

CDS-AFCAT 1 2025

SSBCrack
EXAMS

LIVE

MATHS

RATIO & PROPORTION

MCQS



NAVJYOTI SIR



28 Jan 2025 Live Classes Schedule

9:00AM	28 JANUARY 2025 DAILY DEFENCE UPDATES	DIVYANSHU SIR
10:00AM	28 JANUARY 2025 DAILY CURRENT AFFAIRS	RUBY MA'AM

AFCAT 1 2025 LIVE CLASSES

✓ 12:30PM	REASONING - FIGURE CLASSIFICATION	RUBY MA'AM
✓ 3:00PM	STATIC GK - INDIAN FESTIVALS & FOLK DANCES	DIVYANSHU SIR
4:30PM	ENGLISH - SYNONYMS - CLASS 3	ANURADHA MA'AM
✓ 5:30PM	MATHS - RATIO & PROPORTION	NAVJYOTI SIR

NDA 1 2025 LIVE CLASSES

✓ 10:00AM	MATHS - ANALYTICAL GEOMETRY 2D - CLASS 1	NAVJYOTI SIR
✓ 11:30AM	ANCIENT & MEDIEVAL HISTORY	RUBY MA'AM
✓ 1:00PM	PHYSICS - MOTION	NAVJYOTI SIR
✓ 4:30PM	ENGLISH - SYNONYMS - CLASS 3	ANURADHA MA'AM

CDS 1 2025 LIVE CLASSES

✓ 11:30AM	ANCIENT & MEDIEVAL HISTORY	RUBY MA'AM
✓ 1:00PM	PHYSICS - MOTION	NAVJYOTI SIR
✓ 4:30PM	ENGLISH - SYNONYMS - CLASS 3	ANURADHA MA'AM
✓ 5:30PM	MATHS - RATIO & PROPORTION	NAVJYOTI SIR



Q) How many litres of pure alcohol must be added to 10 litres of mixture which is 15% alcohol to make a mixture which will be 25% alcohol?

(a) $\frac{5}{4}$

(b) $\frac{5}{2}$

(c) $\frac{3}{4}$

(d) $\frac{4}{3}$

let pure alcohol mixed to 15% be x .

$$\frac{15}{100} \times 10 = \underline{1.5 \text{ L}}$$

(Alcohol)

$$\frac{1.5 + x}{10 + x} \times 100 = 25$$

$$150 + 100x = 250 + 25x$$

$$75x = 100 \Rightarrow x = \frac{100}{75} = \frac{4}{3} \text{ L}$$

$\frac{4}{3} \text{ L}$

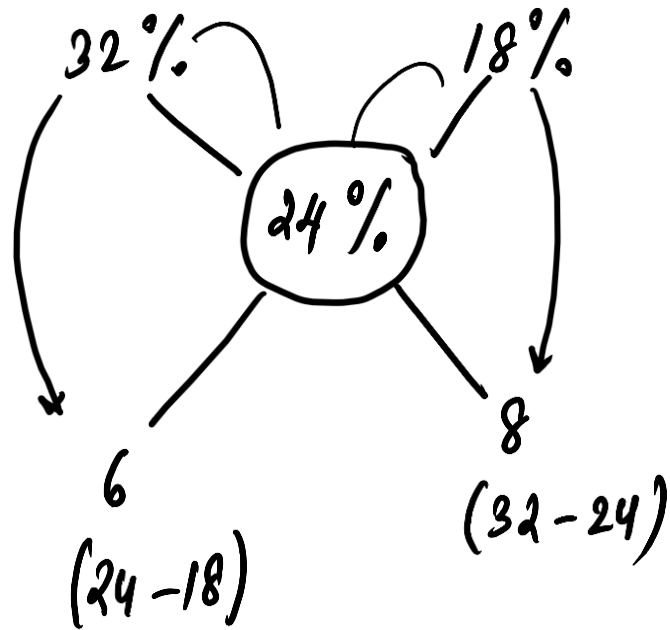
Q) How many litres of pure alcohol must be added to 10 litres of mixture which is 15% alcohol to make a mixture which will be 25% alcohol?

- (a) $\frac{5}{4}$ (b) $\frac{5}{2}$ (c) $\frac{3}{4}$ (d) $\frac{4}{3}$

Ans: (d)

Q) A butler stole wine from a butt of sherry which contained 32% of spirit and then replaced what he stole, by wine containing only 18% spirit. The butt was then of 24% strength only. How much of the butt had he stolen?

- (a) $\frac{3}{8}$ (b) $\frac{5}{7}$ (c) $\frac{4}{7}$ (d) $\frac{7}{11}$



$$\frac{\text{Quantity of } 32\%}{\text{Quantity of } 18\%} = \frac{6}{8} = \frac{3}{4} \checkmark$$

$$1 - \frac{3}{3+4} = 1 - \frac{3}{7} = \frac{4}{7}$$

Q) A butler stole wine from a butt of sherry which contained 32% of spirit and then replaced what he stole, by wine containing only 18% spirit. The butt was then of 24% strength only. How much of the butt had he stolen?

- (a) $\frac{3}{8}$ (b) $\frac{5}{7}$ (c) $\frac{4}{7}$ (d) $\frac{7}{11}$

Ans: (c)

Bottle 1 contains a mixture of milk and water in 7:2 ratio and **Bottle 2** contains a mixture of milk and water in 9:4 ratio. In what ratio of volumes should the liquids in bottle 1 and bottle 2 be combined to obtain a mixture of milk and water in 3:1 ratio ?

- A. 27 : 13
- B. 13 : 27
- C. 40 : 13
- D. None of the above

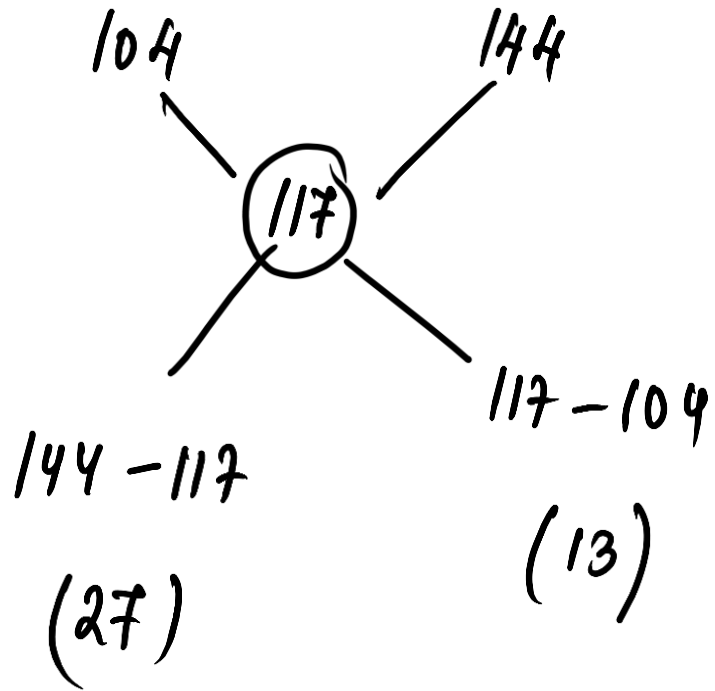
<u>water</u>	<u>Bottle 1</u>	<u>Bottle 2</u>	
$\frac{2}{9}$	$\frac{4}{13}$	$\frac{1}{4}$	} $\times 9 \times 13 \times 4$
$2 \times 13 \times 4$	$4 \times 9 \times 4$		
$13 \times 9 \times 1$			

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$$2 \times 13 \times 4$$

$$4 \times 9 \times 4$$

$$13 \times 9 \times 1$$



$$27 : 13$$

Bottle 1 contains a mixture of milk and water in 7:2 ratio and Bottle 2 contains a mixture of milk and water in 9:4 ratio. In what ratio of volumes should the liquids in bottle 1 and bottle 2 be combined to obtain a mixture of milk and water in 3:1 ratio ?

A. 27 : 13

B. 13: 27

C. 40 : 13

D. None of the above

Q) If a quantity y varies as the sum of three quantities of which the first varies as x , the second varies as $-x + x^2$, the third varies as $x^3 - x^2$, then what is y equal to?

- (a) kx^3 , where k is a constant
 (b) $kx + lx^2 + mx^3$, where k, l, m are constants
 (c) kx^2 , where k is a constant
 (d) kx , where k is a constant

$$y \propto a + b + c \longrightarrow$$

$$a \propto x \Rightarrow a = k_1 x$$

$$b \propto -x + x^2 \Rightarrow b = k_2(-x + x^2)$$

$$c \propto x^3 - x^2 \Rightarrow c = k_3(x^3 - x^2)$$

$$y = k_4 \left[k_1 x + k_2(-x + x^2) + k_3(x^3 - x^2) \right]$$

$$y = \frac{k_4 k_1}{4} x + k_4 k_2(-x) + k_4 k_2 x^2 + k_4 k_3 x^3 - k_4 k_3 x^2$$

$$y = x \left(\frac{k_4 k_1}{4} - k_2 \right) + x^2 (k_4 k_2 - k_4 k_3) + k_4 k_3 x^3$$

$$y = x \left(\frac{k k_1}{4} - k_2 \right) + x^2 (k_4 k_2 - k_4 k_3) + k_4 k_3 x^3$$

$$= kx + x^2 l + mx^3$$

$$= \underline{kx + lx^2 + mx^3}$$

- Q)** If a quantity y varies as the sum of three quantities of which the first varies as x , the second varies as $-x + x^2$, the third varies as $x^3 - x^2$, then what is y equal to?
- (a) kx^3 , where k is a constant
 - (b) $kx + lx^2 + mx^3$, where k, l, m are constants
 - (c) kx^2 , where k is a constant
 - (d) kx , where k is a constant

Ans: (b)

Q) The resistance of a wire is proportional to its length and inversely proportional to the square of its radius. Two wires of the same material have the same resistance and their radii are in the ratio 9 : 8. If the length of the first wire is 162 cms., find the length of the other.

- (a) 64 cm (b) 120 cm
(c) 128 cm (d) 132 cm

$$\frac{r_1}{r_2} = \frac{9}{8}$$

Resistance, $R \propto l$; $R \propto \frac{1}{r^2} \Rightarrow R \propto \frac{l}{r^2} \Rightarrow R = k \frac{l}{r^2}$

$$\frac{R_1}{R_2} = \frac{\cancel{k} \frac{l_1}{r_1^2}}{\cancel{k} \frac{l_2}{r_2^2}} \Rightarrow \frac{1}{1} = \frac{l_1}{l_2} \times \left(\frac{r_2}{r_1}\right)^2 \Rightarrow \frac{l_2}{l_1} = \left(\frac{8}{9}\right)^2$$

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$$\frac{l_2}{l_1} = \left(\frac{8}{9}\right)^2$$

$$\frac{l_2}{162} = \frac{64}{81}$$

$$l_2 = \frac{64}{\cancel{81}} \times \frac{\cancel{18}^2}{\cancel{162}} = 128 \text{ cm}$$

Q) The resistance of a wire is proportional to its length and inversely proportional to the square of its radius. Two wires of the same material have the same resistance and their radii are in the ratio 9 : 8. If the length of the first wire is 162 cms., find the length of the other.

- (a) 64 cm (b) 120 cm
(c) 128 cm (d) 132 cm

Ans: (c)

Q) When x is added to each of 2, 3, 30 and 35, then the numbers obtained in this order, are in proportion. What is the mean proportional between $(x + 7)$ and $(x - 2)$?

- (a) 7 (b) 4 (c) 6 (d) 5

$$\frac{2+x}{3+x} = \frac{30+x}{35+x}$$

$$\cancel{x^2} + 37x + 70 = \cancel{x^2} + 33x + 90$$

$$4x = 20$$

$$\underline{x = 5}$$

$$\sqrt{(x+7)(x-2)}$$

$$\sqrt{(5+7)(5-2)}$$

$$= \sqrt{12 \times 3} = 6$$

Q) When x is added to each of 2, 3, 30 and 35, then the numbers obtained in this order, are in proportion. What is the mean proportional between $(x + 7)$ and $(x - 2)$?

- (a) 7 (b) 4 (c) 6 (d) 5

Ans: (c)

Q) In a school there were 1554 students and the ratio of the number of the boys and girls was 4 : 3. After few days, 30 girls joined the school but few boys left; as a result the ratio of the boys and girls became 7 : 6. The number of boys who left the school is

- (a) 84 (b) 76 (c) 86 (d) 74

$$\frac{4}{4+3} \times 1554 = 4 \times 222 = \frac{888}{\text{(boys)}}$$

$$\text{(girls)} \quad \frac{3}{4+3} \times 1554 = \frac{666}{\text{}}$$

$$\frac{888 - x}{666 + 30} = \frac{7}{6} \Rightarrow 5328 - 6x = 4662 + 210$$

$$6x = 5328 - 4872$$

$$6x = 456 \Rightarrow x = 76$$

Q)In a school there were 1554 students and the ratio of the number of the boys and girls was 4 : 3. After few days, 30 girls joined the school but few boys left; as a result the ratio of the boys and girls became 7 : 6. The number of boys who left the school is

- (a) 84 (b) 76 (c) 86 (d) 74

Ans: (b)

Q) A and B have their monthly incomes in the ratio $8 : 5$, while their monthly expenditures are in the ratio $5 : 3$. If they have saved ₹ 12,000 and ₹ 10,000 monthly respectively, then the difference in their monthly income is

- (a) ₹ 42,000 (b) ₹ 44,000
 (c) ₹ 46,000 (d) ₹ 52,000

$$\begin{array}{r}
 \frac{8x}{5y} \quad \frac{5x}{3y} \\
 \hline
 \end{array}$$

Income - expenditure = Savings

difference = $8x - 5x = \underline{3x}$

$$8x - 5y = 12000 \qquad 5x - 3y = 10000$$

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$$8x - 5y = 12000$$

x3

$$5x - 3y = 10000$$

x5

$$24x - 15y = 36000$$

$$25x - 15y = 50000$$

$$x = 14000$$

$$3x = 3 \times 14000 = 42000$$

Q) A and B have their monthly incomes in the ratio $8 : 5$, while their monthly expenditures are in the ratio $5 : 3$. If they have saved ₹ 12,000 and ₹ 10,000 monthly respectively, then the difference in their monthly income is

- | | |
|--------------|--------------|
| (a) ₹ 42,000 | (b) ₹ 44,000 |
| (c) ₹ 46,000 | (d) ₹ 52,000 |

Ans: (a)

Q) The ratio of the income of A to that of B is 5 : 7.
A and B save ₹4,000 and ₹5,000 respectively. If the
expenditure of A is equal to $66\frac{2}{3}\%$ of the expenditure of B,
then the total income of A and B is:

$$5x \quad 7x$$

$$\text{Total} = 5x + 7x = \underline{12x}$$

- (a) ₹25,200 (b) ₹24,000
(c) ₹26,400 (d) ₹28,800

$$A = \frac{2}{3}B \quad \left(66\frac{2}{3}\% = \frac{2}{3}\right)$$

$$\frac{3A = 2B}{(\text{expenditures})}$$

$$5x - 4000 = A$$

$$7x - 5000 = B$$

$$5x = A + 4000$$

$$7x = B + 5000$$

$$5x = A + 4000$$

$$7x = \frac{3}{2}A + 5000$$

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$$5x = A + 4000 \quad 7x = \frac{3}{2}A + 5000$$

$$5x = A + 4000 \quad \times 3 \quad 14x = 3A + 10000$$

$$15x = 3A + 12000$$

$$\underline{- 14x = 3A + 10000}$$

$$x = 2000$$

$$12x = 12 \times 2000 = 24000$$

(Sum of incomes)

Q) The ratio of the income of A to that of B is 5 : 7.
A and B save ₹4,000 and ₹5,000 respectively. If the
expenditure of A is equal to $66\frac{2}{3}\%$ of the expenditure of B,
then the total income of A and B is:

- | | |
|-------------|-------------|
| (a) ₹25,200 | (b) ₹24,000 |
| (c) ₹26,400 | (d) ₹28,800 |

Ans: (b)

Q) A started a business with a certain amount of money. After a few months B became his partner, contributing three times what A had contributed. At the end of the year, each was entitled to half the total profit. When did B join as a partner?

- (a) 10 months after A (b) 6 months after A
 (c) 1 months after A (d) 8 months after A

Let B joined after x months
 of A's start.

Let contribution be ₹ y .

$$\frac{y \times 12 \text{ months}}{3y \times (12-x) \text{ months}} = \frac{1/2}{1/2}$$

$$\frac{12}{3(12-x)} = 1 \Rightarrow 4 = 12 - x$$

$$x = 8$$

8 months after A

- Q)** A started a business with a certain amount of money. After a few months B became his partner, contributing three times what A had contributed. At the end of the year, each was entitled to half the total profit. When did B join as a partner ?
- (a) 10 months after A (b) 6 months after A
(c) 1 months after A (d) 8 months after A

Ans: (d)

Q) A and B started a partnership business investing in the ratio of 3 : 8. C joined them after 4 months with an amount equal to 3/4th of B. What was their profit (in ₹) at the end of the year if C got ₹ 24,000 as his share?

- (a) 120000 (b) 150000 (c) 90000 (d) 180000

3x 8x (Investment by A & B)

3x x 12 8x x 12 $\frac{3}{4}(8x) \times (12-4)$

3x x 12 8x x 12 6x x 8

3 x 12 8 x 12 6 x 8 \Rightarrow 3 : 8 : 4

Total profit \nearrow
C's share = $\frac{4}{3+8+4} \times y$

$\frac{24000}{6000} = \frac{4}{15} \times y$

$y = 6000 \times 15 = 90000$

- Q)** A and B started a partnership business investing in the ratio of 3 : 8. C joined them after 4 months with an amount equal to $\frac{3}{4}$ th of B. What was their profit (in ₹) at the end of the year if C got ₹ 24,000 as his share?
- (a) 120000 (b) 150000 (c) 90000 (d) 180000

Ans: (c)

Q) If x varies as y , then which of the following is/are correct?

1. $x^2 + y^2$ varies as $x^2 - y^2$

2. $\frac{x}{y^2}$ varies inversely as y

3. $\sqrt[n]{x^2 y}$ varies as $\sqrt[2n]{x^4 y^2}$

Select the correct answer using the code given below:

(a) 1 and 2 only

(b) 2 and 3 only

(c) 3 only

(d) 1, 2 and 3

$$x = ky$$

$$(1) \quad \frac{x^2 + y^2}{x^2 - y^2} = \frac{k^2 y^2 + y^2}{k^2 y^2 - y^2} = \frac{k^2 + 1}{k^2 + 1}$$

no variable, y
 \Downarrow
it varies

(2)

(3)

Q) If x varies as y , then which of the following is/are correct?

1. $x^2 + y^2$ varies as $x^2 - y^2$

2. $\frac{x}{y^2}$ varies inversely as y

3. $\sqrt[n]{x^2 y}$ varies as $\sqrt[2n]{x^4 y^2}$

Select the correct answer using the code given below:

(a) 1 and 2 only

(b) 2 and 3 only

(c) 3 only

(d) 1, 2 and 3

Ans: (d)

Q) 25 kg of alloy X is mixed with 125 kg of alloy Y . If the amount of lead and tin in the alloy X is in the ratio 1 : 2 and the amount of lead and tin in the alloy Y is in the ratio 2 : 3, then what is the ratio of lead to tin in the mixture?

- (a) 1 : 2 (b) 2 : 3 (c) 3 : 5 (d) 7 : 11

Q) 25 kg of alloy X is mixed with 125 kg of alloy Y . If the amount of lead and tin in the alloy X is in the ratio 1 : 2 and the amount of lead and tin in the alloy Y is in the ratio 2 : 3, then what is the ratio of lead to tin in the mixture?

- (a) 1 : 2 (b) 2 : 3 (c) 3 : 5 (d) 7 : 11

Ans: (d)

Q) A mixture contains milk and water in the ratio 5 : 1. On adding 5 l of water, the ratio of milk and water becomes 5 : 2. What is the quantity of milk in the original mixture?

(a) 5 l

(b) 25 l

(c) 27.5 l

(d) 32.5 l

Q) A mixture contains milk and water in the ratio 5 : 1. On adding 5 l of water, the ratio of milk and water becomes 5 : 2. What is the quantity of milk in the original mixture?

(a) 5 l

(b) 25 l

(c) 27.5 l

(d) 32.5 l

Ans: (b)

Q) If 78 is divided into 3 parts which are proportional to

$1, \frac{1}{3}, \frac{1}{6}$, then the middle part is

- (a) $\frac{28}{3}$ (b) 13 (c) $\frac{52}{3}$ (d) $\frac{55}{3}$

Q) If 78 is divided into 3 parts which are proportional to

$1, \frac{1}{3}, \frac{1}{6}$, then the middle part is

- (a) $\frac{28}{3}$ (b) 13 (c) $\frac{52}{3}$ (d) $\frac{55}{3}$

Ans: (c)

Q) A, B and C start a business by investing ₹ 2000, ₹ 3000 and ₹ 4000 respectively. But B increases his investment to ₹ 4000 after 4 months and C withdraws ₹ 1000 at the end of 9 months. What is A's share out of a total profit of ₹ 8475 earned in a year ?

- (a) ₹ 1800 (b) ₹ 1600 (c) ₹ 1500 (d) ₹ 1700

Q) A, B and C start a business by investing ₹ 2000, ₹ 3000 and ₹ 4000 respectively. But B increases his investment to ₹ 4000 after 4 months and C withdraws ₹ 1000 at the end of 9 months. What is A's share out of a total profit of ₹ 8475 earned in a year ?

- (a) ₹ 1800 (b) ₹ 1600 (c) ₹ 1500 (d) ₹ 1700

Ans: (a)

Q) The train fare and bus fare between two stations is in the ratio 3 : 4. If the train fare increases by 20% and bus fare increase by 30%, then what is the ratio between revised train fare and revised bus fare?

- (a) $\frac{9}{13}$ (b) $\frac{17}{12}$ (c) $\frac{32}{43}$ (d) $\frac{19}{21}$

Q) The train fare and bus fare between two stations is in the ratio 3 : 4. If the train fare increases by 20% and bus fare increase by 30%, then what is the ratio between revised train fare and revised bus fare?

- (a) $\frac{9}{13}$ (b) $\frac{17}{12}$ (c) $\frac{32}{43}$ (d) $\frac{19}{21}$

Ans: (a)

Q) Given y is inversely proportional to \sqrt{x} , and $x = 36$ when $y = 36$. What is the value of x when $y = 54$?

- (a) 54 (b) 27 (c) 16 (d) 8

Q) Given y is inversely proportional to \sqrt{x} , and $x = 36$ when $y = 36$. What is the value of x when $y = 54$?

- (a) 54 (b) 27 (c) 16 (d) 8

Ans: (c)

Q) If $a : b = c : d = 1 : 6$, then what is the value of $\frac{a^2 + c^2}{b^2 + d^2}$?

(a) $\frac{1}{600}$

(b) $\frac{1}{60}$

(c) $\frac{1}{36}$

(d) $\frac{1}{6}$

Q) If $a : b = c : d = 1 : 6$, then what is the value of $\frac{a^2 + c^2}{b^2 + d^2}$?

- (a) $\frac{1}{600}$ (b) $\frac{1}{60}$ (c) $\frac{1}{36}$ (d) $\frac{1}{6}$

Ans: (c)

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

- (a) ₹ 3350 (b) ₹ 3250 (c) ₹ 2700 (d) ₹ 2800

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

- (a) ₹ 3350 (b) ₹ 3250 (c) ₹ 2700 (d) ₹ 2800

Ans: (c)

Q) If $\frac{a}{b} = \frac{b}{c} = \frac{c}{d}$, then which of the following is/are correct?

1.
$$\frac{b^3 + c^3 + d^3}{a^3 + b^3 + c^3} = \frac{d}{a}$$

2.
$$\frac{a^2 + b^2 + c^2}{b^2 + c^2 + d^2} = \frac{a}{d}$$

Select the correct answer using the code given below.

- (a) 1 only (b) 2 only
(c) Both 1 and 2 (d) Neither 1 nor 2

Q) If $\frac{a}{b} = \frac{b}{c} = \frac{c}{d}$, then which of the following is/are correct?

1. $\frac{b^3 + c^3 + d^3}{a^3 + b^3 + c^3} = \frac{d}{a}$

2. $\frac{a^2 + b^2 + c^2}{b^2 + c^2 + d^2} = \frac{a}{d}$

Select the correct answer using the code given below.

- (a) 1 only (b) 2 only
(c) Both 1 and 2 (d) Neither 1 nor 2

Ans: (a)

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LIVE

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SPEED-DISTANCE-TIME

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NAVJYOTI SIR