Q1. In a circle of radius 13 cm, a chord is at a distance of 12 cm from the center of the circle. Find the length (in cm) of the chord.

(a) 5 cm

(b) 10 cm

(c) 12 cm

(d) 8 cm

Q2. PQ and RS are common tangents to two circles intersecting at A and B. A and B, when produced on both sides, meet the tangents PQ and RS at X and Y, respectively. If AB = 3 cm and XY = 5 cm, then PQ is

(a) 4 cm

(b) 2 cm

(c) 3 cm

(d) 6 cm

Q3. An amount becomes 5 times its original value in 25 years. What is the rate of simple interest per annum?
(a) 16%
(b) 12%
(c) 20%
(d) 14%

Q4. A train running at the speed of 90 km/h crosses a 400 m long tunnel in 40 seconds. What is the length of the train (in meters)?

(a) 400
(b) 600
(c) 500
(d) 550

Q5. A ladder leaning against a wall makes an angle of 45° with the ground. If the length of the ladder is 10 m, what is the distance of the foot of the ladder from the wall?
(a) $10\sqrt{2}$ m

(b) $5\sqrt{2}$ m

(c) $3\sqrt{2}$ m

(d) $10\sqrt{2}$ m

Q6. If the selling price of 75 articles is equal to the cost price of 90 articles, then find the gain percentage.
(a) 20%
(b) 15%
(c) 25%
(d) 30%

Q7. A die is thrown once. What is the probability of getting a number greater than 4?

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

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

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

(d) $\frac{1}{6}$

Q8. The average of four numbers is 48. If the first number is one-third of the sum of the remaining numbers, then the first number is:

(a) 36

(b) 54

(c) 48

(d) 60

Q9. The sum of a two-digit number and the number obtained by reversing the digits is 99. If the digits of the number differ by 7, then the two-digit number can be:

(a) 92

(b) 29

(c) 81

(d) 18

Q10. The ratio of the ages of Amit and his father is 2:5. After 4 years, the ratio of their ages will become 3:7. What will be the ratio of their ages after 6 years?

(a) 4:9

(b) 19:43

(c) 13:38

(d) 6:11

Solutions:

S1. Ans. (b)

Sol. Given

Radius of the circle (r) = 13 cm

Distance of the chord from the center (d) = 12 cm

Let Length of the chord be l.

By perpendicular bisector theorem, the perpendicular from centre to the chord, bisects it.

Using Pythagoras theorem,

$r^2 = \left(\frac{l}{2}\right)^2 + d^2$

$13^2 = \left(\frac{l}{2}\right)^2 + 12^2$

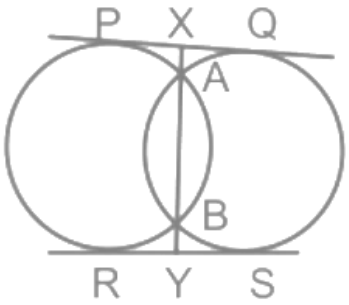
$169 = \left(\frac{l}{2}\right)^2 + 144$

$\left(\frac{l}{2}\right)^2 = 169 - 144 = 25$

$\left(\frac{l}{2}\right)^2 = 25 \Rightarrow \frac{l}{2} = 5 \Rightarrow l = 10cm$

S2. Ans. (a)

Sol. We have



Given

AB = 3 cm and XY = 5 cm

We know

$\Rightarrow XA = YB$
$\Rightarrow XY = XA + AB + BY$
$\Rightarrow 5 = 2XA + 3$
$\Rightarrow 2XA = 5 - 3 = 2$
$\Rightarrow XA = 1$
$XB = XA + AB = 1 + 3 = 4$

As we know,

$PX^2 = XA \times XB$
$\Rightarrow PX^2 = 1 \times 4$
$\Rightarrow PX = 2$ cm

Similarly,

$XQ = 2$ cm

$\Rightarrow PQ = PX + XQ = 2 + 2 = 4$ cm

S3. Ans. (a)
Sol. Given that,

Time duration = 25 years

Let the principal amount = P

So, interest earned in this duration = $5P$

As per the simple interest formula,

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

$5P - P = \frac{P\times\text{R}\times 25}{100}$

$4P = \frac{P \times R \times 25}{100}$

$4 = \frac{R}{4}$

$R = 16\%$

S4. Ans. (b)

Sol. Let length of the train be x

Total distance = (x + 400)

Speed = 90 km/h = $90 \times \frac{1000}{3600} = \frac{900}{36} = 25$ m/sec

We know that

$d = s \times t$

$\Rightarrow x + 400 = 25 \times 40$

$\Rightarrow x + 400 = 1000$

$\Rightarrow x = 600$ m

S5. Ans. (b)

Sol. The given situation forms a right triangle with:

The ladder as the hypotenuse (h = 10 m),

The distance of the foot of the ladder from the wall as the base (b),

The angle between the ladder and the ground as 45°.

We have

$\cos\theta = \frac{b}{h}$

$\cos 45° = \frac{b}{10}$

$\frac{1}{\sqrt{2}} = \frac{b}{10}$

$b = \frac{10}{\sqrt{2}}$

$b = 5\sqrt{2}$ m

S6. Ans. (a)

Sol. Let the cost price of 1 article be ₹1.
Therefore, the cost price (CP) of 90 articles = ₹90.
It is given that the selling price (SP) of 75 articles is equal to the cost price of 90 articles.
So, the selling price (SP) of 75 articles = ₹90.

Thus,

The selling price (SP) of 1 article = $\frac{90}{75} = ₹1.20$

Now,
Cost price (CP) of 1 article = ₹1,
Selling price (SP) of 1 article = ₹1.20.

Gain = SP - CP = ₹1.20 - ₹1 = ₹0.20.

Gain percentage = $\frac{Gain}{CP} \times 100 = \frac{0.20}{1} \times 100 = 20\%$

Thus, the gain percentage is 20%.

S7. Ans. (b)
Sol. Total possible outcomes $= n(S) = 6$
Favourable outcomes $= 5, 6.$
i.e., $n(E) = 2$
$\therefore P(\text{number greater than } 3) = \frac{n(E)}{n(S)} = \frac{2}{6} = \frac{1}{3}.$

S8. Ans. (c)

Sol. The average of the four numbers is 48.

Let four numbers be a, b, c, d. Then

$$\frac{a+b+c+d}{4} = 48$$

$$a+b+c+d = 192$$

$$b+c+d = 192 - a$$

ATQ.

$$a = \frac{1}{3}(b+c+d) = \frac{1}{3}(192-a)$$

$$3a = 192 - a$$

$$4a = 192 \Rightarrow a = \frac{192}{4} = 48$$

S9. Ans. (c)

Sol. Given:
The sum of the two-digit number and the number obtained by reversing the digits is 99.
The digits of the number differ by 7

Let the unit digit be x and tens digit be y

y - x = 7 .....(1)

From the first condition:

10y + x + (10x + y) = 99

11y + 11x = 99

y + x = 9 .....(2)

Subtracting (1) from (2)

y + x -(y-x) = 9 - 7

2x = 2

x = 1

then y = 8

Thus, the number be 81.

S10. Ans. (b)

Sol. Let the present ages of Amit and his father be 2x and 5x.

After 4 years, the ratio of their ages is given as 3:7.

$\frac{2x+4}{5x+4} = \frac{3}{7}$

$7(2x + 4) = 3(5x + 4)$

$14x + 28 = 15x + 12$

$x = 16$

Now, present age of Amit $= 2x = 2 \times 16 = 32 year$

Present age of his father $= 5x = 80 year$

After 6 years Amit's age $= 32 + 6 = 38 year$

After 6 years Amit's father age $= 80 + 6 = 86 year$

So, required ratio $= \frac{38}{86} = \frac{19}{43} = 19:43$