

MH CET LAW Basic Mathematics

Sample Paper – 3

Duration: 8 Minutes

Maximum Marks: 8

Instructions

- This paper contains **8 Multiple Choice Questions** modelled on the Basic Mathematics section of MH CET LAW (5-Year LLB).
- Questions test arithmetic: Number System, Percentages, Ratio & Proportion, Profit & Loss, Simple & Compound Interest, Time & Work, Speed & Distance.
- Each correct answer carries +1 **mark**. There is **no negative marking** for incorrect or unattempted answers.
- Only **one option** is correct per question.
- Use of calculators, mobile phones, and electronic gadgets is **strictly prohibited**.

Questions

Q1. Which of the following numbers is divisible by both 4 and 9?

- A. 1,234
- B. 2,349
- C. 3,204
- D. 4,518

Q2. The price of a laptop before tax is Rs. 45,000. After adding a GST of 18%, what is the final price?

- A. Rs. 51,000
- B. Rs. 52,000
- C. Rs. 52,500
- D. Rs. 53,100



Q3. A trader incurs a loss of 12% by selling an article for Rs. 7,040. At what price should he sell it to make a profit of 10%?

- A. Rs. 8,800
- B. Rs. 8,400
- C. Rs. 8,600
- D. Rs. 9,000

Q4. At 8% per annum simple interest, in how many years will Rs. 6,250 amount to Rs. 8,750?

- A. 4 years
- B. 5 years
- C. 6 years
- D. 7 years

Q5. A 60-litre solution contains milk and water in the ratio 7 : 3. How much water must be added to make the ratio 3 : 2?

- A. 5 litres
- B. 8 litres
- C. 10 litres
- D. 12 litres

Q6. A is three times as efficient as B. Together they finish a job in 6 days. How many days does B alone take to complete the job?

- A. 18 days
- B. 20 days
- C. 22 days
- D. 24 days



Q7. Kavya drives from city P to city Q at 60 km/h and returns at 40 km/h. What is her average speed for the entire journey?

- A. 48 km/h
- B. 50 km/h
- C. 52 km/h
- D. 54 km/h

Q8. Find the compound interest on Rs. 16,000 at 10% per annum for 1 year, compounded semi-annually.

- A. Rs. 1,600
- B. Rs. 1,640
- C. Rs. 1,660
- D. Rs. 1,680



Detailed Solutions

Solution to Q1

Number System / Divisibility

Solution

Concept: A number is divisible by 4 if its last two digits form a number divisible by 4. A number is divisible by 9 if the sum of its digits is divisible by 9. Both conditions must hold simultaneously.

Step 1 — Check divisibility by 4 (last two digits).

$$1234 \rightarrow 34 \div 4 = 8.5 \quad (\text{not divisible by } 4)$$

$$2349 \rightarrow 49 \div 4 = 12.25 \quad (\text{not divisible by } 4)$$

$$3204 \rightarrow 04 \div 4 = 1 \quad \checkmark \quad (\text{divisible by } 4)$$

$$4518 \rightarrow 18 \div 4 = 4.5 \quad (\text{not divisible by } 4)$$

Step 2 — Check divisibility by 9 for 3204 (digit sum).

$$3 + 2 + 0 + 4 = 9 \quad \text{and} \quad 9 \div 9 = 1 \quad \checkmark \quad (\text{divisible by } 9)$$

Both conditions are satisfied only by 3,204.

Why the other options are wrong:

- **A – 1,234:** Last two digits 34 are not divisible by 4 ($34 = 4 \times 8 + 2$).
- **B – 2,349:** Last two digits 49 are not divisible by 4. Digit sum = 18 is divisible by 9, but divisibility by 4 fails.
- **D – 4,518:** Last two digits 18 are not divisible by 4 ($18 = 4 \times 4 + 2$). Digit sum = 18 passes the 9-test but the 4-test fails.

Answer: (C) 3,204

Answer: (C) [Go Back to Q1](#)

Solution to Q2

Percentage / GST

Solution

Concept: GST (Goods and Services Tax) is added as a percentage of the pre-tax price.

$$\text{Final price} = \text{Pre-tax price} \times \left(1 + \frac{\text{GST}\%}{100} \right).$$



Step 1 — Calculate the GST amount.

$$\text{GST} = 18\% \text{ of } 45,000 = \frac{18}{100} \times 45,000 = \text{Rs. } 8,100$$

Step 2 — Find the final price.

$$\text{Final price} = 45,000 + 8,100 = \text{Rs. } 53,100$$

Verification: $45,000 \times 1.18 = 45,000 + 8,100 = 53,100$. ✓

Why the other options are wrong:

- **A – Rs. 51,000:** Corresponds to a 13.3% tax, not 18%.
- **B – Rs. 52,000:** Implies a tax of Rs. 7,000, which is 15.6% of the base price, not 18%.
- **C – Rs. 52,500:** Corresponds to a 16.7% tax; arises from incorrectly computing $\frac{18}{100} \times 45,000 = 7,500$ (a calculation slip).

Answer: (D) Rs. 53,100

Answer: (D) [Go Back to Q2](#)

Solution to Q3

Profit & Loss / Finding new SP

Solution

Concept: If an article is sold at a loss of $x\%$, then $SP = CP \times \frac{100 - x}{100}$. First recover the Cost Price from the loss-sale, then apply the desired profit percentage.

Step 1 — Find the Cost Price (CP).

A 12% loss means the selling price is 88% of CP:

$$7,040 = CP \times \frac{88}{100} \implies CP = \frac{7,040 \times 100}{88} = \frac{7,040}{0.88} = \text{Rs. } 8,000$$

Step 2 — Find the selling price for a 10% profit.

$$SP_{\text{new}} = 8,000 \times \frac{110}{100} = 8,000 \times 1.10 = \text{Rs. } 8,800$$

Why the other options are wrong:

- **B – Rs. 8,400:** Arises from adding a flat 5% to the original SP ($7040 + 1360$),



incorrectly ignoring the CP route.

- **C – Rs. 8,600:** A common mis-step of adding 7.5% of 7040 to get a new price without finding CP first.
- **D – Rs. 9,000:** Overestimates CP; would imply a selling price at a loss of 22% on an assumed CP of Rs. 9,000.

Answer: (A) Rs. 8,800

Answer: (A) [Go Back to Q3](#)

Solution to Q4

Simple Interest / Finding Time

Solution

Concept: Simple Interest formula: $SI = \frac{P \times R \times T}{100}$. Rearranging for time: $T = \frac{SI \times 100}{P \times R}$.

Step 1 — Find the Simple Interest earned.

$$SI = \text{Amount} - \text{Principal} = 8,750 - 6,250 = \text{Rs. } 2,500$$

Step 2 — Solve for time T (in years).

$$T = \frac{SI \times 100}{P \times R} = \frac{2,500 \times 100}{6,250 \times 8} = \frac{2,50,000}{50,000} = 5 \text{ years}$$

Verification: SI for 5 years = $\frac{6250 \times 8 \times 5}{100} = \frac{2,50,000}{100} = \text{Rs. } 2,500$. Amount = $6,250 + 2,500 = 8,750$. ✓

Why the other options are wrong:

- **A – 4 years:** Gives $SI = \frac{6250 \times 8 \times 4}{100} = \text{Rs. } 2,000$; amount would be $8,250 \neq 8,750$.
- **C – 6 years:** Gives $SI = \text{Rs. } 3,000$; amount would be $9,250 \neq 8,750$.
- **D – 7 years:** Gives $SI = \text{Rs. } 3,500$; amount would be $9,750 \neq 8,750$.

Answer: (B) 5 years

Answer: (B) [Go Back to Q4](#)



Solution to Q5

Ratio & Proportion / Mixture

Solution

Concept: When water is added to a mixture, the quantity of milk stays constant. Set up an equation using the new required ratio after addition.

Step 1 — Find the initial quantities.

Total solution = 60 litres; milk to water ratio = 7 : 3; total parts = 10.

$$\text{Milk} = \frac{7}{10} \times 60 = 42 \text{ litres}, \quad \text{Water} = \frac{3}{10} \times 60 = 18 \text{ litres}$$

Step 2 — Set up the equation.

Let x litres of water be added. The new ratio of milk to water must be 3 : 2:

$$\frac{42}{18 + x} = \frac{3}{2}$$

Step 3 — Solve for x .

$$2 \times 42 = 3 \times (18 + x) \implies 84 = 54 + 3x \implies 3x = 30 \implies x = 10 \text{ litres}$$

Verification: New mixture: 42 litres milk, $18 + 10 = 28$ litres water. Ratio = $42 : 28 = 3 : 2$.
✓

Why the other options are wrong:

- **A – 5 litres:** Ratio would become 42 : 23, which does not equal 3 : 2.
- **B – 8 litres:** Ratio would become $42 : 26 = 21 : 13 \neq 3 : 2$.
- **D – 12 litres:** Ratio would become $42 : 30 = 7 : 5 \neq 3 : 2$.

Answer: (C) 10 litres

Answer: (C) [Go Back to Q5](#)

Solution to Q6

Time & Work / Efficiency

Solution

Concept: If A is k times as efficient as B, A's rate of work is k times B's rate. Their combined rate equals the sum of individual rates.

Step 1 — Express rates in terms of B's rate.

Let B alone take b days to complete the job, so B's rate = $\frac{1}{b}$ job/day.



Since A is three times as efficient as B:

$$\text{A's rate} = \frac{3}{b} \text{ job/day}$$

Step 2 — Use the combined time to find b .

Together they finish in 6 days, so their combined rate = $\frac{1}{6}$ job/day:

$$\frac{3}{b} + \frac{1}{b} = \frac{1}{6} \implies \frac{4}{b} = \frac{1}{6} \implies b = 4 \times 6 = \mathbf{24 \text{ days}}$$

Verification: A alone takes $b/3 = 24/3 = 8$ days. Combined rate = $\frac{1}{8} + \frac{1}{24} = \frac{3}{24} + \frac{1}{24} = \frac{4}{24} = \frac{1}{6}$. ✓

Why the other options are wrong:

- **A – 18 days:** Assumes the combined time is simply B's time divided by total efficiency factor ($6 \times 3 = 18$); ignores A's contribution properly.
- **B – 20 days:** Does not satisfy the combined-rate equation $\frac{4}{b} = \frac{1}{6}$.
- **C – 22 days:** Does not satisfy the equation; a rounding approximation with no algebraic basis.

Answer: (D) 24 days

Answer: (D) [Go Back to Q6](#)

Solution to Q7

Speed & Distance / Average Speed

Solution

Concept: When the same distance is covered at two different speeds u and v , the average speed for the entire round trip is the *harmonic mean*: $\bar{v} = \frac{2uv}{u+v}$.

Step 1 — Identify the two speeds.

$$u = 60 \text{ km/h (P to Q),} \quad v = 40 \text{ km/h (Q to P)}$$

Step 2 — Apply the harmonic mean formula.

$$\bar{v} = \frac{2 \times 60 \times 40}{60 + 40} = \frac{4,800}{100} = \mathbf{48 \text{ km/h}}$$



Verification using actual distance: Let the one-way distance be d km.

$$\text{Total time} = \frac{d}{60} + \frac{d}{40} = \frac{2d + 3d}{120} = \frac{5d}{120} = \frac{d}{24}$$

$$\text{Average speed} = \frac{2d}{d/24} = 48 \text{ km/h} \checkmark$$

Why the other options are wrong:

- **B – 50 km/h:** The arithmetic mean $(60 + 40)/2 = 50$ is incorrect for average speed over the same distance at two different speeds; the harmonic mean applies.
- **C – 52 km/h:** Has no algebraic basis for this problem.
- **D – 54 km/h:** Likely from a weighted mean error; does not satisfy the time equation.

Answer: (A) 48 km/h

Answer: (A) [Go Back to Q7](#)

Solution to Q8

Compound Interest / Semi-annual Compounding

Solution

Concept: When interest is compounded semi-annually, the annual rate is halved and the number of periods is doubled. Formula: $A = P \left(1 + \frac{R/2}{100} \right)^{2n}$, where n is the number of years.

Step 1 — Identify parameters.

$$P = \text{Rs. } 16,000, \quad R = 10\% \text{ p.a.,} \quad n = 1 \text{ year}$$

Semi-annual rate = $10/2 = 5\%$; number of periods = $2 \times 1 = 2$.

Step 2 — Calculate the amount.

$$A = 16,000 \times \left(1 + \frac{5}{100} \right)^2 = 16,000 \times (1.05)^2 = 16,000 \times 1.1025 = \text{Rs. } 17,640$$

Step 3 — Calculate Compound Interest.

$$\text{CI} = A - P = 17,640 - 16,000 = \text{Rs. } 1,640$$

Note: Simple Interest for 1 year at 10% would be $\frac{16000 \times 10 \times 1}{100} = \text{Rs. } 1,600$. The extra Rs. 40



is the interest on the first half-year's interest.

Why the other options are wrong:

- **A – Rs. 1,600:** This is the Simple Interest (or annual compounding CI) for 1 year at 10%; it ignores the benefit of semi-annual compounding.
- **C – Rs. 1,660:** Does not arise from any standard computation; a rounding or calculation error.
- **D – Rs. 1,680:** Corresponds to approximately 10.5% annual effective rate, not 10% compounded semi-annually.

Answer: (B) Rs. 1,640

Answer: (B) [Go Back to Q8](#)

Answer Key

Q	Ans	Q	Ans	Q	Ans	Q	Ans	Q	Ans
1	C	2	D	3	A	4	B	5	C
6	D	7	A	8	B				

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