equal to

1. 300 2. 120 3. 90 4. 200

Ans: 1

Explanation
The sum:
4 × [3+{4 ×(3+(3×5))}]
4 × [3+{4 (3+15)}]
4 × [75] = 300

30. Tap *A* takes 3 hours to fill a tank, while Tap *B* takes 6 hours for the same. If both taps are kept running, how long will it take to fill the tank?

1. 1.75 hours 2. 2 hours 3. 2.5 hours 4. None of the above

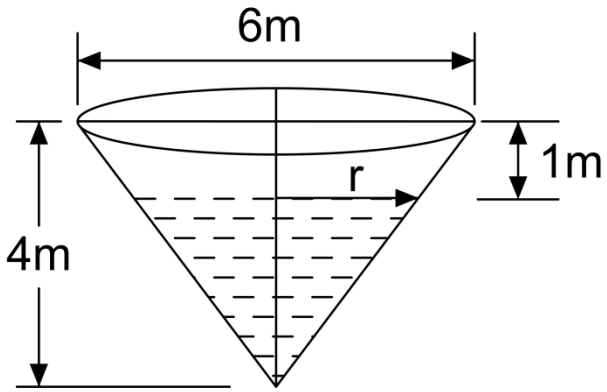
Ans: 2
Explanation
Part of tank filled in 1 hour when both taps are filling = $\frac{1}{3}+\frac{1}{6}$

Therefore time required to the full tank = $\frac{1}{\frac{1}{3}+\frac{1}{6}}$= 6/3 = 2

31 An inverted conical tank of diameter 6 meter and height 4 meter with the apex touching the ground filled with water develops a leak. The leak is arrested, when the water level has come down by 1 meter. What is the percentage of water still left in the tank?

1. 85% 2. 75% 3. 90% 4. None of these

Ans: 4



Let cone diameter be D (6 m) and height H (4 m). After the leak arrested, the diameter of water level be d and height be h (3 m, i.e., 4-1=3).

$V_{cone} = \frac{\pi}{3} D^2H$

$V_{water} = \frac{\pi}{3} d^2h$

Given: D=6, H = 4 and h = 3. To find r = d/2:

The geometrical relations are: $\frac{D}{d} = \frac{H}{h}$. Substituting the above values $\rightarrow d = \frac{Dh}{H} = 4.5 \rightarrow r = 4.5/2$

$\frac{V_{water}}{V_{cone}} = (d^2h)/(D^2H) = \frac{4.5^2 x3}{6^2 x4} = 0.4219 = 42.19\%$

32. Find out the next number in the series 1, 4, 9, 16, 25, ….

1. 30 2. 36 3. 19 4. 16

Ans: 2

Explanation: Given numbers are in squares of 1, 2, 3, 4 and 5. Therefore the next number is $6^2 = 36$.

33. $\left(16 + \frac{2}{7}\right) \times \left(3 + \frac{2}{3}\right) \times 0.8$ is equal to

182875 2. 18.2875 3. 182.875 4. 47.77

Ans: 4

34. What is the greatest number which is less than 1000 and is divisible by 48, 60 and 64?

1. 980 2. 960 3. 480 4. 640

Ans: 2

Explanation

LCM of the given 3 numbers 48, 60 and 64 is the answer.
The given numbers → 4 × 12, 4 × 15, 4 × 16

$= 4\times 3\times 4, 4\times 3\times 5, 4\times 4\times 4$
$\therefore$ LCM $= 4\times 4\times 4\times 3\times 5 = 64\times 15 = 960$

35. Change $\frac{5}{25000}$ into decimals

1. 0.2 2. 0.05 3. 0.002 4. 0.0002

Ans: 4

Explanation

The given sum: 1/5000=0.0002 (Check: 5000x0.0002 =1.)

36. $\frac{21x0.005x0.0036}{5.6x2.7}$ is equal to

1. 0.025 2. 0.0025 3. 0.000025 4. 0.25

Ans: 3

37. A student has to secure 35% in an examination to pass. He got 650 marks and failed by 50 marks. The maximum marks are

1. 1200 2. 2000 3. 1500 4. 1800

Ans: 2

Explanation
Let maximum marks be = x.
Pass marks is 35%.
$\frac{35x}{100}$= 650 + 50 = 700
x = $\frac{700}{35}\times 100 = 2000$

38. 20 = 80% of ?

1. 18 2. 20 3. 24 4. 25

Ans: 4

Explanation
Ans: 20 =$\frac{80}{100}$.x → x= 25 (i.e., 80% of 25 =20)

39. A shopkeeper's prices are 50% above cost price. If he allows his customers a discount of 25%, what profit does he make?

1. 5% 2. 10% 3. 12.5% 4. 20%

Ans: 3

Explanation
Let the cost price = 100, Price tag = 150, Discount 25%
So discount amount = 150 x 25/100 = 37.50
Therefore, selling price = 150 – 37.50 = 112.5,
Price above cost price = 112.5 – 100 = 12.5
Hence profit is 12.5%.

40. $1000^{-3} \times 10^{9} = ?$

1. 0 2. 1 3. 1000 4. 10^{6}

Ans: 2

Explanation
Ans: $\frac{10^9}{1000^3} = \frac{10^9}{(10^3)^3} = \frac{10^9}{10^9} = 1$ (or $10^{-9} \times 10^{9} = 10^{0} = 1$)

41. Two numbers are in the ratio of 15:11, if their HCF is 13, the numbers are

1. 75, 55 2. 105, 77 3. 11, 15 4. 195, 143

Ans: 4

Explanation
Let the numbers be 15x and 11x
Their HCF is 13. Therefore the numbers are 15x ×13 ::11x × 13 = 195 : 143.

Method by trick – The numbers in the given options are to be divisible by the HCF, 13; This condition is satisfied by option 4. Other options do not satisfy.

42. If A is $\frac{1}{3}$ of B and B is $\frac{1}{2}$ of C then A:B:C is

1. 1 : 3 : 6 2. 2 : 3 : 6 3. 3 : 2 : 6 4. 3 : 1 : 2

Ans:1

Explanation
From given condition, A =B/3,

B =C/2; ∴ C =2B

Write the ratios of A, B and C in terms of B. → A : B: C =$\frac{1}{3}$ B:B:2B → $\frac{1:3:6}{3}$.

Therefore the ratio is 1: 3 : 6

43. The sum of the exterior angles of a hexagon is

1.360° 2. 540° 3. 180° 4. none of these

Ans: 1.

Explanation: Sum of exterior angles of all polygons is always 360°

44. A sum of money put at simple interest doubles itself in 20 years, the rate per cent per annum is

1. 5% 2. 12% 3. 2% 4. 20%

Ans: 1

Explanation
N= 20.

Sum as per SI = P + $\frac{PNR}{100}$ = 2P→ 1 + $\frac{NR}{100}$ = 2, ∴ NR = 100

For N =20, R = 5%

45. (6 – 5):5 = ? : 15

1. (16 – 15) 2. (17 – 15) 3. (18 – 15) 4. None of these

Ans: 3

Explanation
1: 5::x : 15 →x= 3. The option (3) viz., (18-15) satisfies the answer

46. The difference between simple interest and compound interest on the same sum of money at $6\frac{2}{3}$% per annum for 3 years is Rs.184/-, the sum is

1. Rs.17000/- 2. Rs.16000/- 3. Rs13500/- 4. Rs.15000/-

Ans: 3

Explanation
Given: R = $6\frac{2}{3}\% = \frac{20}{3}\%$, N = 3 years and difference between CI and SI = Rs. 184.

SI = $\frac{P \times N \times R}{100}$= P$\frac{3x20}{3x100} = \frac{P}{5}$

CI = $P \times \left(1 + \frac{R}{100}\right)^3 - 1$

$= P \times \left(1 + \frac{20}{3X100}\right)^3 - 1$

$= \left(\frac{320}{300}\right)^3 - 1 = \left(\frac{16}{15}\right)^3 - 1 = \frac{4096-3375}{3375} = \frac{721P}{3375}$

Given: CI – SI =184

$= \frac{721P}{3375} - \frac{P}{5} = 184 = \frac{721P-675P}{3375} = 184 = \frac{46P}{3375} = 184 \rightarrow P$

$= \frac{184 \times 3375}{46} = \text{Rs.}13500$

47. 25% of 60 - ?% of 25 = $17\frac{1}{2}$% of 40

1. 30 2. 32 3. 40 4. 50

Ans: 2

Explanation

Ans: $\frac{25}{100} \times 60 - \frac{x}{100} x25 = \frac{35}{2 \times 100} \times 40$

$\frac{25 \times 60}{100} - \frac{35 \times 40}{2 \times 100} = \frac{x}{100} x25$

$15 - 7 = \frac{x}{100} \times 25,$

$\therefore\ 8 = \frac{x}{100} \times 25$

$\therefore\ x = 32$

48. $\frac{1}{7 - \frac{1}{\frac{1}{2} x \frac{1}{3}}} =$

1. $^1/_2$ 2. 1 3. $^1/_7$ 4. None of these

Ans: 2

Explanation

Ans: $\frac{1}{7 - \frac{1}{\frac{1}{6}}} = \frac{1}{7-6} = 1$

49. Find the simple interest on Rs.600 for six months at the rate of 6% per annum:

1. Rs.18 2. Rs 20 3. Rs.26 4. Rs 306

Ans:1

Explanation

P = 600, N = 6 months, R =6%.

$\therefore SI = \frac{PNR}{100} = 600 \times \frac{6}{12} \times \frac{6}{100} = 18$

50. What is the ratio of volumes of two spheres whose radii are in the ratio 3:5?

1. 27 : 105 2 35 : 125 3 25 : 115 4. 27 : 125

Ans:4

Explanation

Volume of sphere in terms of radius, $r = \frac{4\pi}{3} r^3$

$\therefore V_1 : V_2 = r_1^3 : r_2^3 = 27 : 125$

(Note: Ratio of surface areas: $S_1 : S_2 = r_1^2 : r_2^2 = 9 : 25$.)