MH CET LAW Basic Mathematics
Sample Paper – 1

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 are based on Class 10 level 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, or electronic gadgets is **strictly prohibited**.

Questions

Q1. Find the least number that when divided by 12, 18, and 24 leaves a remainder of 7 in each case.

A. 79

B. 67

C. 71

D. 83

Q2. A shopkeeper marks up the price of an article by 40% over its cost price and then offers a 15% discount on the marked price. What is his overall percentage profit?

A. 17%

B. 19%

C. 21%

D. 25%

Q3. Rajan buys two pens for Rs. 120 each. He sells the first pen at a 20% profit and the second pen at a 20% loss. What is his net percentage gain or loss on the whole transaction?

A. 4% gain

B. 2% gain

C. No profit, no loss

D. 2% loss

Q4. A sum of Rs. $5{,}000$ amounts to Rs. $6{,}500$ in 4 years under simple interest. Find the rate of interest per annum.

A. 6%

B. 6.5%

C. 7%

D. 7.5%

Q5. Divide Rs. 630 among A, B, and C in the ratio $3 : 2 : 2$. How much does A get?

A. Rs. 270

B. Rs. 180

C. Rs. 210

D. Rs. 240

Q6. A can complete a job in 12 days and B can complete the same job in 18 days. Working together, in how many days will they complete the job?

A. 6 days

B. 7.2 days

C. 8 days

D. 9 days

Q7. A train 120 m long passes a stationary pole in 6 seconds. How long will it take to pass a platform 480 m long?

A. 24 sec

B. 28 sec

C. 30 sec

D. 36 sec

Q8. Find the compound interest on Rs. $8{,}000$ at 10% per annum for 2 years, compounded annually.

A. Rs. $1{,}600$

B. Rs. $1{,}640$

C. Rs. $1{,}660$

D. Rs. $1{,}680$

Detailed Solutions

Solution to Q1

Number System / LCM

Solution

Concept: The smallest number leaving the same remainder r when divided by a, b, c is $\text{LCM}(a, b, c) + r$.

Step 1 — Find the LCM of 12, 18, and 24.

Prime factorisations:

$$12 = 2^2 \times 3, \quad 18 = 2 \times 3^2, \quad 24 = 2^3 \times 3$$

$$\text{LCM} = 2^3 \times 3^2 = 8 \times 9 = 72$$

Step 2 — Add the remainder.

$$\text{Required number} = 72 + 7 = \mathbf{79}$$

Why the other options are wrong:

- **B – 67:** $67 = 72 - 5$; does not leave remainder 7 when divided by 12, 18, or 24.
- **C – 71:** $71 = 72 - 1$; leaves remainder 1, not 7.
- **D – 83:** $83 = 72 + 11$; leaves remainder 11, not 7.

Answer: (A) 79

Answer: (A) Go Back to Q1

Solution to Q2

Percentage / Discount

Solution

Concept: Successive percentage changes: if a value is increased by $x\%$ then decreased by $y\%$, the net change is $x - y - \frac{xy}{100}$ percent.

Step 1 — Set Cost Price (CP) = Rs. 100.

Marked Price (MP) after 40% mark-up:

$$\text{MP} = 100 \times 1.40 = \text{Rs. } 140$$

Step 2 — Apply 15% discount on MP.

$$\text{SP} = 140 \times (1 - 0.15) = 140 \times 0.85 = \text{Rs. } 119$$

Step 3 — Calculate profit percentage.

$$\text{Profit \%} = \frac{\text{SP} - \text{CP}}{\text{CP}} \times 100 = \frac{119 - 100}{100} \times 100 = \mathbf{19\%}$$

Why the other options are wrong:

- **A – 17%:** Incorrectly subtracts $40 - 15 - \frac{40 \times 15}{100} = 19$; a common arithmetic slip gives 17 if the formula is mis-applied.
- **C – 21%:** Arises from adding instead of subtracting the discount effect.
- **D – 25%:** Simply the difference $40 - 15 = 25$; ignores the multiplicative interaction.

Answer: (B) 19%

Answer: (B) Go Back to Q2

Solution to Q3

Profit & Loss

Solution

Concept: When the same percentage is used for profit on one item and loss on another, the gains and losses cancel exactly if the cost prices are equal.

Step 1 — Calculate selling prices.

$$\text{SP}_1 = 120 \times 1.20 = \text{Rs. } 144 \quad (\text{20\% profit on pen 1})$$

$$\text{SP}_2 = 120 \times 0.80 = \text{Rs. } 96 \quad (\text{20\% loss on pen 2})$$

Step 2 — Compare total CP and total SP.

$$\text{Total CP} = 120 + 120 = \text{Rs. } 240$$

$$\text{Total SP} = 144 + 96 = \text{Rs. } 240$$

$$\text{Net result} = 240 - 240 = \text{Rs. } 0 \implies \text{No profit, no loss}$$

Why the other options are wrong:

- **A – 4% gain:** A common misconception; the $\pm 20\%$ cancels only when CPs are

equal.

- **B – 2% gain:** Incorrect partial calculation.
- **D – 2% loss:** The formula $\left(\frac{x}{10}\right)^2\%$ loss applies when selling prices (not cost prices) are equal; here CPs are equal so there is no net loss.

Answer: (C) No profit, no loss

Answer: (C) Go Back to Q3

Solution to Q4

Simple Interest

Solution

Concept: Simple Interest formula: $\text{SI} = \dfrac{P \times R \times T}{100}$, where P = principal, R = rate % p.a., T = time in years.

Step 1 — Find the Simple Interest earned.

$$\text{SI} = \text{Amount} - \text{Principal} = 6500 - 5000 = \text{Rs. } 1500$$

Step 2 — Solve for the rate R.

$$1500 = \frac{5000 \times R \times 4}{100} \implies R = \frac{1500 \times 100}{5000 \times 4} = \frac{150000}{20000} = \mathbf{7.5\%}$$

Why the other options are wrong:

- **A – 6%:** Gives SI $= \frac{5000 \times 6 \times 4}{100} = \text{Rs. } 1200 \neq 1500$.
- **B – 6.5%:** Gives SI $= \text{Rs. } 1300 \neq 1500$.
- **C – 7%:** Gives SI $= \text{Rs. } 1400 \neq 1500$.

Answer: (D) 7.5%

Answer: (D) Go Back to Q4

Solution to Q5

Ratio & Proportion

Solution

Concept: To divide an amount in the ratio $a : b : c$, find the total parts and multiply each

share by $\dfrac{\text{amount}}{\text{total parts}}$.

Step 1 — Find total parts.

$$\text{Total parts} = 3 + 2 + 2 = 7$$

Step 2 — Calculate A's share.

$$A\text{'s share} = \frac{3}{7} \times 630 = 3 \times 90 = \text{Rs. } \mathbf{270}$$

(For reference: $B = \frac{2}{7} \times 630 = \text{Rs. } 180$; $C = \frac{2}{7} \times 630 = \text{Rs. } 180$; Total $= 270 + 180 + 180 = 630$. ✓)

Why the other options are wrong:

- **B – Rs. 180:** This is B's (or C's) share, not A's.
- **C – Rs. 210:** Would arise if the ratio were $3 : 2 : 1$ (6 total parts); not the case here.
- **D – Rs. 240:** Incorrect; no ratio combination of $3 : 2 : 2$ on Rs. 630 yields 240 for A.

Answer: (A) Rs. 270

Answer: (A) Go Back to Q5

Solution to Q6

Time & Work

Solution

Concept: If A completes a job in m days and B in n days, together they complete $\dfrac{1}{m} + \dfrac{1}{n}$ of the job per day, so they finish in $\dfrac{mn}{m+n}$ days.

Step 1 — Find combined work rate per day.

$$\text{Work per day} = \frac{1}{12} + \frac{1}{18} = \frac{3}{36} + \frac{2}{36} = \frac{5}{36}$$

Step 2 — Find number of days to complete the job.

$$\text{Days} = \frac{1}{\frac{5}{36}} = \frac{36}{5} = \mathbf{7.2} \text{ days}$$

Why the other options are wrong:

- **A – 6 days:** Would require a combined rate of $\frac{1}{6}$; here the rate is $\frac{5}{36} < \frac{1}{6}$.
- **C – 8 days:** Arises from incorrectly averaging the two times: $(12 + 18)/2 = 15$; even then, 15 is not 8.
- **D – 9 days:** A common mis-application of the harmonic mean formula.

Answer: (B) 7.2 days

Answer: (B) Go Back to Q6

Solution to Q7

Speed & Distance

Solution

Concept: To cross a stationary object of length L_o, a train of length L_t must travel a total distance of $L_t + L_o$ at its speed v.

Step 1 — Find the speed of the train.

The train covers its own length (120 m) while passing the pole:

$$v = \frac{120 \text{ m}}{6 \text{ s}} = 20 \text{ m/s}$$

Step 2 — Find time to pass the platform.

Total distance to cover $= 120 + 480 = 600$ m:

$$t = \frac{600 \text{ m}}{20 \text{ m/s}} = \textbf{30 seconds}$$

Why the other options are wrong:

- **A – 24 sec:** Considers only the platform length $(480/20 = 24)$ and ignores the train's own length.
- **B – 28 sec:** Arithmetic error in the total distance.
- **D – 36 sec:** Over-counts the distance; perhaps adds the pole distance twice.

Answer: (C) 30 sec

Answer: (C) Go Back to Q7

Solution to Q8

Compound Interest

Solution

Concept: Compound Interest formula: $A = P\left(1 + \frac{R}{100}\right)^n$; $\text{CI} = A - P$.

Step 1 — Calculate the amount after 2 years.

$$A = 8000 \times \left(1 + \frac{10}{100}\right)^2 = 8000 \times (1.1)^2 = 8000 \times 1.21 = \text{Rs. } 9{,}680$$

Step 2 — Calculate Compound Interest.

$$\text{CI} = A - P = 9680 - 8000 = \text{Rs. } \mathbf{1{,}680}$$

Note: Simple Interest for 2 years would be $\frac{8000 \times 10 \times 2}{100} = \text{Rs. } 1600$. The extra Rs. 80 is interest on first-year interest.

Why the other options are wrong:

- **A – Rs. 1,600:** This is the Simple Interest (not compound) for 2 years.
- **B – Rs. 1,640:** Incorrect; does not correspond to any standard computation at 10% for 2 years.
- **C – Rs. 1,660:** A partial or rounding error in computing $(1.1)^2$.

Answer: (D) Rs. 1,680

Answer: (D) Go Back to Q8

Answer Key

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

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