AISSEE Mathematics

Sample Paper – 4

Duration: 60 Minutes **Maximum Marks: 150**

Instructions

- This paper contains **50** Multiple Choice Questions (Single Correct Answer), modelled on the Mathematics portion of **AISSEE** (All India Sainik School Entrance Examination) for Class 6.
- Each correct answer carries **+3 marks**. There is **no negative marking** for incorrect or unattempted answers.
- Only **one** option is correct. Choose carefully.
- Syllabus level: **Class 5 (NCERT/CBSE) — Number System, Fractions, Decimals, LCM & HCF, Percentage, Profit & Loss, Ratio & Proportion, Simple Interest, Geometry, Mensuration, Data Handling.**
- Use of mobile phones, calculators, or electronic gadgets is strictly prohibited. Use the space in the question paper for rough work.

Q1. What is the **predecessor** of $10{,}00{,}001$?

(A) $9{,}99{,}999$

(B) $10{,}00{,}000$

(C) $10{,}00{,}002$

(D) $10{,}01{,}000$

Q2. Which of the following is the **greatest** number?

(A) $47{,}83{,}219$

(B) $47{,}85{,}193$

(C) $47{,}85{,}312$

(D) $47{,}84{,}321$

Q3. Write $3{,}72{,}15{,}648$ in the **International number system** (inserting commas every 3 digits from the right).

(A) $37{,}215{,}648$

(B) $3{,}721{,}5648$

(C) $372{,}15{,}648$

(D) $3{,}72{,}15{,}648$

Q4. The Roman numeral **XCIX** represents which number in Hindu-Arabic numerals?

(A) 89

(B) 94

(C) 101

(D) 99

Q5. Find the **next term** in the pattern: $4,\ 8,\ 16,\ 32,\ \_\_\_\_\_$

(A) 36

(B) 64

(C) 48

(D) 128

Q6. How many **prime numbers** lie between 30 and 50?

(A) 5

(B) 4

(C) 6

(D) 3

Q7. Which of the following numbers is **divisible by 8**?

(A) $5{,}234$

(B) $4{,}314$

(C) $6{,}248$

(D) $3{,}156$

Q8. Evaluate using **BODMAS**: $36 \div 6 + 4 \times 3 - 7$

(A) 7

(B) 9

(C) 13

(D) 11

Q9. Find the value of $\frac{3}{7} \times \frac{14}{9}$.

(A) $\frac{2}{3}$

(B) $\frac{3}{7}$

(C) $\frac{2}{9}$

(D) $\frac{1}{3}$

Q10. Find the value of $\frac{5}{6} \div \frac{5}{3}$.

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

(B) $\frac{5}{18}$

(C) $\frac{1}{2}$

(D) $\frac{25}{18}$

Q11. What **fraction** of 40 is 24?

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

(B) $\frac{3}{5}$

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

(D) $\frac{7}{10}$

Q12. Which of the following is **NOT** equivalent to $\frac{3}{4}$?

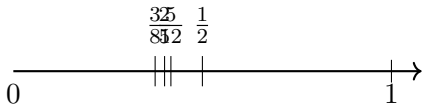
(A) $\frac{6}{8}$

(B) $\frac{9}{12}$

(C) $\frac{15}{20}$

(D) $\frac{8}{14}$

Q13. The number line below shows four fractions. Arrange $\frac{3}{8}$, $\frac{2}{5}$, $\frac{5}{12}$, $\frac{1}{2}$ in **ascending order**.



(A) $\frac{3}{8} < \frac{2}{5} < \frac{5}{12} < \frac{1}{2}$

(B) $\frac{2}{5} < \frac{3}{8} < \frac{5}{12} < \frac{1}{2}$

(C) $\frac{5}{12} < \frac{3}{8} < \frac{2}{5} < \frac{1}{2}$

(D) $\frac{1}{2} < \frac{5}{12} < \frac{2}{5} < \frac{3}{8}$

Q14. Evaluate: $4\frac{1}{3} - 1\frac{5}{6}$

(A) 2

(B) $2\frac{1}{3}$

(C) $2\frac{1}{2}$

(D) 3

Q15. Find the value of 2.4×3.5.

(A) 7.4

(B) 8.4

(C) 9.4

(D) 84

Q16. Arrange in **descending order**: $4.22,\ 4.2,\ 4.02,\ 4.002$

(A) $4.22,\ 4.2,\ 4.02,\ 4.002$

(B) $4.2,\ 4.22,\ 4.02,\ 4.002$

(C) $4.02,\ 4.2,\ 4.22,\ 4.002$

(D) $4.002,\ 4.02,\ 4.2,\ 4.22$

Q17. Express $\frac{3}{8}$ as a **percentage**.

(A) 30%

(B) 37.5%

(C) 33.33%

(D) 40%

Q18. Decrease 500 by 12%.

(A) 488

(B) 460

(C) 450

(D) 440

Q19. A shopkeeper buys goods for Rs. 750 and sells them for Rs. 675. What is his **loss percentage**?

(A) 5%

(B) 8%

(C) 10%

(D) 12%

Q20. An article is sold for Rs. 880 at a gain of 10%. Find the **cost price**.

(A) Rs. 800

(B) Rs. 840

(C) Rs. 860

(D) Rs. 900

Q21. Two successive discounts of 20% and 10% are given on an article with MRP Rs. 1000. Find the **selling price**.

(A) Rs. 700

(B) Rs. 720

(C) Rs. 750

(D) Rs. 800

Q22. A trader marks his goods 25% above the cost price of Rs. 400. Find the **marked price**.

(A) Rs. 420

(B) Rs. 450

(C) Rs. 480

(D) Rs. 500

Q23. A shopkeeper buys 3 items at Rs. 200 each and sells all three for Rs. 660. Find the **profit percentage**.

(A) 5%

(B) 8%

(C) 10%

(D) 15%

Q24. Find the **HCF** of 60, 90, and 120.

(A) 30

(B) 15

(C) 20

(D) 60

Q25. Find the **LCM** of 18 and 27.

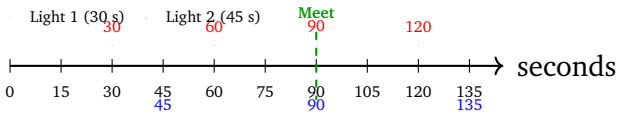
(A) 9

(B) 18

(C) 36

(D) 54

Q26. Two traffic lights at a crossing change every 30 seconds and 45 seconds respectively. They change together at time $t = 0$. After how many seconds do they **next change together**?



(A) 75 s

(B) 90 s

(C) 120 s

(D) 135 s

Q27. Two numbers whose HCF is 1 are called **co-prime**. The HCF of any two co-prime numbers is always:

(A) 0

(B) Their product

(C) 1

(D) Their LCM

Q28. The HCF of two numbers is 6 and their product is 288. Find their **LCM**.

(A) 48

(B) 36

(C) 24

(D) 72

Q29. Two **supplementary angles** are in the ratio $2 : 7$. Find the measure of the **larger angle**.

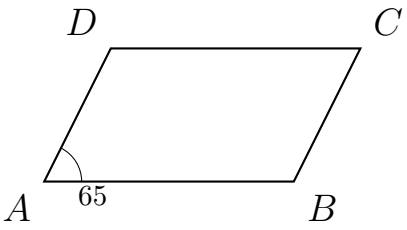
(A) 35

(B) 60

(C) 105

(D) 140

Q30. One angle of a **parallelogram** is 65. Find the measure of its **adjacent angle**.



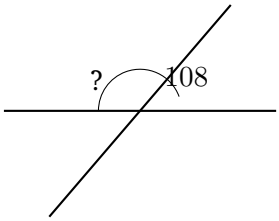
(A) 65

(B) 115

(C) 90

(D) 45

Q31. Two straight lines intersect and one of the angles formed is 108. Find the **adjacent angle**.



(A) 108

(B) 90

(C) 72

(D) 36

Q32. In an **isosceles triangle**, one of the base angles measures 55. Find the **apex angle**.

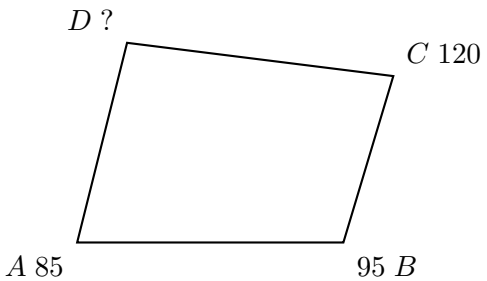
(A) 70

(B) 55

(C) 80

(D) 110

Q33. Three angles of a **quadrilateral** are 85, 95, and 120. Find the **fourth angle**.



(A) 50

(B) 60

(C) 70

(D) 80

Q34. Which of the following is a **reflex angle**?

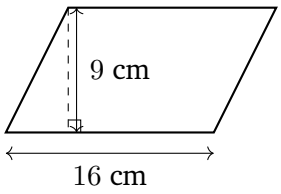
(A) 45

(B) 90

(C) 135

(D) 270

Q35. Find the **area** of a parallelogram with base 16 cm and height 9 cm.



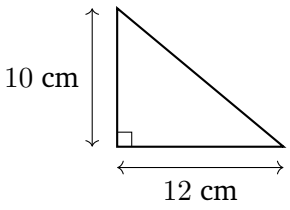
(A) 100 cm^2

(B) 128 cm^2

(C) 144 cm^2

(D) 160 cm^2

Q36. Find the **area** of the right-angled triangle shown below.



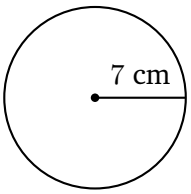
(A) 60 cm^2

(B) 70 cm^2

(C) 80 cm^2

(D) 120 cm^2

Q37. Find the **circumference** of the circle shown below. $\left(\pi = \frac{22}{7}\right)$



(A) 22 cm

(B) 44 cm

(C) 66 cm

(D) 154 cm

Q38. Find the **area** of a circle with radius 7 cm. $\left(\pi = \frac{22}{7}\right)$

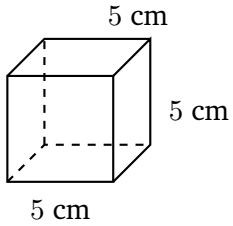
(A) 44 cm^2

(B) 88 cm^2

(C) 132 cm^2

(D) 154 cm^2

Q39. Find the **volume** of the cube shown below.



(A) 125 cm^3

(B) 75 cm^3

(C) 150 cm^3

(D) 216 cm^3

Q40. Two identical squares, each with side 6 cm, are joined along one full side. Find the **perimeter** of the combined shape.

(A) 24 cm

(B) 30 cm

(C) 36 cm

(D) 48 cm

Q41. Find the **mean proportional** between 4 and 16.

(A) 4

(B) 6

(C) 10

(D) 8

Q42. If 6 pencils cost Rs. 54, find the cost of 9 pencils.

(A) Rs. 72

(B) Rs. 81

(C) Rs. 90

(D) Rs. 108

Q43. A train travels 315 km at a speed of 90 km/h. How long does the journey take?

(A) 3.5 h

(B) 4 h

(C) 4.5 h

(D) 5 h

Q44. Rs. 2100 is divided among three persons in the ratio $2 : 3 : 2$. Find the **share of the middle person**.

(A) Rs. 600

(B) Rs. 700

(C) Rs. 900

(D) Rs. 1050

Q45. If 4 pipes can fill a tank in 45 minutes, how long will 6 pipes take to fill the same tank?

(A) 20 min

(B) 30 min

(C) 40 min

(D) 60 min

Q46. Find the **amount** when Principal $=$ Rs. 4000, Rate $= 7.5\%$ p.a., Time $= 2$ years.

(A) Rs. 4600

(B) Rs. 4500

(C) Rs. 4800

(D) Rs. 5000

Q47. Simple Interest $=$ Rs. 480, Rate $= 8\%$ p.a., Time $= 5$ years. Find the **Principal**.

(A) Rs. 800

(B) Rs. 960

(C) Rs. 1000

(D) Rs. 1200

Q48. Find the **mode** of the data set: $7,\ 12,\ 7,\ 15,\ 7,\ 12,\ 9,\ 15,\ 7$.

(A) 9

(B) 7

(C) 12

(D) 15

Q49. Find the **median** of: $13,\ 5,\ 9,\ 17,\ 3,\ 21,\ 7$.

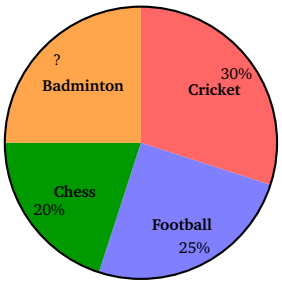
(A) 9

(B) 11

(C) 13

(D) 17

Q50. A pie chart shows the favourite sports of students in a class. Cricket: 30%, Football: 25%, Chess: 20%, Badminton: rest. What percentage of students like **Badminton**?



(A) 30%

(B) 20%

(C) 25%

(D) 15%

Detailed Solutions

Q1.

Solution

Concept — Number System:

The **predecessor** of a number is the number that comes just before it; obtained by subtracting 1.

Solution:

Predecessor of $10{,}00{,}001 = 10{,}00{,}001 - 1 = \mathbf{10{,}00{,}000}$

Why other options are wrong:

- **Option A:** $9{,}99{,}999$ is obtained by subtracting 2; it is the predecessor of $10{,}00{,}000$, not $10{,}00{,}001$.
- **Option B:** Correct.
- **Option C:** $10{,}00{,}002$ is the *successor*, not predecessor.
- **Option D:** $10{,}01{,}000$ differs by 999 from the given number.

Final Answer: Predecessor of $10{,}00{,}001$ is $10{,}00{,}000 \Rightarrow$ **(B)**

Answer: (B) ↑ Go back to Q 1

Q2.

Solution

Concept — Ordering Numbers:

Compare digits place by place from the leftmost digit.

Solution:

All four numbers start with 47. Compare the next digits: $47{,}83{,}219$ — third digit pair: 83; $47{,}85{,}193$ — 85; $47{,}85{,}312$ — 85; $47{,}84{,}321$ — 84.

Among those starting with $47{,}85$: compare $47{,}85{,}193$ vs $47{,}85{,}312$. Third pair: $1 < 3$, so $47{,}85{,}312 > 47{,}85{,}193$.

Greatest $= \mathbf{47{,}85{,}312}$.

Why other options are wrong:

- **Option A:** $47{,}83{,}219$ — third digit-group $83 < 85$; not greatest.
- **Option B:** $47{,}85{,}193 < 47{,}85{,}312$.
- **Option C:** Correct.
- **Option D:** $47{,}84{,}321$ — third digit-group $84 < 85$; not greatest.

Final Answer: Greatest number is $47{,}85{,}312 \Rightarrow$ **(C)**

Answer: (C) ↑ Go back to Q 2

Solution

Concept — International Number System:

In the International system, commas are placed after every 3 digits from the right (ones, thousands, millions, ...).

Solution:

3,72,15,648 (Indian) $\rightarrow$ strip commas $\rightarrow$ 37215648 $\rightarrow$ insert international commas: **37,215,648**.

Why other options are wrong:

Q3.

- **Option A:** Correct.
- **Option B:** 3,721,5648 — last group has 4 digits, invalid.
- **Option C:** 372,15,648 — second group has only 2 digits.
- **Option D:** 3,72,15,648 is the Indian system form, not International.

Final Answer: International form is 37,215,648 $\Rightarrow$ **(A)**

Answer: (A) ↑ Go back to Q 3

Solution

Concept — Roman Numerals:

X before C means $C - X = 90$; I before X means $X - I = 9$. So $XC = 90$, $IX = 9$.

Solution:

XCIX = XC + IX = $90 + 9 = $ **99**

Why other options are wrong:

Q4.

- **Option A:** 89 = LXXXIX, not XCIX.
- **Option B:** 94 = XCIV, not XCIX.
- **Option C:** 101 = CI, not XCIX.
- **Option D:** Correct.

Final Answer: XCIX = 99 $\Rightarrow$ **(D)**

Answer: (D) ↑ Go back to Q 4

Solution

Concept — Geometric Sequence:

Each term is multiplied by the common ratio r. Here $8/4 = 2$, so $r = 2$.

Solution:

$4,\ 8,\ 16,\ 32,\ 32 \times 2 =$ **64**

Why other options are wrong:

Q5.

- **Option A:** 36 — adds 4 each time (arithmetic, not geometric).
- **Option B:** Correct.
- **Option C:** 48 — adds 16; incorrect ratio.
- **Option D:** 128 would be the term after 64, not the next term.

Final Answer: Next term $= 64 \Rightarrow$ **(B)**

Answer: (B) ↑ Go back to Q 5

Solution

Concept — Prime Numbers:

A prime number has exactly two factors: 1 and itself.

Solution:

Primes between 30 and 50: $31, 37, 41, 43, 47$ — that is **5** primes.

($32 = 2^5$; $33 = 3 \times 11$; 34, 35, 36, 38, 39, 40, 42, 44, 45, 46, 48, 49 are all composite.)

Why other options are wrong:

Q6.

- **Option A:** Correct.
- **Option B:** 4 would omit one prime; list has 5.
- **Option C:** 6 overcounts; there are only 5.
- **Option D:** 3 undercounts the list.

Final Answer: 5 prime numbers $\Rightarrow$ **(A)**

Answer: (A) ↑ Go back to Q 6

Solution

Concept — Divisibility by 8:

A number is divisible by 8 if its last three digits form a number divisible by 8.

Solution:

$234 \div 8 = 29.25$ (No); $314 \div 8 = 39.25$ (No); $248 \div 8 = 31$ ✓; $156 \div 8 = 19.5$ (No).

So **6,248** is divisible by 8.

Why other options are wrong:

Q7.

- **Option A:** $234 \div 8$ is not a whole number.
- **Option B:** $314 \div 8$ is not a whole number.
- **Option C:** Correct.
- **Option D:** $156 \div 8$ is not a whole number.

Final Answer: 6,248 is divisible by 8 $\Rightarrow$ **(C)**

Answer: (C) ↑ Go back to Q 7

Solution

Concept — BODMAS:

Order: Brackets $\rightarrow$ Division $\rightarrow$ Multiplication $\rightarrow$ Addition $\rightarrow$ Subtraction.

Solution:

$36 \div 6 + 4 \times 3 - 7$

$= 6 + 12 - 7$ (Division and Multiplication first)

$= 18 - 7 = \mathbf{11}$

Why other options are wrong:

Q8.

- **Option A:** 7 — results from wrong order, e.g. adding before dividing.
- **Option B:** 9 — another incorrect order of operations.
- **Option C:** 13 — likely computed $36 \div 6 + 4 \times 3 - 7 + 2$ or similar error.
- **Option D:** Correct.

Final Answer: $36 \div 6 + 4 \times 3 - 7 = 11 \Rightarrow$ **(D)**

Answer: (D) ↑ Go back to Q 8

Solution

Concept — Multiplication of Fractions:

Multiply numerators together and denominators together, then simplify.

Solution:

$$\frac{3}{7} \times \frac{14}{9} = \frac{3 \times 14}{7 \times 9} = \frac{42}{63} = \frac{42 \div 21}{63 \div 21} = \mathbf{\frac{2}{3}}$$

Why other options are wrong:

Q9.

- **Option A:** Correct.
- **Option B:** $\frac{3}{7}$ — the first fraction itself, not the product.
- **Option C:** $\frac{2}{9}$ — forgetting to cancel the 7 properly.
- **Option D:** $\frac{1}{3}$ — incorrect cancellation.

Final Answer: $\frac{3}{7} \times \frac{14}{9} = \frac{2}{3} \Rightarrow$ **(A)**

Answer: (A) ↑ Go back to Q 9

Solution

Concept — Division of Fractions:

To divide by a fraction, multiply by its reciprocal: $\frac{a}{b} \div \frac{c}{d} = \frac{a}{b} \times \frac{d}{c}$.

Solution:

$\frac{5}{6} \div \frac{5}{3} = \frac{5}{6} \times \frac{3}{5} = \frac{15}{30} = \mathbf{\frac{1}{2}}$

Why other options are wrong:

Q10.

- **Option A:** $\frac{5}{2}$ — multiplied instead of dividing (did not flip the second fraction).
- **Option B:** $\frac{5}{18}$ — multiplied without flipping: $\frac{5}{6} \times \frac{5}{3} = \frac{25}{18}$; closest wrong answer.
- **Option C:** Correct.
- **Option D:** $\frac{25}{18}$ — same as the direct product error.

Final Answer: $\frac{5}{6} \div \frac{5}{3} = \frac{1}{2} \Rightarrow$ **(C)**

Answer: (C) ↑ Go back to Q 10

Solution

Concept — Fraction of a Quantity:

"What fraction of X is Y?" $= \frac{Y}{X}$, simplified.

Solution:

$\frac{24}{40} = \frac{24 \div 8}{40 \div 8} = \mathbf{\frac{3}{5}}$

Why other options are wrong:

Q11.

- **Option A:** $\frac{2}{5} = \frac{16}{40} \neq \frac{24}{40}$.
- **Option B:** Correct.
- **Option C:** $\frac{4}{5} = \frac{32}{40} \neq \frac{24}{40}$.
- **Option D:** $\frac{7}{10} = \frac{28}{40} \neq \frac{24}{40}$.

Final Answer: $\frac{24}{40} = \frac{3}{5} \Rightarrow$ **(B)**

Answer: (B) ↑ Go back to Q 11

Solution

Concept — Equivalent Fractions:

Two fractions are equivalent if they reduce to the same value.

Solution:

$\frac{3}{4}$ in lowest terms. Check each option: $\frac{6}{8} = \frac{3}{4}$ ✓; $\frac{9}{12} = \frac{3}{4}$ ✓; $\frac{15}{20} = \frac{3}{4}$ ✓; $\frac{8}{14} = \frac{4}{7} \neq \frac{3}{4}$ ×

Why other options are wrong:

Q12.

- **Option A:** $\frac{6}{8} = \frac{3}{4}$ — equivalent; not the answer.
- **Option B:** $\frac{9}{12} = \frac{3}{4}$ — equivalent; not the answer.
- **Option C:** $\frac{15}{20} = \frac{3}{4}$ — equivalent; not the answer.
- **Option D:** Correct — $\frac{8}{14} = \frac{4}{7}$, which is NOT equal to $\frac{3}{4}$.

Final Answer: $\frac{8}{14}$ is NOT equivalent to $\frac{3}{4} \Rightarrow$ **(D)**

Answer: (D) ↑ Go back to Q 12

Solution

Concept — Comparing Fractions:

Convert to a common denominator (LCM of 8, 5, 12, 2 = 120).

Solution:

$\frac{3}{8} = \frac{45}{120}, \quad \frac{2}{5} = \frac{48}{120}, \quad \frac{5}{12} = \frac{50}{120}, \quad \frac{1}{2} = \frac{60}{120}$

Ascending order: $45 < 48 < 50 < 60$, i.e. $\frac{3}{8} < \frac{2}{5} < \frac{5}{12} < \frac{1}{2}$.

Why other options are wrong:

Q13.

- **Option A:** Correct.
- **Option B:** Places $\frac{2}{5}$ before $\frac{3}{8}$; but $\frac{48}{120} > \frac{45}{120}$.
- **Option C:** Places $\frac{5}{12}$ first; it is actually third.
- **Option D:** Descending order, not ascending.

Final Answer: $\frac{3}{8} < \frac{2}{5} < \frac{5}{12} < \frac{1}{2} \Rightarrow$ **(A)**

Answer: (A) ↑ Go back to Q 13

Solution

Concept — Subtraction of Mixed Numbers:

Convert to improper fractions, find LCM of denominators, subtract.

Solution:

$4\frac{1}{3} = \frac{13}{3}; \quad 1\frac{5}{6} = \frac{11}{6}$

LCM of 3 and 6 = 6:

$\frac{13}{3} - \frac{11}{6} = \frac{26}{6} - \frac{11}{6} = \frac{15}{6} = \frac{5}{2} = \mathbf{2\frac{1}{2}}$

Why other options are wrong:

Q14.

- **Option A:** 2 — ignores the fractional parts.
- **Option B:** $2\frac{1}{3}$ — uses denominator 3 only, misses LCM step.
- **Option C:** Correct.
- **Option D:** 3 — adds instead of subtracting fractional parts.

Final Answer: $4\frac{1}{3} - 1\frac{5}{6} = 2\frac{1}{2} \Rightarrow$ **(C)**

Answer: (C) ↑ Go back to Q 14

Solution

Concept — Decimal Multiplication:

Multiply as whole numbers, then place the decimal point (total decimal places in both factors).

Solution:

$24 \times 35 = 840$. Total decimal places: $1 + 1 = 2$. So $2.4 \times 3.5 = \mathbf{8.40} = 8.4$.

Why other options are wrong:

Q15.

- **Option A:** 7.4 — arithmetic error in 24×35.
- **Option B:** Correct.
- **Option C:** 9.4 — arithmetic error.
- **Option D:** 84 — forgot to place the decimal point.

Final Answer: $2.4 \times 3.5 = 8.4 \Rightarrow$ **(B)**

Answer: (B) ↑ Go back to Q 15

Solution

Concept — Comparing Decimals:

Compare digit by digit from the left. Larger digit at first differing place $\Rightarrow$ larger number.

Solution:

All start with $4.$. Tenths: 4.22 and 4.2 have tenths digit 2; 4.02 and 4.002 have tenths digit 0.

So $4.22, 4.2 > 4.02 > 4.002$.

Between 4.22 and 4.2: hundredths: 4.22 has 2, 4.20 has 0. So $4.22 > 4.2$.

Descending: $\mathbf{4.22}$, $\mathbf{4.2}$, $\mathbf{4.02}$, $\mathbf{4.002}$.

Why other options are wrong:

Q16.

- **Option A:** Correct.
- **Option B:** Places 4.2 before 4.22; incorrect.
- **Option C:** 4.02 placed first; it is actually third.
- **Option D:** Ascending order, not descending.

Final Answer: Descending: $4.22,\ 4.2,\ 4.02,\ 4.002 \Rightarrow$ **(A)**

Answer: (A) ↑ Go back to Q 16

Solution

Concept — Fraction to Percentage:

$$\text{Percentage} = \frac{\text{numerator}}{\text{denominator}} \times 100.$$

Solution:

$$\frac{3}{8} \times 100 = \frac{300}{8} = 37.5\%$$

Why other options are wrong:

Q17.

- **Option A:** 30% — incorrect calculation.
- **Option B:** Correct.
- **Option C:** 33.33% is $\frac{1}{3}$, not $\frac{3}{8}$.
- **Option D:** $40\% = \frac{2}{5}$, not $\frac{3}{8}$.

Final Answer: $\frac{3}{8} = 37.5\% \Rightarrow$ **(B)**

Answer: (B) ↑ Go back to Q 17

Solution

Concept — Percentage Decrease:

$$\text{Decrease} = \text{Original} \times \frac{\%}{100}.\ \text{New value} = \text{Original} - \text{Decrease}.$$

Solution:

$$\text{Decrease} = 500 \times \frac{12}{100} = 60$$

$$\text{New value} = 500 - 60 = \mathbf{440}$$

Why other options are wrong:

Q18.

- **Option A:** 488 — decreases by only 12 (confused 12% with 12 units).
- **Option B:** 460 — decreases by 40 (used 8%).
- **Option C:** 450 — decreases by 50 (used 10%).
- **Option D:** Correct.

Final Answer: 500 decreased by $12\% = 440 \Rightarrow$ **(D)**

Answer: (D) ↑ Go back to Q 18

Solution

Concept — Loss Percentage:

$$\text{Loss\%} = \frac{\text{CP} - \text{SP}}{\text{CP}} \times 100$$

Solution:

$$\text{Loss} = 750 - 675 = 75$$

$$\text{Loss\%} = \frac{75}{750} \times 100 = \mathbf{10\%}$$

Why other options are wrong:

Q19.

- **Option A:** 5% — would mean loss of Rs. 37.50, not Rs. 75.
- **Option B:** 8% — loss of Rs. 60, not Rs. 75.
- **Option C:** Correct.
- **Option D:** 12% — loss of Rs. 90, not Rs. 75.

Final Answer: Loss $= 10\% \Rightarrow$ **(C)**

Answer: (C) ↑ Go back to Q 19

Solution

Concept — Cost Price from Selling Price:

$$\text{CP} = \frac{\text{SP}}{1 + \frac{\text{Gain\%}}{100}} = \frac{\text{SP} \times 100}{100 + \text{Gain\%}}$$

Solution:

$$\text{CP} = \frac{880 \times 100}{110} = \frac{88000}{110} = \mathbf{Rs.\ 800}$$

Why other options are wrong:

Q20.

- **Option A:** Correct.
- **Option B:** Rs. 840 — subtracting $880 - 40$; incorrect method.
- **Option C:** Rs. 860 — subtracting $880 - 20$; incorrect.
- **Option D:** Rs. 900 — adding 10% instead of computing CP.

Final Answer: CP $=$ Rs. $800 \Rightarrow$ **(A)**

Answer: (A) ↑ Go back to Q 20

Solution

Concept — Successive Discounts:

Apply discounts one after another on the remaining price.

Solution:

After 20% discount: $1000 \times 0.80 = 800$

After 10% discount: $800 \times 0.90 = \mathbf{720}$

(Note: successive discounts of 20% and 10% $\neq$ 30% single discount.)

Why other options are wrong:

Q21.

- **Option A:** Rs. 700 — applied a flat 30% discount $(1000 - 300)$.
- **Option B:** Correct.
- **Option C:** Rs. 750 — applied 25% flat discount.
- **Option D:** Rs. 800 — only the first discount applied.

Final Answer: SP after successive discounts $=$ Rs. $720 \Rightarrow$ **(B)**

Answer: (B) ↑ Go back to Q 21

Solution

Concept — Marked Price:

$$\text{MP} = \text{CP} \times \left(1 + \frac{\text{Mark-up\%}}{100}\right)$$

Solution:

$\text{MP} = 400 \times 1.25 = \mathbf{Rs.\ 500}$

Why other options are wrong:

Q22.

- **Option A:** Rs. 420 — marks up only Rs. 20 (5%).
- **Option B:** Rs. 450 — marks up 12.5%.
- **Option C:** Rs. 480 — marks up 20%.
- **Option D:** Correct.

Final Answer: Marked Price $=$ Rs. $500 \Rightarrow$ **(D)**

Answer: (D) ↑ Go back to Q 22

Solution

Concept — Profit Percentage:

$$\text{Profit\%} = \frac{\text{Total SP} - \text{Total CP}}{\text{Total CP}} \times 100$$

Solution:

$\text{Total CP} = 3 \times 200 = \text{Rs. } 600; \quad \text{Total SP} = \text{Rs. } 660$

$\text{Profit} = 660 - 600 = 60$

$$\text{Profit\%} = \frac{60}{600} \times 100 = \mathbf{10\%}$$

Why other options are wrong:

Q23.

- **Option A:** 5% — profit of only Rs. 30.
- **Option B:** 8% — profit of Rs. 48.
- **Option C:** Correct.

- **Option D:** 15% — profit of Rs. 90.

Final Answer: Profit $= 10\% \Rightarrow$ **(C)**

Answer: (C) ↑ Go back to Q 23

Solution

Concept — HCF (Highest Common Factor):

HCF is the greatest number that divides all given numbers exactly.

Solution:

$60 = 2^2 \times 3 \times 5; \quad 90 = 2 \times 3^2 \times 5; \quad 120 = 2^3 \times 3 \times 5$

HCF $= 2^1 \times 3^1 \times 5^1 =$ **30**

Why other options are wrong:

Q24.

- **Option A:** Correct.
- **Option B:** 15 divides all three but is not the *greatest* such divisor.
- **Option C:** 20 does not divide 90 $(90/20 = 4.5)$.
- **Option D:** 60 does not divide 90 $(90/60 = 1.5)$.

Final Answer: HCF$(60, 90, 120) = 30 \Rightarrow$ **(A)**

Answer: (A) ↑ Go back to Q 24

Solution

Concept — LCM (Least Common Multiple):

LCM is the smallest number divisible by all given numbers.

Solution:

$18 = 2 \times 3^2; \quad 27 = 3^3$

LCM $= 2 \times 3^3 = 2 \times 27 =$ **54**

Check: $54 \div 18 = 3$ ✓; $\quad 54 \div 27 = 2$ ✓

Why other options are wrong:

Q25.

- **Option A:** 9 is the HCF, not LCM.
- **Option B:** 18 is not divisible by 27.
- **Option C:** $36 \div 27$ is not a whole number.
- **Option D:** Correct.

Final Answer: LCM$(18, 27) = 54 \Rightarrow$ **(D)**

Answer: (D) ↑ Go back to Q 25

Solution

Concept — LCM Application (Simultaneous Events):

The two lights change together again after LCM(30, 45) seconds.

Solution:

$30 = 2 \times 3 \times 5; \quad 45 = 3^2 \times 5$

LCM $= 2 \times 3^2 \times 5 =$ **90** seconds

Why other options are wrong:

Q26.

- **Option A:** 75 s — not a multiple of both 30 and 45.
- **Option B:** Correct.
- **Option C:** 120 s — multiple of 30 but not of 45 $(120/45 = 2.67)$.
- **Option D:** 135 s — multiple of 45 but not of 30 $(135/30 = 4.5)$.

Final Answer: They change together after 90 seconds $\Rightarrow$ **(B)**

Answer: (B) ↑ Go back to Q 26

Solution

Concept — Co-prime Numbers:

Two numbers are co-prime (relatively prime) if their only common factor is 1, i.e. HCF $= 1$.

Solution:

By definition, co-prime numbers have HCF $=$ **1**.

Why other options are wrong:

Q27.

- **Option A:** 0 — HCF of any two positive numbers is at least 1.
- **Option B:** Their product — this equals LCM $\times$ HCF; for co-primes LCM $=$ product.
- **Option C:** Correct.
- **Option D:** Their LCM — the LCM of co-primes is their product, not 1.

Final Answer: HCF of co-prime numbers $= 1 \Rightarrow$ **(C)**

Answer: (C) ↑ Go back to Q 27

Solution

Concept — Relationship between HCF, LCM, and Product:

For two numbers: HCF $\times$ LCM $=$ Product of the numbers.

Solution:

$$\text{LCM} = \frac{\text{Product}}{\text{HCF}} = \frac{288}{6} = \mathbf{48}$$

Why other options are wrong:

Q28.

- **Option A:** Correct.
- **Option B:** 36 — $6 \times 36 = 216 \neq 288$.
- **Option C:** 24 — $6 \times 24 = 144 \neq 288$.
- **Option D:** 72 — $6 \times 72 = 432 \neq 288$.

Final Answer: LCM $= 48 \Rightarrow$ **(A)**

Answer: (A) ↑ Go back to Q 28

Solution

Concept — Supplementary Angles:

Supplementary angles sum to 180.

Solution:

Ratio $2 : 7$, total parts $= 9$. Each part $= 180 \div 9 = 20$.

Larger angle $= 7 \times 20 =$ **140**

Why other options are wrong:

Q29.

- **Option A:** 35 — corresponds to ratio part 1.75; inconsistent.
- **Option B:** 60 — the smaller angle if ratio were $1 : 2$ summing to 180.
- **Option C:** 105 — $7/9 \times 135$; uses wrong total.
- **Option D:** Correct.

Final Answer: Larger angle $= 140 \Rightarrow$ **(D)**

Answer: (D) ↑ Go back to Q 29

Solution

Concept — Angles in a Parallelogram:

Adjacent angles of a parallelogram are supplementary (sum to 180).

Solution:

Adjacent angle $= 180 - 65 =$ **115**

Why other options are wrong:

Q30.

- **Option A:** 65 — the opposite angle equals 65, not the adjacent one.
- **Option B:** Correct.
- **Option C:** 90 — only true for rectangles.
- **Option D:** 45 — incorrect; no basis in parallelogram properties.

Final Answer: Adjacent angle $= 115 \Rightarrow$ **(B)**

Answer: (B) ↑ Go back to Q 30

Solution

Concept — Linear Pair of Angles:

Angles on a straight line (linear pair) are supplementary: they sum to 180.

Solution:

Adjacent angle $= 180 - 108 =$ **72**

Why other options are wrong:

Q31.

- **Option A:** 108 — the vertically opposite angle equals 108, not the adjacent.
- **Option B:** 90 — adjacent angles are 90 only when lines are perpendicular.
- **Option C:** Correct.
- **Option D:** 36 — half of 72; no geometric basis here.

Final Answer: Adjacent angle $= 72 \Rightarrow$ **(C)**

Answer: (C) ↑ Go back to Q 31

Solution

Concept — Angle Sum in Isosceles Triangle:

In an isosceles triangle both base angles are equal. All three angles sum to 180.

Solution:

Both base angles $= 55$. Apex angle $= 180 - 55 - 55 =$ **70**

Why other options are wrong:

Q32.

- **Option A:** Correct.
- **Option B:** 55 — this is the base angle, not the apex.
- **Option C:** 80 — $80 + 55 + 55 = 190 \neq 180$.
- **Option D:** 110 — $110 + 55 + 55 = 220 \neq 180$.

Final Answer: Apex angle $= 70 \Rightarrow$ **(A)**

Answer: (A) ↑ Go back to Q 32

Solution

Concept — Angle Sum of a Quadrilateral:

The sum of all interior angles of a quadrilateral $= 360$.

Solution:

Fourth angle $= 360 - (85 + 95 + 120) = 360 - 300 =$ **60**

Why other options are wrong:

Q33.

- **Option A:** 50 — $85 + 95 + 120 + 50 = 350 \neq 360$.
- **Option B:** Correct.
- **Option C:** 70 — $85 + 95 + 120 + 70 = 370 \neq 360$.
- **Option D:** 80 — $85 + 95 + 120 + 80 = 380 \neq 360$.

Final Answer: Fourth angle $= 60 \Rightarrow$ **(B)**

Answer: (B) ↑ Go back to Q 33

Solution

Concept — Types of Angles:

A reflex angle measures more than 180 and less than 360.

Solution:

45 — acute; 90 — right; 135 — obtuse; 270 — **reflex** (between 180 and 360).

Why other options are wrong:

Q34.

- **Option A:** 45 — acute angle (< 90).
- **Option B:** 90 — right angle.
- **Option C:** 135 — obtuse angle ($90 < 135 < 180$).
- **Option D:** Correct — 270 is reflex ($180 < 270 < 360$).

Final Answer: 270 is a reflex angle $\Rightarrow$ **(D)**

Answer: (D) ↑ Go back to Q 34

Solution

Concept — Area of a Parallelogram:

Area $=$ base $\times$ height

Solution:

Area $= 16$ cm $\times 9$ cm $=$ **144 cm^2**

Why other options are wrong:

Q35.

- **Option A:** 100 cm^2 — uses wrong values.
- **Option B:** 128 cm^2 — uses 16×8.
- **Option C:** Correct.
- **Option D:** 160 cm^2 — uses 16×10.

Final Answer: Area $= 144$ cm^2 $\Rightarrow$ **(C)**

Answer: (C) ↑ Go back to Q 35

Solution

Concept — Area of a Triangle:

$$\text{Area} = \frac{1}{2} \times \text{base} \times \text{height}$$

Solution:

$$\text{Area} = \frac{1}{2} \times 12 \times 10 = \frac{120}{2} = \mathbf{60\ cm^2}$$

Why other options are wrong:

Q36.

- **Option A:** Correct.
- **Option B:** $70\ \text{cm}^2$ — arithmetic error.
- **Option C:** $80\ \text{cm}^2$ — arithmetic error.
- **Option D:** $120\ \text{cm}^2$ — forgot the $\frac{1}{2}$ factor.

Final Answer: Area $= 60\ \text{cm}^2 \Rightarrow$ **(A)**

Answer: (A) ↑ Go back to Q 36

Solution

Concept — Circumference of a Circle:

$$\text{Circumference} = 2\pi r$$

Solution:

$$C = 2 \times \frac{22}{7} \times 7 = 2 \times 22 = \mathbf{44\ cm}$$

Why other options are wrong:

Q37.

- **Option A:** 22 cm — πr only (forgot the factor of 2).
- **Option B:** Correct.
- **Option C:** 66 cm — used $r = 10.5$ or diameter 21.
- **Option D:** $154\ \text{cm}^2$ — this is the area, not circumference.

Final Answer: Circumference $= 44$ cm $\Rightarrow$ **(B)**

Answer: (B) ↑ Go back to Q 37

Solution

Concept — Area of a Circle:

$$\text{Area} = \pi r^2$$

Solution:

$$\text{Area} = \frac{22}{7} \times 7^2 = \frac{22}{7} \times 49 = 22 \times 7 = \mathbf{154\ cm^2}$$

Why other options are wrong:

Q38.

- **Option A:** 44 cm^2 — this is the circumference value.
- **Option B:** 88 cm^2 — double the circumference.
- **Option C:** 132 cm^2 — incorrect calculation.
- **Option D:** Correct.

Final Answer: Area $= 154$ cm^2 $\Rightarrow$ **(D)**

Answer: (D) ↑ Go back to Q 38

Solution

Concept — Volume of a Cube:

Volume $=$ side^3

Solution:

Volume $= 5^3 = 5 \times 5 \times 5 =$ **125 cm^3**

Why other options are wrong:

Q39.

- **Option A:** Correct.
- **Option B:** 75 cm^3 — $5 \times 5 \times 3$ (wrong multiplier).
- **Option C:** 150 cm^3 — $5 \times 5 \times 6$ (wrong).
- **Option D:** 216 cm^3 $= 6^3$; confuses side $= 6$ with side $= 5$.

Final Answer: Volume $= 125$ cm^3 $\Rightarrow$ **(A)**

Answer: (A) ↑ Go back to Q 39

Solution

Concept — Perimeter of Combined Shape:

When two squares (side 6 cm) are joined along a full side, the combined shape is a rectangle 12 cm $\times$ 6 cm. The joined side is interior (not part of perimeter).

Solution:

Rectangle dimensions: length $= 6 + 6 = 12$ cm, width $= 6$ cm.

Perimeter $= 2(12 + 6) = 2 \times 18 =$ **36** cm

Why other options are wrong:

Q40.

- **Option A:** 24 cm — perimeter of one square only.
- **Option B:** 30 cm — subtracted only one side from two squares' perimeters.
- **Option C:** Correct.
- **Option D:** 48 cm — sum of both squares' perimeters without removing joined sides.

Final Answer: Perimeter $= 36$ cm $\Rightarrow$ **(C)**

Answer: (C) ↑ Go back to Q 40

Solution

Concept — Mean Proportional:

The mean proportional of a and b is $\sqrt{a \times b}$.

Solution:

Mean proportional $= \sqrt{4 \times 16} = \sqrt{64} = \mathbf{8}$

Why other options are wrong:

Q41.

- **Option A:** 4 — the smaller number itself.
- **Option B:** 6 — arithmetic mean, not mean proportional.
- **Option C:** 10 — $(4 + 16)/2 = 10$ is arithmetic mean.
- **Option D:** Correct.

Final Answer: Mean proportional $= 8 \Rightarrow$ **(D)**

Answer: (D) ↑ Go back to Q 41

Solution

Concept — Direct Proportion:

More pencils cost more; use unitary method or ratio.

Solution:

Cost of 1 pencil $= \dfrac{54}{6} = \text{Rs. } 9$

Cost of 9 pencils $= 9 \times 9 = \text{Rs. } \mathbf{81}$

Why other options are wrong:

Q42.

- **Option A:** Rs. 72 — cost of 8 pencils.
- **Option B:** Correct.
- **Option C:** Rs. 90 — cost of 10 pencils.
- **Option D:** Rs. 108 — cost of 12 pencils.

Final Answer: Cost of 9 pencils $=$ Rs. $81 \Rightarrow$ **(B)**

Answer: (B) ↑ Go back to Q 42

Solution

Concept — Speed, Distance, Time:

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

Solution:

$$\text{Time} = \frac{315}{90} = 3.5 \text{ hours} = \mathbf{3.5} \text{ h}$$

Why other options are wrong:

Q43.

- **Option A:** Correct.
- **Option B:** 4 h would cover 360 km at 90 km/h.
- **Option C:** 4.5 h would cover 405 km.
- **Option D:** 5 h would cover 450 km.

Final Answer: Time $= 3.5$ h $\Rightarrow$ **(A)**

Answer: (A) ↑ Go back to Q 43

Solution

Concept — Ratio Division:

Divide the total into parts proportional to the given ratio.

Solution:

Ratio $2 : 3 : 2$; total parts $= 2 + 3 + 2 = 7$

Value of each part $= \dfrac{2100}{7} = 300$

Middle person's share (ratio 3) $= 3 \times 300 =$ Rs. **900**

Why other options are wrong:

Q44.

- **Option A:** Rs. 600 — two parts (2×300).
- **Option B:** Rs. 700 — incorrect; $\frac{1}{3}$ of 2100.
- **Option C:** Correct.
- **Option D:** Rs. 1050 — half of 2100.

Final Answer: Middle person gets Rs. 900 $\Rightarrow$ **(C)**

Answer: (C) ↑ Go back to Q 44

Solution

Concept — Inverse Proportion (Work and Pipes):

More pipes $\Rightarrow$ less time. Pipes $\times$ Time $=$ constant.

Solution:

$4 \times 45 = 6 \times t$

$t = \dfrac{4 \times 45}{6} = \dfrac{180}{6} =$ **30** min

Why other options are wrong:

Q45.

- **Option A:** 20 min — result for 9 pipes, not 6.
- **Option B:** Correct.
- **Option C:** 40 min — more time with more pipes (direct proportion error).

- **Option D:** 60 min — same as time for 3 pipes.

Final Answer: 6 pipes take 30 minutes $\Rightarrow$ **(B)**

Answer: (B) ↑ Go back to Q 45

Solution

Concept — Simple Interest and Amount:

$\text{SI} = \dfrac{P \times R \times T}{100}$; Amount $= P + \text{SI}$

Solution:

$\text{SI} = \dfrac{4000 \times 7.5 \times 2}{100} = \dfrac{60000}{100} = \text{Rs. } 600$

$\text{Amount} = 4000 + 600 = \text{Rs. } \mathbf{4600}$

Why other options are wrong:

Q46.

- **Option A:** Correct.
- **Option B:** Rs. 4500 — SI computed as $\frac{4000 \times 7.5 \times 1}{100} = 300$; one year only.
- **Option C:** Rs. 4800 — SI of Rs. 800 (used 10% rate).
- **Option D:** Rs. 5000 — SI of Rs. 1000 (incorrect).

Final Answer: Amount = Rs. 4600 $\Rightarrow$ **(A)**

Answer: (A) ↑ Go back to Q 46

Solution

Concept — Finding Principal from Simple Interest:

$P = \dfrac{\text{SI} \times 100}{R \times T}$

Solution:

$P = \dfrac{480 \times 100}{8 \times 5} = \dfrac{48000}{40} = \text{Rs. } \mathbf{1200}$

Why other options are wrong:

Q47.

- **Option A:** Rs. 800 — $\frac{480 \times 100}{8 \times 7.5}$ (wrong time).
- **Option B:** Rs. 960 — calculation error.
- **Option C:** Rs. 1000 — $\frac{480 \times 100}{48}$ (used $R \times T = 48$; close but $8 \times 5 = 40$).
- **Option D:** Correct.

Final Answer: Principal = Rs. 1200 $\Rightarrow$ **(D)**

Answer: (D) ↑ Go back to Q 47

Solution

Concept — Mode:

The mode is the value that appears most frequently in a data set.

Solution:

Data: $7, 12, 7, 15, 7, 12, 9, 15, 7$

Frequency: $7 \to 4$ times; $12 \to 2$ times; $15 \to 2$ times; $9 \to 1$ time.

Mode $=$ **7** (highest frequency).

Why other options are wrong:

Q48.

- **Option A:** 9 — appears only once.
- **Option B:** Correct.
- **Option C:** 12 — appears only twice.
- **Option D:** 15 — appears only twice.

Final Answer: Mode $= 7 \Rightarrow$ **(B)**

Answer: (B) ↑ Go back to Q 48

Solution

Concept — Median:

Arrange data in order; median is the middle value.

Solution:

Data: $13, 5, 9, 17, 3, 21, 7$

Sorted: $3, 5, 7, \mathbf{9}, 13, 17, 21$ (7 values; middle = 4th term)

Median $=$ **9**

Why other options are wrong:

Q49.

- **Option A:** Correct.
- **Option B:** 11 — arithmetic mean $(3+5+7+9+13+17+21)/7 = 75/7 \approx 10.7$; not median.
- **Option C:** 13 — the 5th term, not middle.
- **Option D:** 17 — the 6th term.

Final Answer: Median $= 9 \Rightarrow$ **(A)**

Answer: (A) ↑ Go back to Q 49

Solution

Concept — Pie Chart / Data Handling:

All percentage sectors must sum to 100%.

Solution:

Cricket + Football + Chess + Badminton = 100%

30 + 25 + 20 + Badminton = 100

Badminton = 100 − 75 = **25%**

Why other options are wrong:

Q50.

- **Option A:** 30% — Cricket's share, not Badminton's.
- **Option B:** 20% — Chess's share.
- **Option C:** Correct.
- **Option D:** 15% — would make total only 90%.

Final Answer: Badminton = 25% ⇒ **(C)**

Answer: (C) ↑ Go back to Q 50

Answer Key

Q	Ans	Q	Ans	Q	Ans	Q	Ans	Q	Ans
1	B	2	C	3	A	4	D	5	B
6	A	7	C	8	D	9	A	10	C
11	B	12	D	13	A	14	C	15	B
16	A	17	B	18	D	19	C	20	A
21	B	22	D	23	C	24	A	25	D
26	B	27	C	28	A	29	D	30	B
31	C	32	A	33	B	34	D	35	C
36	A	37	B	38	D	39	A	40	C
41	D	42	B	43	A	44	C	45	B
46	A	47	D	48	B	49	A	50	C