

Q.1 A pie-chart shows the expenditure pattern of a person out of his total income ₹28,000. If he saves ₹4,900, then the value of x° (saving sector angle) is:

- A. 136°
- B. 126°
- C. 63°
- D. 45°

Answer: C

Sol: Given:
Total income = 28,000
Saving = 4,900
Formula used:
Sector angle = (Value / Total) × 360°
x = (Saving / Total income) × 360°
Solution:
x = 4900 / 28000 × 360
x = 0.175 × 360
x = 63°
Correct answer is (C)

Q.2 According to National Curriculum Framework (2005) the primary objective of school mathematics is

- A. To teach number system
- B. To teach measurement of quantities
- C. To develop mathematical reasoning for problem-solving
- D. To solve problems using mathematical formulae

Answer: C

Sol: The primary objective of school mathematics is to develop mathematical reasoning for problem-solving. This encompasses understanding mathematical concepts, applying them to solve problems, and communicating solutions logically. While other objectives like number systems and measurement are important, they are secondary to the core goal of developing problem-solving skills. So the answer is (c).

Q.3 Five times the present age of P exceeds the present age of Q by 29 years. After 8 years, five times Q’s age will be 17 years less than seven times P’s age at that time. What is the present age (in years) of Q?

- A. 3
- B. 5
- C. 6
- D. 11

Answer: D

Sol: Given:
Let present age of P = P years

Let present age of Q = Q years

Five times P exceeds Q by 29 years

After 8 years: $5(Q + 8)$ is 17 less than $7(P + 8)$

Solution:

From first condition;

$$5P - Q = 29$$

$$Q = 5P - 29$$

From second condition;

$$5(Q + 8) = 7(P + 8) - 17$$

$$5Q + 40 = 7P + 56 - 17 = 7P + 39$$

$$5Q = 7P - 1$$

Substitute $Q = 5P - 29$:

$$5(5P - 29) = 7P - 1$$

$$25P - 145 = 7P - 1$$

$$25P - 7P = 145 - 1$$

$$18P = 144$$

$$P = 8$$

Now,

$$Q = 5P - 29 = 5 \times 8 - 29 = 40 - 29 = 11$$

So, the present age of Q = 11 years

Q.4 ABCD is a cyclic quadrilateral whose side AB is a diameter of the circle through A, B, C and D. If angle $\angle ADC = 129^\circ$, then what is the measure of $\angle BAC$?

- A. 39°
- B. 49°
- C. 41°
- D. 51°

Answer: A

Sol: Given:

ABCD is a cyclic quadrilateral whose side AB is a diameter of the circle through A, B, C and D.

$$\angle ADC = 129^\circ$$

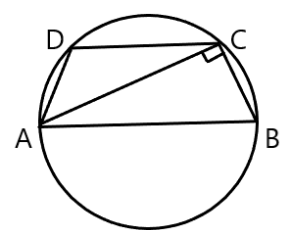
Concept used:

Sum of opposite angles of a cyclic quadrilateral = 180°

Angle in a semicircle = 90°

Sum of angles of a triangle = 180°

Solution:



$\angle D + \angle B = 180^\circ$ (Opposite angles of a cyclic quadrilateral)

$129^\circ + \angle B = 180^\circ$

$\angle B = 180^\circ - 129^\circ = 51^\circ$

$\angle ACB = 90^\circ$ (Angle in a semicircle)

In $\triangle ABC$:

$\angle BAC + 51^\circ + 90^\circ = 180^\circ$ (Since sum of angles of a triangle is

$\angle BAC = 180^\circ - 90^\circ - 51^\circ = 39^\circ$

$\therefore$ The $\angle BAC$ is 39° .

Q.5 The length of the base of a parallelogram is $(4x^2 - 7xy + y^2)$ m and its height is $(x + y)$ m. Find the area of parallelogram, when $x = 3$ and $y = -2$.

- A. 69 m^2
- B. 82 m^2
- C. 48 m^2
- D. 57 m^2

Answer: B

Sol: Given:

Length of the base of the parallelogram: $4x^2 - 7xy + y^2$ meters

Height of the parallelogram: $x + y$ meters

Values for $x = 3$ and $y = -2$

Formula Used:

Area of a parallelogram = Base $\times$ Height

Solution:

Area of parallelogram = $(4x^2 - 7xy + y^2) \times (x + y)$

Substitute $x = 3$ and $y = -2$ into the expressions for the base and height

Area of parallelogram = $(4(3)^2 - 7(3)(-2) + (-2)^2) \times (3 + (-2))$

= $(4(9) + 7(6) + 4) \times (1)$

= $(36 + 42 + 4) \times (1)$

= 82×1

= $82m^2$

Q.6 Which of the following is true for an irrational number?

- A. Decimal form is terminating.
- B. Decimal form is non-terminating and repeating.
- C. Decimal form is non-terminating and non-repeating.
- D. None of these.

Answer: C

Sol: As we know that :-

An irrational number cannot be expressed as a fraction. Its decimal representation is non-terminating and non-repeating.

Solution:

- (A) Terminating → Rational → Incorrect
 - (B) Non-terminating and repeating → Rational → Incorrect
 - (C) Non-terminating and non-repeating → Irrational → **Correct**
 - (D) None of these → Incorrect
- Correct answer is (C)

Q.7 How much should you invest today at 10% compound interest annually, to accumulate ₹1,61,051 in 5 years?

- A. ₹100000
- B. ₹111000
- C. ₹110000
- D. ₹111100

Answer: A

Sol: Given:

Future amount after 5 years = ₹1,61,051
Rate of interest = 10% per annum (compounded annually)
Time = 5 years

Formula Used:

$$A = P\left(1 + \frac{R}{100}\right)^T$$
$$P = \frac{A}{\left(1 + \frac{R}{100}\right)^T}$$

Solution:

$$P = \frac{1,61,051}{(1.10)^5}$$

$$P = \frac{1,61,051}{1.61051} = 1,00,000$$

Q.8 The oldest branch of Mathematics is –

- A. Algebra
- B. Arithmetic
- C. Geometry
- D. Astrology Math

Answer: B

Sol: The correct answer is **(B) Arithmetic**

Explanation:

Arithmetic is considered the oldest branch of mathematics because it deals with basic number operations—addition, subtraction, multiplication, and division—which early humans used for counting, trade, and daily survival.

Additional Information:

- Evidence of arithmetic dates back to prehistoric times, such as tally sticks from around 30,000 years ago.
- Ancient civilizations like the Egyptians, Babylonians, and Sumerians developed arithmetic for agriculture, trade, and record-keeping.

Other Options:

- **A) Algebra** – Developed later, around 9th century AD, with earlier roots in Babylonian and Greek mathematics.
- **C) Geometry** – Emerged in ancient Egypt and Greece for land measurement, but after basic arithmetic was already in use.
- **D) Astrology Math** – Astrology uses mathematics but is not considered a formal branch of mathematics.

Q.9 The sides of a triangle GHL are GH = 65 m, HL = 75 m and LG = 80 m. What is the area of this triangle ?

- A. 2100 m²
- B. 2160 m²
- C. 2200 m²
- D. 2280 m²

Answer: D

Sol: Given:

Side GH = 65 m

Side HL = 75 m

Side LG = 80 m

Need to find: Area of triangle GHL

Formula Used:

$$s = \frac{a + b + c}{2}$$

$$\text{Area of triangle} = \sqrt{s(s - a)(s - b)(s - c)}$$

where s is the semi-perimeter and a, b, c are the sides of the triangle

Solution:

Let a = 65m, b = 75m, c = 80m

$$\text{Semi-perimeter}(s) = \frac{65 + 75 + 80}{2} = \frac{220}{2} = 110 \text{ m}$$

Apply Heron's formula:

$$= \sqrt{110(110 - 65)(110 - 75)(110 - 80)}$$

$$= \sqrt{110 \times 45 \times 35 \times 30}$$

$$= \sqrt{110 \times 45 \times 35 \times 30}$$

$$= \sqrt{110 \times 45 \times 35 \times 30}$$

$$= \sqrt{5 \times 22 \times 5 \times 9 \times 5 \times 7 \times 5 \times 6}$$

$$= 5 \times 5 \times \sqrt{22 \times 9 \times 7 \times 6}$$

$$= 25\sqrt{8316}$$

$$= 25 \times 91.19 \approx 2279.8$$

Therefore, the area of triangle GHL $\approx$ 2280 m²

- Q.10** The population of a district is 328000, out of which 164000 are males. 24% of the population is literate. If 34% males are literate, then what percentage of females are literate?
- A. 13%
 - B. 11%
 - C. 17%
 - D. 14%

Answer: D

Sol: Given:

Total population = 328000

Total males = 164000

Therefore, total females = 328000 – 164000 = 164000

Total literate population = 24% of 328000

Literate males = 34% of 164000

Find: Percentage of literate females.

Solution:

$$\text{Total literates} = \frac{24}{100} \times 328000 = 78720$$

$$\text{Literate males} = \frac{34}{100} \times 164000 = 55760$$

$$\text{Literate females} = 78720 - 55760 = 22960$$

$$\text{Percentage of literate females} = \frac{22960}{164000} \times 100 = 14\%$$

Thus, 14% of the females are literate

- Q.11** Two dice (both numbered 1 to 6) are rolled, simultaneously. What is the probability of observing a sum of 8?

- A. $\frac{5}{36}$
- B. $\frac{36}{5}$
- C. $\frac{6}{1}$
- D. $\frac{1}{6}$

Answer: A

Sol: Given:

Two dice are rolled simultaneously. We need to find the probability of observing a sum of 8.

Formula Used:

$$Probability = \frac{FavorableOutcomes}{TotalOutcomes}$$

Solution:

Total number of possible outcomes when two dice are rolled is:

$$6 \times 6 = 36$$

Now, let's find the favorable outcomes where the sum is 8.

The pairs of numbers that give a sum of 8 are:

$$(2, 6), (3, 5), (4, 4), (5, 3), (6, 2)$$

Thus, there are 5 favorable outcomes.

Therefore, the probability of observing a sum of 8 is:

$$Probability = \frac{FavorableOutcomes}{TotalOutcomes}$$

$$Probability = 5 / 36$$

Q.12 What is the simplified value of $\frac{6}{5 + 4\sqrt{3}}$?

- A. $(13\sqrt{3}-15)/27$
- B. $(24\sqrt{5}-25)/25$
- C. $(15\sqrt{3}-24)/23$
- D. $\frac{-30 + 24\sqrt{3}}{23}$

Answer: D

Sol: Given :

$$\frac{6}{5 + 4\sqrt{3}}$$

Fromula:

$$\frac{a}{b + c} \times \frac{b - c}{b - c}$$

Solution:

$$\begin{aligned} &\frac{6}{5 + 4\sqrt{3}} \times \frac{5 - 4\sqrt{3}}{5 - 4\sqrt{3}} \\ &= \frac{6(5 - 4\sqrt{3})}{(5 + 4\sqrt{3})(5 - 4\sqrt{3})} \\ &= \frac{6(5 - 4\sqrt{3})}{25 - 48} \\ &= \frac{6(5 - 4\sqrt{3})}{-23} \\ &= \frac{30 - 24\sqrt{3}}{-23} \\ &= \frac{-30 + 24\sqrt{3}}{23} \end{aligned}$$

Correct answer is (D).

Q.13 The distance between two points P(2, 3) Q(4, 2) will be.

- A. $\sqrt{2}$
- B. $\sqrt{3}$
- C. 2
- D. $\sqrt{5}$

Answer: D

Sol: Given:

Points P(2, 3), Q(4, 2)

Concept used:

Distance between two points:

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

Solution:

$$d = \sqrt{(4 - 2)^2 + (2 - 3)^2}$$

$$= \sqrt{(2)^2 + (-1)^2}$$

$$= \sqrt{4 + 1}$$

$$= \sqrt{5}$$

Correct Answer is (d) $\sqrt{5}$

Q.14 There are two circles of radii r_1 and r_2 ($r_1 < r_2$). The area of the bigger circle is $693/2 \text{ cm}^2$. The difference of their circumferences is 22 cm. What is the sum of the diameters of the two circles?

- A. 17.5 cm
- B. 22 cm
- C. 28.5 cm
- D. 35 cm

Answer: D

Sol: Given:

Area of bigger circle = $\frac{693}{2} \text{ cm}^2$; difference of circumferences = 22 cm

$$\text{take } \pi = \frac{22}{7}$$

Formula Used:

$$\text{Circle area} = \pi r^2$$

$$\text{Circumference difference} = 2\pi(r_2 - r_1)$$

Solution:

Let radii be $r_1 < r_2$.

$$\text{From area: } \pi r_2^2 = \frac{693}{2}$$

$$r_2^2 = \frac{693}{2} \times \frac{7}{22} = \frac{441}{4}$$

$$r_2 = \frac{21}{2} = 10.5 \text{ cm}$$

From circumference difference:

$$2\pi(r_2 - r_1) = 22$$

$$\frac{44}{7}(r_2 - r_1) = 22$$

$$r_2 - r_1 = 3.5$$

$$\text{So } r_1 = 10.5 - 3.5 = 7 \text{ cm}$$

$$\text{Sum of diameters} = 2(r_1 + r_2) = 2(7 + 10.5) = 35 \text{ cm}$$

Q.15 There are 7 candidates for 3 posts. In A Chow many ways can the posts be filled-

- A. 120
- B. 130
- C. 100
- D. 210

Answer: D

Sol: Given:

Number of candidates = 7

Number of posts = 3

Formula used:

$${}^nP_r = \frac{n!}{(n - r)!}$$

Solution:

$${}^7P_3 = \frac{7!}{(7 - 3)!} = \frac{7!}{4!}$$

$$= 7 \times 6 \times 5 = 210$$

Correct answer is (d) **210**

Q.16 I bought two dresses for ₹1,200. I sold the first one at a loss of 9% and the second at a gain of 18%. If, on the whole I made neither a loss nor a gain, find the cost price (in ₹) of the first dress.

- A. 824
- B. 820
- C. 784
- D. 800

Answer: D

Sol: Given:

Total cost of two dresses = ₹1200

First dress sold at 9% loss

Second dress sold at 18% gain

No profit, no loss overall

Formula Used:

$$\text{Loss SP} = \text{CP} \times \left(1 - \frac{\text{Loss}\%}{100}\right)$$

$$\text{Gain SP} = \text{CP} \times \left(1 + \frac{\text{Gain}\%}{100}\right)$$

Solution:

Let the cost price of the first dress = x

Then, cost price of the second dress = 1200 - x

SP of first dress = 0.91x

SP of second dress = 1.18(1200 - x)

Since no profit, no loss:

$$0.91x + 1.18(1200 - x) = 1200$$

Solving gives x = 800

Q.17 Inductive method of teaching Mathematics we proceed from -

- A. Abstract to Concrete
- B. General to Specific

- C. Known to Unknown
- D. Unknown to Known

Answer: C

Sol: The correct answer is (C) Known to Unknown.

Explanation:

In the **Inductive Method** of teaching mathematics:

Teachers **start with specific, known examples** and guide students to discover patterns or rules that are **not yet known**.

It follows the natural learning process: **from what the learner already knows (concrete and specific) to what they need to discover or understand (general or abstract).**

This approach helps in **developing reasoning skills**, as students observe, analyze, and **generalize** based on **known situations**.

Additional Information (Other Options):

Abstract to Concrete: Common in the **Deductive Method**, where rules are first given, then applied to specific problems.

General to Specific: Also linked to **Deductive Method**, starting from general rules to apply on specific problems.

Unknown to Known: Not aligned with learning psychology; teaching is most effective when it starts from what the student already knows.

Information Booster:

Inductive Method is especially effective in the early stages of concept formation.

For example, when teaching the formula for the **sum of angles in a triangle**, the teacher might:

- Draw multiple triangles (known),
- Measure the angles in each,
- Observe that the sum is always 180°,
- Then help students **conclude the general rule** (unknown).

Q.18 Priya can do a certain piece of work in 22 days. Priya and Varsha can together do the same work in 11 days, and Priya, Varsha and Nisha can do the same work together in 8 days. In how many days can Priya and Nisha do the same work?

- A. 94/9
- B. 95/8
- C. 78/7
- D. 88/7

Answer: D

Sol: **Given:**

Priya alone can do the work in 22 days.

Priya and Varsha together can do the work in 11 days.

Priya, Varsha and Nisha together can do the work in 8 days.

Required: Time taken by Priya and Nisha together to do the same work

Formula Used:

Rate = $\frac{\text{Total Work}}{\text{Time}}$

Solution:

Assume Total Work = LCM(22, 11, 8) = 88 unit

Priya’s rate = $\frac{88}{22}$ = 4 units/day

Priya + Varsha rate = $\frac{88}{11}$ = 8 units/day

Varsha rate = 8 - 4 = 4 units/day

Priya + Varsha + Nisha rate = $\frac{88}{8}$ = 11 units/day

Nisha rate = 11 - (4 + 4) = 3 units/day

Priya and Nisha together = 4 + 3 = 7 units/day

Time taken by Priya and Nisha:

$$= \frac{88}{7} \text{ days}$$

- Q.19** ABCD is quadrilateral and E,F,G, and H are the mid point of $\overline{AB}$, $\overline{BC}$, $\overline{CD}$, and $\overline{DA}$ respectively. The quadrilateral EFGH is necessarily a:
- A. parallelogram
 - B. Square
 - C. rhombus, but not a square
 - D. rectangle, but not a square

Answer: A

Sol: Given:

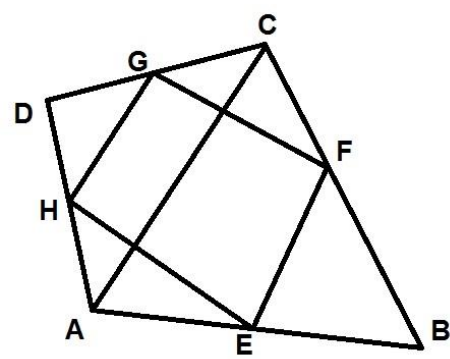
ABCD is a quadrilateral

E,F,G and H are mid-points of AB,BC,CD and DA respectively

Formula Used:

Opposite sides in a parallelogram are equal

Solution:



In $\triangle ADC$

H and G are the mid-points of AD and DC

Hence $GH \parallel AC$ (Mid-point theorem)

And $GH = \frac{1}{2}AC$ ($\triangle DHG \sim \triangle DAC$)

In $\triangle ABC$

E and F are mid-points of AB and BC

Therefore $EF \parallel AC$

And $EF = \frac{1}{2}AC$

So $EF = GH$ and $EF \parallel GH$

Opposite sides of parallelogram are parallel and equal

Hence EFGH is a parallelogram

Q.20 A cylinder is completely filled with water. A certain number of cylindrical bullets of diameter 1.4 cm and height 3 cm are gradually immersed into water in the cylinder. From the cylinder 5.544 litres of water overflows which is collected in a vessel. How many bullets were immersed into the cylinder? (Take $\pi = \frac{22}{7}$)

- A. 1400
- B. 1200
- C. 1060
- D. 950

Answer: B

Sol: Given :

Bullet diameter = 1.4 cm

radius r = 0.7 cm

Bullet height h = 3 cm

Overflowed water = 5.544 litres = 5544 cm³

Formula Used :

Volume of one bullet

$V = \pi r^2 h$

Solution :

$V = \frac{22}{7} \times (0.7)^2 \times 3$

$= \frac{22}{7} \times 0.49 \times 3$

$= \frac{22}{7} \times 1.47$
 $= 22 \times 0.21 = 4.62\text{cm}^3$

Number of bullets

$= \frac{5544}{4.62} = 1200$
