

CAT Quantitative Aptitude

Sample Paper – 11

Duration: 40 Minutes

Maximum Marks: 66

Instructions

- This paper contains **22 MCQ questions (single-correct)**, modelled on the Quantitative Aptitude section of CAT.
- Each correct answer carries **+3 marks**. There is a penalty of **−1 mark per wrong MCQ**; **0 marks** for unattempted questions.
- Only **one** option is correct per question. Choose carefully.
- **No personal calculators** are permitted; a basic on-screen calculator is provided in the actual CAT exam.
- **Rough sheets** are provided at the test centre; use them freely for calculations.
- Syllabus level: **Arithmetic, Algebra, Geometry & Mensuration, and Modern Mathematics** at the level of the CAT Quantitative Aptitude section.

Questions (Q1 – Q22)

Q1. How many zeros does $100!$ end with?

- (A) 24
- (B) 20
- (C) 22
- (D) 26

Q2. Find the smallest 4-digit number divisible by both 12 and 18.

- (A) 1004
- (B) 1006
- (C) 1008



(D) 1010

Q3. A shopkeeper buys an article at 80% of its marked price (MRP) and sells it at 20% above the MRP. Find his profit percentage.

(A) 50%

(B) 40%

(C) 60%

(D) 45%

Q4. A and B together can complete a work in 12 days. B alone can complete it in 18 days. How many days will A alone take to complete the work?

(A) 24 days

(B) 30 days

(C) 32 days

(D) 36 days

Q5. The cost price of 16 articles equals the selling price of 12 articles. Find the profit percentage.

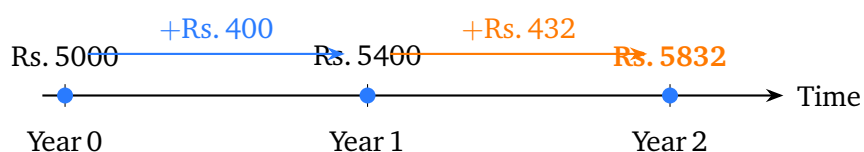
(A) 25%

(B) 33.33%

(C) 40%

(D) 50%

Q6. Find the compound interest on Rs. 5,000 at 8% per annum for 2 years, compounded annually.



(A) Rs. 800

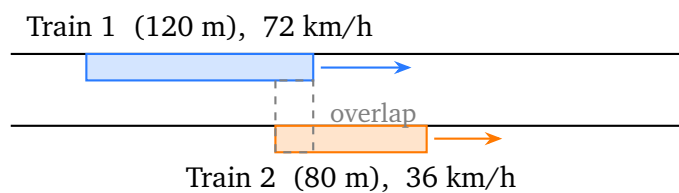


- (B) Rs. 816
- (C) Rs. 832
- (D) Rs. 848

Q7. A's age is 4 times B's age. After 5 years, A's age will be 3 times B's age. What is B's current age?

- (A) 10 years
- (B) 12 years
- (C) 8 years
- (D) 15 years

Q8. Two trains of lengths 120 m and 80 m are running in the *same direction* at 72 km/h and 36 km/h respectively. How long does the faster train take to completely overtake the slower one?



- (A) 10 s
- (B) 15 s
- (C) 18 s
- (D) 20 s

Q9. Two varieties of tea costing Rs. 36 per kg and Rs. 54 per kg are mixed to get a blend costing Rs. 45 per kg. In what ratio should they be mixed?

- (A) 2:1
- (B) 1:1
- (C) 3:2
- (D) 2:3

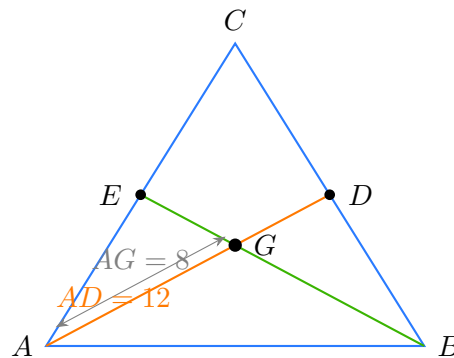


- Q10.** A pipe fills a tank in 6 hours. Due to a leak at the bottom, it now takes 8 hours to fill the tank. If the tank is full, how many hours will the leak take to empty it?
- (A) 12 hours
(B) 18 hours
(C) 24 hours
(D) 36 hours
- Q11.** The sum of three consecutive odd numbers is 75. Find the largest of the three.
- (A) 27
(B) 25
(C) 29
(D) 23
- Q12.** Find the sum of all integers from 1 to 100 that are divisible by 3 but *NOT* by 9.
- (A) 900
(B) 999
(C) 1089
(D) 1188
- Q13.** If $x^2 + y^2 = 29$ and $xy = 10$, find $(x + y)^2$.
- (A) 41
(B) 45
(C) 50
(D) 49
- Q14.** Solve: $\log_{10}(x^2 - 6x + 9) = 0$. Find all values of x .



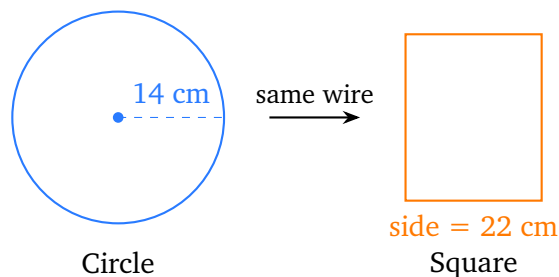
- (A) $x = 2$ only
- (B) $x = 2$ or $x = 4$
- (C) $x = 4$ only
- (D) No real solution

Q15. In triangle ABC , medians AD and BE intersect at centroid G . If $AG = 8$ cm, find the length of median AD .



- (A) 16 cm
- (B) 10 cm
- (C) 12 cm
- (D) 18 cm

Q16. A wire is bent into a circle of radius 14 cm. The same wire is now bent into a square. Find the side of the square. (Use $\pi = 22/7$.)



- (A) 20 cm
- (B) 22 cm
- (C) 24 cm



(D) 28 cm

Q17. The volume of a right circular cylinder is 1386 cm^3 and its height is 9 cm. Find the radius. (Use $\pi = 22/7$.)

(A) 14 cm

(B) 3.5 cm

(C) 3 cm

(D) 7 cm

Q18. The volume of a cube is 216 cm^3 . Find its total surface area.

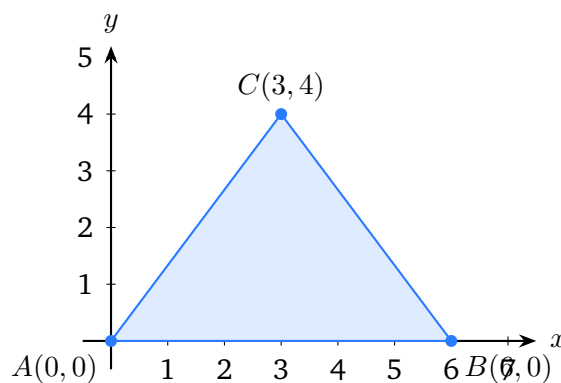
(A) 216 cm^2

(B) 144 cm^2

(C) 180 cm^2

(D) 252 cm^2

Q19. The vertices of a triangle are $A(0, 0)$, $B(6, 0)$, and $C(3, 4)$. Find the area of the triangle.



(A) 6 sq units

(B) 9 sq units

(C) 10 sq units

(D) 12 sq units



- Q20.** In how many ways can the letters of the word LEVEL be arranged?
- (A) 60
(B) 24
(C) 30
(D) 120
- Q21.** A bag contains 3 red, 4 blue and 2 white balls. A ball is drawn at random. What is the probability that it is *NOT* white?
- (A) $\frac{7}{9}$
(B) $\frac{2}{9}$
(C) $\frac{4}{9}$
(D) $\frac{5}{9}$
- Q22.** How many 3-digit numbers can be formed using the digits 1, 2, 3, 4, 5, with no digit repeated?
- (A) 120
(B) 60
(C) 90
(D) 45



Detailed Solutions

Q1.

Solution

Concept — Trailing zeros in $n!$ come from factors of $10 = 2 \times 5$. Since factors of 2 always outnumber factors of 5, we count only the total factors of 5 in $100!$ using Legendre's formula:

$$\left\lfloor \frac{n}{5} \right\rfloor + \left\lfloor \frac{n}{25} \right\rfloor + \left\lfloor \frac{n}{125} \right\rfloor + \dots$$

Step 1 — Apply the formula for $n = 100$:

$$\left\lfloor \frac{100}{5} \right\rfloor + \left\lfloor \frac{100}{25} \right\rfloor + \left\lfloor \frac{100}{125} \right\rfloor = 20 + 4 + 0 = 24.$$

Why other options are wrong:

- Option B (20): Counts only $\lfloor 100/5 \rfloor = 20$, forgetting that multiples of 25 contribute an extra factor of 5 each.
- Option C (22): An arithmetic error; no formula gives 22 for $n = 100$.
- Option D (26): Overcounts; $\lfloor 100/125 \rfloor = 0$, so there are no multiples of 5^3 below 100 to add.

Final Answer: $100!$ ends with 24 zeros $\Rightarrow$ **A**

Answer: (A) [Go Back to Q 1](#)

Q2.

Solution

Concept — A number divisible by both 12 and 18 must be a multiple of $\text{LCM}(12, 18)$. We then find the smallest such multiple that is at least 1000.

Step 1 — Compute $\text{LCM}(12, 18)$: $12 = 2^2 \times 3$ and $18 = 2 \times 3^2$. $\text{LCM} = 2^2 \times 3^2 = 36$.

Step 2 — Find the smallest 4-digit multiple of 36:

$$\left\lceil \frac{1000}{36} \right\rceil = \lceil 27.78 \rceil = 28. \quad 28 \times 36 = 1008.$$

Why other options are wrong:

- Option A (1004): $1004/36 = 27.89$; not an integer, so not divisible by 36.
- Option B (1006): $1006/36 = 27.94$; not an integer.



- Option D (1010): $1010/36 = 28.06$; not an integer, and larger than 1008.

Final Answer: Smallest 4-digit number = 1008 $\Rightarrow$ C

Answer: (C) [Go Back to Q 2](#)

Q3.

Solution

Concept — Profit percentage is calculated on cost price (CP). Here CP and SP are both expressed as multiples of MRP.

Step 1 — Let MRP = 100. Then:

$$CP = 80\% \times 100 = 80, \quad SP = 120\% \times 100 = 120.$$

Step 2 — Calculate profit percentage:

$$\text{Profit\%} = \frac{SP - CP}{CP} \times 100 = \frac{120 - 80}{80} \times 100 = \frac{40}{80} \times 100 = 50\%.$$

Why other options are wrong:

- Option B (40%): Calculates profit over MRP ($40/100 = 40\%$) instead of over CP.
- Option C (60%): Divides 48 by 80 (uses $1.2 \times 80 = 96$ as SP); a computation error.
- Option D (45%): An arbitrary incorrect value; no standard formula gives this result.

Final Answer: Profit = 50% $\Rightarrow$ A

Answer: (A) [Go Back to Q 3](#)



Q4.

Solution

Concept — Work-rate method: individual rate = combined rate minus the other person's rate.

Step 1 — Assign rates (fraction of work per day):

$$\text{Rate of (A+B)} = \frac{1}{12}, \quad \text{Rate of B} = \frac{1}{18}.$$

Step 2 — Find A's rate:

$$\text{Rate of A} = \frac{1}{12} - \frac{1}{18} = \frac{3}{36} - \frac{2}{36} = \frac{1}{36}.$$

Step 3 — Days for A alone:

$$\text{Days} = \frac{1}{1/36} = 36 \text{ days}.$$

Why other options are wrong:

- Option A (24 days): Uses $1/12 - 1/12 = 0$ or an incorrect LCM; arithmetic error.
- Option B (30 days): Implies A's rate = $1/30$, which does not satisfy the given conditions.
- Option C (32 days): Incorrect; not consistent with the work rates given.

Final Answer: A alone takes 36 days $\Rightarrow$ D

Answer: (D) [Go Back to Q 4](#)

Q5.

Solution

Concept — When the CP of m articles equals the SP of n articles ($m > n$), there is a profit. $\text{Profit}\% = \frac{m-n}{n} \times 100$.

Step 1 — Let CP of 1 article = c . Then SP of 1 article = $\frac{16c}{12} = \frac{4c}{3}$.

Step 2 — Profit percentage:

$$\text{Profit}\% = \frac{\text{SP} - \text{CP}}{\text{CP}} \times 100 = \frac{\frac{4c}{3} - c}{c} \times 100 = \frac{\frac{1}{3}c}{c} \times 100 = 33.33\%.$$



Why other options are wrong:

- Option A (25%): Uses $(16 - 12)/16 \times 100$; divides by the wrong quantity (CP count instead of SP count).
- Option C (40%): Overcalculates; not consistent with the given CP-SP ratio.
- Option D (50%): Confuses 16:12 ratio with a 3:2 ratio giving 50%.

Final Answer: Profit = 33.33% $\Rightarrow$ B

Answer: (B) [Go Back to Q 5](#)

Q6.

Solution

Concept — Compound interest (CI) compounded annually: $A = P\left(1 + \frac{r}{100}\right)^n$; then $CI = A - P$.

Step 1 — Compute the amount after 2 years with $P = 5000$ and $r = 8\%$:

$$A = 5000 \times (1.08)^2 = 5000 \times 1.1664 = 5832.$$

Step 2 — Compute CI:

$$CI = A - P = 5832 - 5000 = \text{Rs. } 832.$$

Year-by-year breakdown: Year 1 interest = $5000 \times 0.08 = \text{Rs. } 400$. Year 2 interest = $5400 \times 0.08 = \text{Rs. } 432$. Total CI = $400 + 432 = \text{Rs. } 832$.

Why other options are wrong:

- Option A (Rs. 800): This is the simple interest for 2 years ($5000 \times 0.08 \times 2$); it ignores compounding.
- Option B (Rs. 816): Uses an incorrect rate or a rounding error in Year 2 interest.
- Option D (Rs. 848): Adds an extra incorrect interest component; arithmetic error.

Final Answer: CI = Rs. 832 $\Rightarrow$ C

Answer: (C) [Go Back to Q 6](#)



Q7.

Solution

Concept — Age problems: set up algebraic equations for present and future ages.

Step 1 — Let B's current age = x years. Then A's current age = $4x$ years.

Step 2 — After 5 years: A's age = $4x + 5$ and B's age = $x + 5$. Use the condition:

$$4x + 5 = 3(x + 5) \implies 4x + 5 = 3x + 15 \implies x = 10.$$

Verification: Present: B = 10, A = 40. After 5 years: B = 15, A = 45 = 3×15 . ✓

Why other options are wrong:

- Option B (12 years): $4(12) + 5 = 53 \neq 3(12 + 5) = 51$; fails the condition.
- Option C (8 years): $4(8) + 5 = 37 \neq 3(8 + 5) = 39$; fails the condition.
- Option D (15 years): $4(15) + 5 = 65 \neq 3(15 + 5) = 60$; fails the condition.

Final Answer: B's current age = 10 years $\Rightarrow$ A

Answer: (A) [Go Back to Q 7](#)

Q8.

Solution

Concept — When two objects move in the *same* direction, relative speed = difference of speeds. Time to overtake = (sum of lengths) $\div$ (relative speed).

Step 1 — Convert speeds to m/s and find relative speed:

$$72 \text{ km/h} = 72 \times \frac{5}{18} = 20 \text{ m/s}, \quad 36 \text{ km/h} = 36 \times \frac{5}{18} = 10 \text{ m/s}.$$

$$\text{Relative speed} = 20 - 10 = 10 \text{ m/s}.$$

Step 2 — Total distance to cover for complete overtaking = $120 + 80 = 200 \text{ m}$:

$$\text{Time} = \frac{200}{10} = 20 \text{ s}.$$

Why other options are wrong:

- Option A (10 s): Uses only one train's length (100 m) or doubles the relative speed.
- Option B (15 s): Uses distance = 150 m (incorrect); arithmetic error.



- Option C (18 s): Uses relative speed incorrectly or miscounts the total length.

Final Answer: Time to overtake = 20 s $\Rightarrow$ D

Answer: (D) [Go Back to Q 8](#)

Q9.

Solution

Concept — Alligation rule: to find the mixing ratio of two ingredients at prices c_1 and c_2 to obtain a mixture at mean price m :

$$\text{Ratio} = (c_2 - m) : (m - c_1).$$

Step 1 — Identify values: $c_1 = 36$, $c_2 = 54$, $m = 45$.

Step 2 — Apply alligation:

$$\text{Ratio} = (54 - 45) : (45 - 36) = 9 : 9 = 1 : 1.$$

Why other options are wrong:

- Option A (2:1): Would give mean price = $(2 \times 36 + 1 \times 54)/3 = 126/3 = 42 \neq 45$.
- Option C (3:2): Would give mean price = $(3 \times 36 + 2 \times 54)/5 = 216/5 = 43.2 \neq 45$.
- Option D (2:3): Would give mean price = $(2 \times 36 + 3 \times 54)/5 = 234/5 = 46.8 \neq 45$.

Final Answer: Mixing ratio = 1 : 1 $\Rightarrow$ B

Answer: (B) [Go Back to Q 9](#)

Q10.

Solution

Concept — Pipe and leak: effective fill rate with leak = fill rate – leak rate. We know both the normal and the effective fill rates, so we can isolate the leak rate.

Step 1 — Assign rates (fraction of tank per hour):

$$\text{Pipe rate (no leak)} = \frac{1}{6}, \quad \text{Effective rate (with leak)} = \frac{1}{8}.$$



Step 2 — Leak rate:

$$\text{Leak rate} = \frac{1}{6} - \frac{1}{8} = \frac{4}{24} - \frac{3}{24} = \frac{1}{24}.$$

Time for leak to empty full tank = 24 hours.

Why other options are wrong:

- Option A (12 hours): Implies leak rate = $1/12$; then effective rate = $1/6 - 1/12 = 1/12$, giving fill time = 12 h, not 8 h. Inconsistent.
- Option B (18 hours): Implies leak rate = $1/18$; effective rate = $1/6 - 1/18 = 2/18 = 1/9$, fill time = 9 h $\neq$ 8 h. Inconsistent.
- Option D (36 hours): Implies leak rate = $1/36$; effective rate = $1/6 - 1/36 = 5/36$, fill time = $36/5 = 7.2$ h $\neq$ 8 h. Inconsistent.

Final Answer: Leak empties the tank in 24 hours $\Rightarrow$ C

Answer: (C) [Go Back to Q 10](#)

Q11.

Solution

Concept — Three consecutive odd numbers differ by 2. Let the middle odd number be n ; the three numbers are $n - 2, n, n + 2$.

Step 1 — Set up the equation:

$$(n - 2) + n + (n + 2) = 75 \implies 3n = 75 \implies n = 25.$$

Step 2 — The largest of the three is $n + 2 = 25 + 2 = 27$.

Verification: $23 + 25 + 27 = 75$. ✓ All three are odd. ✓

Why other options are wrong:

- Option B (25): This is the middle number, not the largest.
- Option C (29): Would make the three numbers 25, 27, 29 with sum $81 \neq 75$.
- Option D (23): This is the smallest of the three, not the largest.

Final Answer: Largest number = 27 $\Rightarrow$ A

Answer: (A) [Go Back to Q 11](#)



Q12.

Solution

Concept — Use the inclusion-exclusion principle: integers divisible by 3 but NOT by 9 = (divisible by 3) – (divisible by 9).

Step 1 — Sum of multiples of 3 from 1 to 100: multiples are 3, 6, 9, ..., 99; there are 33 terms.

$$S_3 = 3 \times \frac{33 \times 34}{2} = 3 \times 561 = 1683.$$

Step 2 — Sum of multiples of 9 from 1 to 100: multiples are 9, 18, 27, ..., 99; there are 11 terms.

$$S_9 = 9 \times \frac{11 \times 12}{2} = 9 \times 66 = 594.$$

Step 3 — Required sum:

$$S = S_3 - S_9 = 1683 - 594 = 1089.$$

Why other options are wrong:

- Option A (900): An undercount; likely misses several multiples of 3.
- Option B (999): Subtracts too much (e.g., wrongly subtracts multiples of 6 instead of 9).
- Option D (1188): Adds instead of subtracts; $1683 - 495 = 1188$ using wrong S_9 .

Final Answer: Sum = 1089 $\Rightarrow$ **C**

Answer: (C) [Go Back to Q 12](#)

Q13.

Solution

Concept — Use the algebraic identity $(x + y)^2 = x^2 + y^2 + 2xy$.

Step 1 — Substitute the given values directly:

$$(x + y)^2 = x^2 + y^2 + 2xy = 29 + 2(10) = 29 + 20 = 49.$$

Why other options are wrong:

- Option A (41): Uses $(x + y)^2 = x^2 + y^2 + xy = 29 + 10 + 2 = 41$; adds xy once instead of $2xy$.



- Option B (45): Uses $29 + 2(8) = 45$; substitutes $xy = 8$ instead of 10.
- Option C (50): Adds $29 + 21 = 50$; uses $2xy = 21$ (incorrect arithmetic).

Final Answer: $(x + y)^2 = 49 \Rightarrow \boxed{\text{D}}$

Answer: (D) [Go Back to Q 13](#)

Q14.

Solution

Concept — $\log_{10}(A) = 0 \implies A = 10^0 = 1$. Solve the resulting quadratic.

Step 1 — Set the argument equal to 1:

$$x^2 - 6x + 9 = 1 \implies x^2 - 6x + 8 = 0.$$

Step 2 — Factor the quadratic:

$$(x - 2)(x - 4) = 0 \implies x = 2 \quad \text{or} \quad x = 4.$$

Step 3 — Domain check: the argument of a logarithm must be positive. $x^2 - 6x + 9 = (x - 3)^2 \geq 0$, and $= 0$ only when $x = 3$ (excluded). For $x = 2$: $(2 - 3)^2 = 1 > 0$. For $x = 4$: $(4 - 3)^2 = 1 > 0$. Both values are valid.

Why other options are wrong:

- Option A ($x = 2$ only): Misses the second root $x = 4$; finds only one solution of the quadratic.
- Option C ($x = 4$ only): Misses the first root $x = 2$.
- Option D (No real solution): The quadratic $x^2 - 6x + 8 = 0$ has discriminant $36 - 32 = 4 > 0$; two real solutions exist.

Final Answer: $x = 2$ or $x = 4 \Rightarrow \boxed{\text{B}}$

Answer: (B) [Go Back to Q 14](#)



Q15.

Solution

Concept — The centroid divides each median in the ratio 2 : 1 from the vertex.
So $AG = \frac{2}{3} \times AD$.

Step 1 — Use the centroid property:

$$AG = \frac{2}{3} \times AD \implies 8 = \frac{2}{3} \times AD \implies AD = \frac{8 \times 3}{2} = 12 \text{ cm.}$$

Verification: $GD = AD - AG = 12 - 8 = 4 \text{ cm}$. Check ratio $AG : GD = 8 : 4 = 2 : 1$. ✓

Why other options are wrong:

- Option A (16 cm): Uses $AD = 2 \times AG = 16$; applies ratio 1 : 1 instead of 2 : 1 from vertex.
- Option B (10 cm): Adds $GD = 2$ (wrong); does not correctly use the 2 : 1 ratio.
- Option D (18 cm): Uses $AD = \frac{3}{2} \times AG \times \frac{3}{2} = 18$; over-scales the ratio.

Final Answer: Median $AD = 12 \text{ cm} \Rightarrow \boxed{\text{C}}$

Answer: (C) [Go Back to Q 15](#)

Q16.

Solution

Concept — The total length of a wire is conserved when reshaped. Circumference of circle = perimeter of square.

Step 1 — Find the wire length (circumference of circle with $r = 14 \text{ cm}$, $\pi = 22/7$):

$$L = 2\pi r = 2 \times \frac{22}{7} \times 14 = 2 \times 22 \times 2 = 88 \text{ cm.}$$

Step 2 — Find the side of the square (perimeter = 88 cm):

$$4 \times \text{side} = 88 \implies \text{side} = \frac{88}{4} = 22 \text{ cm.}$$

Why other options are wrong:

- Option A (20 cm): Uses perimeter = 80 (incorrect circumference); likely



used $\pi \approx \frac{20}{7}$.

- Option C (24 cm): Would require perimeter = 96; corresponds to circumference of a circle with $r \approx 15.3$ cm, not 14 cm.
- Option D (28 cm): Would require perimeter = 112 cm; far exceeds the actual wire length.

Final Answer: Side of square = 22 cm $\Rightarrow$ **B**

Answer: (B) [Go Back to Q 16](#)

Q17.

Solution

Concept — Volume of a right circular cylinder: $V = \pi r^2 h$. Solve for r .

Step 1 — Substitute $V = 1386$, $h = 9$, $\pi = 22/7$:

$$\frac{22}{7} \times r^2 \times 9 = 1386 \implies r^2 = \frac{1386 \times 7}{22 \times 9} = \frac{9702}{198} = 49 \implies r = 7 \text{ cm.}$$

Verification: $V = \frac{22}{7} \times 49 \times 9 = \frac{22 \times 49 \times 9}{7} = 22 \times 7 \times 9 = 1386 \text{ cm}^3$. ✓

Why other options are wrong:

- Option A (14 cm): $r = 14 \Rightarrow V = \frac{22}{7} \times 196 \times 9 = 5544 \text{ cm}^3 \neq 1386$.
- Option B (3.5 cm): $r = 3.5 \Rightarrow r^2 = 12.25 \Rightarrow V = \frac{22}{7} \times 12.25 \times 9 = 346.5 \text{ cm}^3 \neq 1386$.
- Option C (3 cm): $r = 3 \Rightarrow V = \frac{22}{7} \times 9 \times 9 = 254.6 \text{ cm}^3 \neq 1386$.

Final Answer: Radius = 7 cm $\Rightarrow$ **D**

Answer: (D) [Go Back to Q 17](#)

Q18.

Solution

Concept — For a cube with volume V : side $s = \sqrt[3]{V}$, and total surface area (TSA) = $6s^2$.

Step 1 — Find side length:

$$s^3 = 216 \implies s = \sqrt[3]{216} = 6 \text{ cm.}$$



Step 2 — Compute TSA:

$$\text{TSA} = 6s^2 = 6 \times 6^2 = 6 \times 36 = 216 \text{ cm}^2.$$

Why other options are wrong:

- Option B (144 cm²): Uses $\text{TSA} = 4s^2 = 4 \times 36 = 144$; counts only 4 faces instead of 6.
- Option C (180 cm²): Uses $\text{TSA} = 5s^2$; counts 5 faces instead of 6.
- Option D (252 cm²): Uses $s = 6.5$ or adds an extra term; arithmetic error.

Final Answer: $\text{TSA} = 216 \text{ cm}^2 \Rightarrow \boxed{\text{A}}$

Answer: (A) [Go Back to Q 18](#)

Q19.

Solution

Concept — Area of a triangle with vertices (x_1, y_1) , (x_2, y_2) , (x_3, y_3) by the shoelace formula:

$$\text{Area} = \frac{1}{2} |x_1(y_2 - y_3) + x_2(y_3 - y_1) + x_3(y_1 - y_2)|.$$

Step 1 — Substitute $A(0, 0)$, $B(6, 0)$, $C(3, 4)$:

$$\text{Area} = \frac{1}{2} |0(0 - 4) + 6(4 - 0) + 3(0 - 0)| = \frac{1}{2} |0 + 24 + 0| = \frac{1}{2} \times 24 = 12.$$

Alternative (base $\times$ height): Base $AB = 6$ (along x -axis). Height = y -coordinate of $C = 4$.

$$\text{Area} = \frac{1}{2} \times 6 \times 4 = 12 \text{ sq units.}$$

Why other options are wrong:

- Option A (6 sq units): Uses $\text{Area} = \frac{1}{2} \times \text{base} \times \text{half-height} = \frac{1}{2} \times 6 \times 2$; halves the height incorrectly.
- Option B (9 sq units): Arithmetic error; uses base = 4.5 or height = 3.
- Option C (10 sq units): Off by 2; a common miscalculation in the shoelace steps.

Final Answer: $\text{Area} = 12 \text{ sq units} \Rightarrow \boxed{\text{D}}$

Answer: (D) [Go Back to Q 19](#)



Q20.

Solution

Concept — Number of distinct arrangements of n letters where letters repeat: $\frac{n!}{p! q! \dots}$, where $p, q, \dots$ are the frequencies of repeated letters.

Step 1 — Identify letter frequencies in LEVEL: L appears 2 times, E appears 2 times, V appears 1 time. Total letters = 5.

Step 2 — Apply the formula:

$$\text{Arrangements} = \frac{5!}{2! \times 2!} = \frac{120}{2 \times 2} = \frac{120}{4} = 30.$$

Why other options are wrong:

- Option A (60): Divides $5!$ by only $2!$ (accounts for only one set of repeated letters): $120/2 = 60$.
- Option B (24): Computes $4! = 24$; treats it as a 4-letter word.
- Option D (120): Computes $5!$ without dividing by any repetition factor; treats all letters as distinct.

Final Answer: Number of arrangements = 30 $\Rightarrow$ C

Answer: (C) [Go Back to Q 20](#)

Q21.

Solution

Concept — Complement rule: $P(\text{not white}) = 1 - P(\text{white})$. Alternatively, count non-white balls directly.

Step 1 — Total balls = $3 + 4 + 2 = 9$. White balls = 2. Non-white balls = $3 + 4 = 7$.

Step 2 — Probability:

$$P(\text{not white}) = \frac{7}{9}.$$

Why other options are wrong:

- Option B ($2/9$): This is $P(\text{white})$, not $P(\text{not white})$.
- Option C ($4/9$): This is $P(\text{blue})$ only; misses the red balls among non-white.
- Option D ($5/9$): Uses non-white = 5 (counts only red + 2 from blue); incorrect count.



Final Answer: $P(\text{not white}) = \frac{7}{9} \Rightarrow \boxed{\text{A}}$

Answer: (A) [Go Back to Q 21](#)

Q22.

Solution

Concept — Permutation without repetition: number of ways to arrange r objects chosen from n distinct objects is $P(n, r) = \frac{n!}{(n-r)!}$.

Step 1 — We choose and arrange 3 digits from 5 distinct digits $\{1, 2, 3, 4, 5\}$ with no repetition:

$$P(5, 3) = \frac{5!}{(5-3)!} = \frac{5!}{2!} = \frac{120}{2} = 60.$$

Step 2 — Verify by direct count: hundreds digit has 5 choices, tens digit has 4, units digit has 3. Total = $5 \times 4 \times 3 = 60$.

Why other options are wrong:

- Option A (120): Computes $5! = 120$; this would be the number of arrangements of *all* 5 digits, not just 3.
- Option C (90): Confuses with $P(6, 3) = 120$ or uses an incorrect formula; no standard formula gives 90 here.
- Option D (45): Computes $C(5, 3) \times 3 = 10 \times 3 = 30$, or $\binom{10}{2} = 45$; confuses combinations with permutations.

Final Answer: Number of 3-digit numbers = 60 $\Rightarrow \boxed{\text{B}}$

Answer: (B) [Go Back to Q 22](#)



Answer Key

Q	Ans	Q	Ans	Q	Ans	Q	Ans	Q	Ans
1	A	2	C	3	A	4	D	5	B
6	C	7	A	8	D	9	B	10	C
11	A	12	C	13	D	14	B	15	C
16	B	17	D	18	A	19	D	20	C
21	A	22	B						

Quick Reference: Correct Answers

Q	Ans	Q	Ans	Q	Ans	Q	Ans
1	A	7	A	13	D	19	D
2	C	8	D	14	B	20	C
3	A	9	B	15	C	21	A
4	D	10	C	16	B	22	B
5	B	11	A	17	D		
6	C	12	C	18	A		

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