

- Q1** A container contains 10 litres mixture in which there is 10% sulphuric acid. How much sulphuric acid is to be added to make the solution to contain 25% sulphuric acid?
 (A) 1 liter (B) 2 liter
 (C) 3 liter (D) 4 liter
- Q2** The area of the circular base of the tent house is $308m^2$, and its height is $7\sqrt{2}m$. Then find the area (in m^2) of cloth required to cover the curved surface area of the conical tent.
 (A) 308 (B) $308\sqrt{2}$
 (C) $304\sqrt{3}$ (D) 304
- Q3** A man purchases two fans for Rs. 2160. By selling one fan at a profit of 15% and the other at a loss of 9% he neither gains nor losses in the whole transaction. Find the cost price of each fan.
 (A) Rs. 800 & Rs. 1300
 (B) Rs. 910 & Rs. 1250
 (C) Rs. 900 & Rs. 1200
 (D) Rs. 810 & Rs. 1350
- Q4** A sum becomes 3 times in 5 years at compound interest. In how many years the same sum will become 9 times?
 (A) 5 (B) 10
 (C) 15 (D) 20
- Q5** If the difference between C.I. and S.I. for 2 years at 5% per annum is equal to 25. What is the sum of money?
 (A) Rs. 25000
 (B) Rs. 10000
 (C) Rs. 12000
 (D) Rs. 20000
- Q6** $27^{(2n-1)} - (243)^3$, then the value of n is:
 (A) 3 (B) 5
 (C) 7 (D) 9
- Q7** Two cards are drawn at random from a pack of 52 cards. The probability that either both are black or both are queen is
 (A) $\frac{325}{1326}$ (B) $\frac{6}{1326}$
 (C) $\frac{330}{1326}$ (D) $\frac{5}{1326}$
- Q8** A and B can do a piece of work in 30 days, while B and C can do the same in 24 days and C and A in 20 days. They all work together till 12th day then A and C leave. How many more days will it be required for B to finish the remaining work?
 (A) 24 days (B) 22 days
 (C) 16 days (D) 20 days
- Q9** A student scores 40% of marks and fails by 40 marks in the examination and another student scores 60% and scores 20 more marks. Find the maximum marks for the examination.
 (A) 100 (B) 200
 (C) 300 (D) 400
- Q10** The angle in your wrist watch at 10 hours, 22 minutes will be
 (A) 174° (B) 175°
 (C) 179° (D) 181°
- Q11** X sold something to Y for 540 rupees with a 20% loss. Y spent 170 rupees repairing it and selling Z at the rate at which X would have gained 24%. Find the profit earned by Y.
 (A) 229.5 rupees (B) 227.5 rupees
 (C) 127 rupees (D) 229 rupees
- Q12** The diameter of a pizza is 8 cm; it will cost 240 rupees, and the diameter of other pizzas is 12 cm; it will cost 360 rupees. If the size of the



pizza is directly proportional to the price, then find a discount on the second pizza.

- (A) Rs. 190 (B) Rs. 182
(C) Rs. 180 (D) Rs. 192

Q13 Sudha sold an article to Renu for Rs. 576 at a loss of 20% Renu spent a sum of Rs. 224 on its transportation and sold it to Raghu at a price which would have given Sudha a profit of 24%. The percentage of gain for Renu is:

- (A) 10.5% (B) 11.6%
(C) 13.2% (D) 12.9%

Q14 The diagonal of a square is equal to the side of an equilateral triangle. If the area of the square is $18\sqrt{3}$ sq. cm. What is the area (in cm^2) of the equilateral triangle?

- (A) $54\sqrt{2}$ (B) $27\sqrt{2}$
(C) 54 (D) 27

Q15 If $\frac{\sqrt[3]{2744} + \sqrt[3]{6859}}{3} = x\%$ of 50 then $x = ?$

- (A) 20 (B) 21
(C) 22 (D) 23

Q16 A person goes from home to the office at 80% of his usual speed. After a 2-hour rest, he returns with the usual speed. If he covers 2000 km of distance during the whole journey, it takes 52 hours to complete it. Find the speed at which he goes to the office.

- (A) 10 m/s (B) 11 m/s
(C) 12 m/s (D) 13 m/s

Q17 A man bought a horse and a carriage for Rs. 30,000. He sold the horse at a profit of 20% and the carriage at a loss of 10%. Finally he gains 2% on the whole. The cost of the horse is

- (A) Rs. 9,000 (B) Rs. 10,000
(C) Rs. 12,000 (D) Rs. 15,000

Q18 The HCF of two numbers is one-twentieth of their LCM. If one of the numbers is 96 and the

difference of the LCM and the HCF is 456, then what is the other number?

- (A) 48 (B) 120
(C) 144 (D) 72

Q19 Average age of 12 students of a school is 23 years. The average age of students and their mathematics and science teacher is 35 years. If the age of science teacher is 15 years more than the age of mathematics teacher, then what is the age of mathematics teacher?

- (A) 98.5 years
(B) 101.5 years
(C) 100 years
(D) 99.5 years

Q20 49000 is divided among A, B and C in such a way that the share of A is the sum of B and $\frac{2}{5}$ of B's share, and the share of B is $\frac{3}{7}$ of the total share of A and C. What is the share of C?

- (A) Rs. 21000 (B) Rs. 20000
(C) Rs. 13720 (D) Rs. 14700



Answer Key

Q1 B
Q2 B
Q3 D
Q4 B
Q5 B
Q6 A
Q7 C
Q8 D
Q9 D
Q10 C

Q11 C
Q12 C
Q13 B
Q14 D
Q15 C
Q16 A
Q17 C
Q18 B
Q19 D
Q20 C



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Hints & Solutions

Note: scan the QR code to watch video solution

Q1 Text Solution:

Given that 1 litre of sulphuric acid is already present in the 10 litres mixture. Let x litres of sulphuric acid be added to the mixture, so that the volume of the new mixture becomes $10+x$ litres.

According to question,

$$25 = \frac{x+1}{10+x} \times 100$$

$$10+x = 4x+4$$

$$x = 2$$

Hence 2 litres of sulphuric acid should be added.

Hence, the correct answer is option (b), i.e. 2 litres.

Q2 Text Solution:

Given:

The area of the circular base of the tent house is 308m^2 .

Calculation:

According to question



$$\pi \times r^2 = 308\text{ m}^2$$

$$\Rightarrow \frac{22}{7} \times r^2 = 308\text{ m}^2$$

$$\Rightarrow r^2 = 308 \times \frac{7}{22}$$

$$\Rightarrow r^2 = 98$$

$$\Rightarrow r = 7\sqrt{2}\text{ m}$$

The slant height $= (\sqrt{r^2 + h^2})$

$$\sqrt{70(\sqrt{2})^2 + 7(\sqrt{2})^2}$$

$$L = \sqrt{98 + 98} = 14$$

The curved surface area of the conical tent =

$$\pi \times 7\sqrt{2} \times 14$$

$$\Rightarrow 308\sqrt{2}\text{ m}$$

Hence, the correct answer is option (b), i.e.

$$308\sqrt{2}\text{ m}$$

Q3 Text Solution:

Given:

A man purchases two fans for Rs. 2160. By selling one fan at a profit of 15%.

The other at a loss of 9% he neither gains nor losses in the whole transaction.

Calculation:

Let, Cost price of the first fan = Rs. x

Cost price of the second fan = Rs. $2160-x$

According to question

The gain on selling the first fan is 15% of its cost price $= 0.15x$

The loss on selling the second fan is 9% of its cost price

$$= 0.09(2160-x)$$

These equal gives us the equation

$$\Rightarrow 0.15x = 0.09(2160 - x)$$

$$\Rightarrow 0.15x = 194.4 - 0.09x$$

$$\Rightarrow 0.24x = 194.4$$

$$\Rightarrow x = 810$$

Cost price of the second fan $= 2160 - 810 = \text{Rs. } 1350$



Hence, the correct answer is option (d), i.e Rs. 810 & Rs. 1350

Q4 Text Solution:

Given,

$$3P = p\left(1 + \frac{r}{100}\right)^5$$

$$3 = \left(1 + \frac{r}{100}\right)^5 \dots\dots\dots (1)$$

$$\text{Then } 9P = P\left(1 + \frac{r}{100}\right)^t$$

$$\Rightarrow \left(1 + \frac{r}{100}\right)^t = 9 = 3^2$$

$$\Rightarrow \left(1 + \frac{r}{100}\right)^t = \left(\left(1 + \frac{r}{100}\right)^5\right)^2 \dots\dots$$

(From(i))

$$\Rightarrow \left(1 + \frac{r}{100}\right)^t = \left(1 + \frac{r}{100}\right)^{10}$$

$$\Rightarrow t = 10 \text{ years}$$

Hence, the correct answer is option (b), i.e 10

Q5 Text Solution:

To find the sum of money for which the difference between Compound Interest (C.I.) and Simple Interest (S.I.) for 2 years at 5% per annum is equal to 25, we'll use the formulae for C.I. and S.I.

Given:

- Rate of interest (r) = 5% per annum = 0.05
- Time (t) = 2 years
- Difference between C.I. and S.I. = 25

Calculation :

Given that the difference between C.I. and S.I. is 25, we can set up the equation:

$$\text{C.I.} - \text{S.I.} = 25$$

Substitute the formulas:

$$P \left(\left(1 + \frac{0.05}{1} \right)^2 - 1 \right) - P \times 0.05 \times 2 = 25$$

Simplify and solve for P :

$$P \left((1.05)^2 - 1 \right) - P \times 0.1 = 25$$

Calculate $(1.05)^2$:

$$(1.05)^2 = 1.1025$$

Substitute back:

$$P(1.1025 - 1) - 0.1P = 25$$

$$P \times 0.1025 - 0.1P = 25$$

Combine like terms:

$$0.0025P = 25$$

Divide both sides by 0.0025 to solve for P :

$$P = \frac{25}{0.0025}$$

$$P = 10000$$

Hence, the correct answer is option (b), i.e 10000

Q6 Text Solution:

Calculation:

Given expression:

$$27^{2n-1} - (243)^3$$

First, express 27 and 243 in terms of powers of 3:

$$27 = 3^3$$



$$243 = 3^5$$

Substitute these values into the expression:

$$(3^3)^{2n-1} - (3^5)^3$$

Simplify each term:

$$3^{3(2n-1)} - 3^{5 \cdot 3}$$

Further simplify the exponents:

$$3^{6n-3} - 3^{15}$$

Now, equate the exponents since the bases are the same:

$$6n - 3 = 15$$

$$6n = 18$$

$$n = \frac{18}{6}$$

$$n = 3$$

Hence, the correct answer is option (a), i.e 3

Q7 Text Solution:

Calculation:

Since there are 26 cards in a pack which are black

The probability of getting both black

$$= \frac{26}{52} \times \frac{25}{51}$$

Also, there are 4 queens in a pack

The probability of getting both queens

$$= \frac{4}{52} \times \frac{3}{51}$$

The probability of getting a queen of black

$$\text{color is } \frac{2}{52} \times \frac{1}{51}$$

The probability that either both are black or both are queens

$$= \left(\frac{26}{52} \times \frac{25}{51} \right) + \left(\frac{4}{52} \times \frac{3}{51} - \frac{2}{52} \times \frac{1}{51} \right)$$

$$\text{therefore Required answer} = \frac{330}{1326}$$

Hence the correct Option is Option C i.e, $\frac{330}{1326}$

Q8 Text Solution:

given:

A and B can do a piece of work in 30 days, while B and C can do the same work in 24 days and C and A in 20 days.

They all work together till 12th day then A and C leave.

Formula used:

Time taken to complete the work = Total work/Efficiency
Concept used:

Total work = LCM of the number of days taken by A and B, B and C and C and A.

$$= \text{LCM}(30, 24, 20) = 120$$

Calculations:

Efficiency

$$A+B=120/3=4$$

$$B+C=120/24=5$$

$$C+A=120/20=6$$

$$\text{then } 2(A+B+C)=4+5+6$$

$$A+B+C=7.5$$

Now,

$$\text{efficiency of B} = 7.5 - 6 = 1.5$$

According to question,

(A + B + C) work for 12 days and completed (12 × 7.5) units work.

$$\text{Remaining work} = (120 - 90) = 30 \text{ units}$$

Time taken by B to complete the remaining work = $30/1.5 = 20$

Hence, the correct answer is option (d), i.e 20 days

Q9 Text Solution:

Given:

A student score 40 % of marks and fails by 40



marks in the examination.

Another student scores 60 % and scores 20 more marks.

Calculation:

The maximum marks for examination = x

According to question

$$(m \times 40\%) + 40 = (m \times 60\%) - 20$$

$$20m\% = 60$$

$$\frac{m}{100} = 3$$

$$m = 300$$

The maximum marks for the examination is 300 .

Hence, the correct answer is option (c), i.e 300

Q10 Text Solution:

Calculation:

To determine the angle between the hour and minute hands at 10:22:

Minute Hand Position:

- The minute hand moves 360 degrees in 60 minutes.
- In 22 minutes, it moves:

$$\text{Minute angle} = \frac{360}{60} \times 22 = 6 \times 22 = 132^\circ$$

Hour Hand Position:

- The hour hand moves 360 degrees in 12 hours, which is 30 degrees per hour.
- At 10 o'clock, it is at:

$$\text{Hour angle at 10 o'clock} = 10 \times 30 = 300^\circ$$

- Additional movement due to 22 minutes:
- Each minute moves the hour hand by

$$\frac{30}{60} = 0.5 \text{ degrees.}$$

- For 22 minutes, it moves:

$$\text{Additional hour angle} = 22 \times 0.5 = 11^\circ$$

- Therefore, at 10:22, the hour hand is at:

$$\text{Hour angle at 10:22} = 300^\circ + 11^\circ = 311^\circ$$

Calculate the Angle Between the Hands:

- The angle between the hour and minute hands is the absolute difference between their positions:

$$\text{Angle between hands} = |311^\circ - 132^\circ| = 179^\circ$$

Hence, the correct answer is option (c), i.e 179°

Q11 Text Solution:

Calculation:

X sold the item to Y for 540 rupees at a 20% loss. To find X's cost price (CP), we know that selling at a 20% loss means X received 80% of the original price. Therefore, we set up the equation:

$$540 = 0.8 \times \text{CP}$$

Solving for CP, we get:

$$\text{CP} = \frac{540}{0.8} = 675 \text{ rupees}$$

Next, we determine the price at which X would have gained a 24% profit. A 24% profit on X's cost price is calculated as:

$$\text{Selling Price} = 675 \times 1.24 = 837 \text{ rupees}$$

This means Y sold the item to Z for 837 rupees. Y's total cost price includes the purchase price plus the repair cost. Y bought the item for 540



rupees and spent 170 rupees on repairs, making the total cost:

$$\text{Total Cost Price} = 540 + 170 = 710 \text{ rupees}$$

To find Y's profit, we subtract the total cost price from the selling price:

$$\text{Profit} = 837 - 710 = 127 \text{ rupees}$$

Therefore, Y earned a profit of 127 rupees. Hence, the correct answer is option (c), i.e 127 rupees

Q12 Text Solution:

Calculation:

Calculate the area of both pizzas:

The area A of a circle is given by:

$$A = \pi r^2$$

where r is the radius of the circle.

For the first pizza with a diameter of 8 cm:

$$\text{Radius} = \frac{8}{2} = 4 \text{ cm}$$

$$A_1 = \pi \times 4^2 = 16\pi \text{ square cm}$$

For the second pizza with a diameter of 12 cm:

$$\text{Radius} = \frac{12}{2} = 6 \text{ cm}$$

$$A_2 = \pi \times 6^2 = 36\pi \text{ square cm}$$

Determine the cost per square centimeter for the first pizza:

$$\text{Cost of first pizza} = 240 \text{ rupees}$$

$$\text{Cost per square cm} = \frac{240}{16\pi}$$

Calculate the expected cost of the second pizza:

If the cost is directly proportional to the area, the expected cost of the second pizza C_2 should be:

$$C_2 = \left(\frac{240}{16\pi} \right) \times 36\pi$$

Simplifying:

$$C_2 = \frac{240 \times 36\pi}{16\pi} = \frac{240 \times 36}{16} = 540 \text{ rupees}$$

Compare the expected cost with the actual cost:

The actual cost of the second pizza is 360 rupees.

Calculate the discount:

$$\begin{aligned} \text{Discount} &= \text{Expected cost} - \text{Actual cost} \\ &= 540 - 360 = 180 \text{ rupees} \end{aligned}$$

Hence, the correct answer is option (c), i.e 180



Q13 Text Solution:

Calculate Sudha's cost price (CP) of the article:

Sudha sold the article to Renu for Rs. 576 at a loss of 20%. Let CP be Sudha's cost price.

$$\text{Selling Price (SP)} = CP \times \left(1 - \frac{20}{100}\right)$$

$$576 = CP \times 0.8$$

$$CP = \frac{576}{0.8} = 720$$

Determine the selling price that would have given Sudha a profit of 24%:

$$\text{Required SP} = CP \times \left(1 + \frac{24}{100}\right)$$

$$\text{Required SP} = 720 \times 1.24 = 892.8$$

Therefore, Renu sold the article to Raghu for Rs. 892.8.

Calculate Renu's total cost price (including transportation):

Renu bought the article for Rs. 576 and spent Rs. 224 on transportation.

$$\text{Total CP for Renu} = 576 + 224 = 800$$

Calculate Renu's profit:

$$\text{Profit} = \text{Selling Price} - \text{Total Cost Price}$$

$$\text{Profit} = 892.8 - 800 = 92.8$$

Calculate the percentage gain for Renu:

$$\text{Percentage Gain} = \left(\frac{\text{Profit}}{\text{Total Cost Price}}\right) \times 100$$

$$\text{Percentage Gain} = \left(\frac{92.8}{800}\right) \times 100 = 11.6\%$$

Hence, the correct answer is option (b), i.e 11.6%

Q14 Text Solution:

As we know,

$$\text{Area of the equilateral triangle} = \sqrt{\frac{3}{4}}a^2$$

$$\text{Diagonal of a square} = \sqrt{2}a$$

$$\text{Area of the square} = a^2$$

$$a^2 = 18\sqrt{3}$$

$$\Rightarrow a = \sqrt{18\sqrt{3}}$$

$$\text{Diagonal of a square} = \sqrt{2}a$$

$$\text{Diagonal of the square} = \sqrt{2} \times \sqrt{18\sqrt{3}}$$

$$= \text{Side of the equilateral triangle}$$

$$\text{Area of the equilateral triangle} =$$



$$\sqrt{\frac{3}{4}} \left[\sqrt{2} \times \sqrt{(18\sqrt{3})^2} = \sqrt{\frac{3}{4}} \left[2 \times \left(18\sqrt{3} \right) \right] \right]$$

$$= 27$$

Hence, the correct answer is option (d), i.e 27

Q15 Text Solution:

Calculation

Cube root of 2744 = 14

Cube root of 6859 = 19

Now putting value of cube root

$$\Rightarrow \frac{14+19}{3} = \frac{x}{100} \times 50$$

$$\Rightarrow \frac{33}{3} = \frac{x}{2}$$

$$\Rightarrow x = 11 \times 2$$

$$\Rightarrow x = 22$$

Q16 Text Solution:

Given:

- The new speed is 80% of the usual speed.
- Total distance covered in 52 hours.
- Takes 2 hours of rest and then returns.

- Let u be the usual speed in km/h.

- New speed = $0.8u$ (80% of usual speed).

Calculate Time for the Journey:

- Total time excluding rest = 52 hours - 2 hours = 50 hours.

Set up the Average Speed Formula:

$$\text{Average Speed} = \frac{\text{Total Distance}}{\text{Total Time}}$$

Apply Average Speed Formula:

- Total Distance = 2000 km (to and fro)

$$\text{Average Speed} = \frac{2000}{50} = 40 \text{ km/h}$$

Formulate Equation using New Speed:

- Using the average speed formula for the journey:

$$\frac{2 \cdot 0.8u \cdot u}{0.8u + u} = 40$$

Solve for u :

- Simplify the equation:

$$\frac{1.6u^2}{1.8u} = 40$$

$$1.6u = 40 \cdot 1.8$$

$$1.6u = 72$$

$$u = \frac{72}{1.6}$$

$$u = 45 \text{ km/h}$$

Calculate New Speed:

- New Speed = $0.8 \cdot 45 = 36 \text{ km/h}$

Convert to m/s:

- Convert km/h to m/s:

$$\text{New Speed} = 36 \cdot \frac{1000}{3600}$$

$$\text{New Speed} = 10 \text{ m/s}$$



Hence, the correct answer is option (a), i.e 10 m/s

Q17 Text Solution:

Given:

Cost of Horse and Carriage is Rs. 30,000

Calculation:

Let the cost of Horse be Rs. x

Then the cost of the Carriage will be Rs.

$(30,000 - x)$

According to the question,

$$\Rightarrow 120\% \text{ of } x + 90\% \text{ of } (30,000 - x) = 102\% \text{ of } 30,000$$

$$\Rightarrow \frac{6}{5}x + \frac{9}{10}(30,000 - x) = 102 \times 300$$

$$\Rightarrow (12x + 2,70,000 - 9x)/10 = 30,600$$

$$\Rightarrow 3x + 2,70,000 = 3,06,000$$

$$\Rightarrow 3x = 3,06,000 - 2,70,000$$

$$\Rightarrow 3x = 36,000$$

$$\Rightarrow x = 36,000/3 = 12,000$$

Hence The cost of Horse is Rs. 12,000 .

Q18 Text Solution:

Calculation:

According to the question,

$$HCF = 1/20 \times LCM \quad \dots (i)$$

$$LCM - HCF = 456$$

$$\Rightarrow LCM - (1/20 \times LCM) = 456$$

[from equation (i)]

$$\Rightarrow \frac{19}{20} \times LCM = 456$$

$$\Rightarrow LCM = (456 \times 20)/19$$

$$\Rightarrow LCM = 480$$

Then $HCF = (480 - 456) = 24$

Let's assume that the other number be k , then

$$k \times 96 = 24 \times 480$$

$$\Rightarrow k = 11520/96$$

$$\Rightarrow k = 120$$

Hence, The correct answer is 120

Q19 Text Solution:

Given:

Average age of 12 students = 23 years

Average age of students including two teachers = 35 years

Age of science teacher = (Age of mathematics teacher + 15) years

Formula:

Sum of total observation = Total number of observations times Average

Calculation:

Let, Age of mathematics teacher = X years

Age of science teacher = $(X + 15)$ years

Total age of 12 students

$$\Rightarrow 23 \times 12 = 276 \text{ years}$$

Total age of students including two teachers

$$\Rightarrow 35 \times 14 = 490 \text{ years}$$

According to the question,

$$\Rightarrow 276 + X + (X + 15) = 490$$

$$\Rightarrow 276 + 2X + 15 = 490$$

$$\Rightarrow 2X + 291 = 490$$

$$\Rightarrow 2x = 490 - 291$$

$$\Rightarrow X = 199/2 = 99.5 \text{ years}$$

Hence, The age of mathematics teacher is 99.5 years.

Q20 Text Solution:

Given conditions:

$$A = B + \frac{2}{5}B$$



$$B = \frac{3}{7}(A + C)$$

The total amount is 49000.

Simplify the conditions:

- From the first condition:

$$A = B + \frac{2}{5}B = \frac{5}{5}B + \frac{2}{5}B = \frac{7}{5}B$$

- From the second condition:

$$B = \frac{3}{7}(A + C)$$

Substitute A from the first condition into the second condition:

$$B = \frac{3}{7}\left(\frac{7}{5}B + C\right)$$

- Multiply both sides by 7 to clear the fraction:

$$7B = 3\left(\frac{7}{5}B + C\right)$$

- Distribute the 3:

$$7B = \frac{21}{5}B + 3C$$

- Multiply everything by 5 to clear the fraction:

$$35B = 21B + 15C$$

$$14B = 15C$$

$$C = \frac{14B}{15}$$

Sum up all parts:

- We know $A + B + C = 49000$, and substituting A and C we get:

$$\frac{7}{5}B + B + \frac{14B}{15} = 49000$$

- Find a common denominator to combine the terms:

$$\frac{21B}{15} + \frac{15B}{15} + \frac{14B}{15} = 49000$$

$$\frac{50B}{15} = 49000$$

- Multiply both sides by 15 to clear the fraction:

$$50B = 49000 \times 15$$

- Solve for B :



$$50B = 735000$$

$$B = \frac{735000}{50}$$

$$B = 14700$$

Find A and C :

$$- A = \frac{7}{5}B = \frac{7}{5} \times 14700 = 20580$$

$$- C = \frac{14B}{15} = \frac{14 \times 14700}{15} = 13720$$

Hence, the correct answer is option (c), i.e
13720





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