

JSSC Para Teacher PRT and Upper Primary Paper 2 Mathematics Set 2 - English

Q.1 An eleven-digit number $624x58143y$ is divisible by 72. Find the value of $(2x + 3y)$.

Options:

- (a) 15
- (b) 18
- (c) 21
- (d) 24

- A. 15
- B. 18
- C. 21
- D. 8

Answer: D

Sol: Given:

Number: **$624x58143y$**

Divisible by **72** → divisible by **8** and **9**.

Formula used:

Divisible by 8 → Last three digits divisible by 8

Divisible by 9 → Sum of digits divisible by 9

Solution:

Check divisibility by 8

Last three digits = **$43y$**

Test $y = 0-9$ for $43y$ divisible by 8:

$430 \div 8 = 53.75 \rightarrow$ no

$432 \div 8 = 54 \rightarrow$ YES

So **$y = 2$** is the only one that works.

Apply divisibility by 9

Digits with $y = 2$:

$6 + 2 + 4 + x + 5 + 8 + 1 + 4 + 3 + 2$

Sum known digits:

$6 + 2 + 4 + 5 + 8 + 1 + 4 + 3 + 2 = \mathbf{35}$

Total sum = **$35 + x$**

For divisibility by 9:

$35 + x \equiv 0 \pmod{9}$

$35 \pmod{9} = 8$

So:

$8 + x \equiv 0 \pmod{9}$

$x \equiv 1 \pmod{9}$

Since x is a digit:

$x = 1$

Evaluate $(2x + 3y)$

$x = 1$

$y = 2$

$2x + 3y = 2(1) + 3(2)$

$= 2 + 6$

$= 8$

Correct answer is (D) 8.

Q.2 A boat takes 0.5 h more to travel a distance of 45 km upstream than to travel the same distance downstream. If the speed of the boat in still water is 4 times the speed of the stream, then in what time will it cover a distance of 72 km downstream?

- A. $1\frac{2}{5}$ h
- B. $2\frac{1}{6}$ h
- C. $2\frac{1}{3}$ h
- D. $1\frac{1}{5}$ h

Answer: D

Sol: Given:

Distance = 45 km (both upstream and downstream)

Upstream time = Downstream time + 0.5 hours



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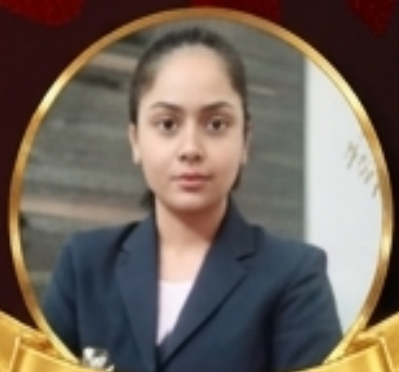
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Speed of boat in still water = 4 × speed of stream

Required: Time to cover 72 km downstream

Formula Used:

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

Solution:

Let stream speed = x km/h
Then, boat speed in still water = 4x km/h

So:

$$\text{Downstream speed} = 4x + x = 5x$$

$$\text{Upstream speed} = 4x - x = 3x$$

$$\text{Upstream time} - \text{Downstream time} = 0.5$$

$$\frac{45}{3x} - \frac{45}{5x} = 0.5$$

$$\frac{15}{x} - \frac{9}{x} = 0.5$$

$$\frac{6}{x} = 0.5$$

$$x = \frac{6}{0.5} = 12$$

So:

$$\text{Stream speed } x = 12 \text{ km/h}$$

$$\text{Boat speed in still water} = 4x = 48 \text{ km/h}$$

$$\text{Downstream speed} = 48 + 12 = 60 \text{ km/h}$$

Now,

$$\text{Time for 72 km downstream} = \frac{72}{60} = 1\frac{1}{5} \text{ hours}$$

Q.3 If radius of a sphere is increased by 30 percent, then what will be the percentage increase in its volume?

- A. 120 percent
- B. 90 percent
- C. 119.7 percent
- D. 125.5 percent

Answer: C

Sol: Given :

Radius increased by 30%

Formula Used :

Volume of sphere:

$$V = \frac{4}{3}\pi r^3$$

Percentage change formula:

$$\text{Increase \%} = \left(\frac{V_{\text{new}} - V_{\text{old}}}{V_{\text{old}}} \right) \times 100$$

Solution :

Original radius = r

New radius = 1.3r

$$V_{\text{new}} = \frac{4}{3}\pi(1.3r)^3$$

$$\text{So, } \frac{V_{\text{new}}}{V_{\text{old}}} = 2.197$$

Percentage increase:

$$(2.197 - 1) \times 100 = 1.197 \times 100 = 119.7\%$$

Q.4 If the points A(1, 2), B(4, 3), C(1, 0) and D(k, -1) are the vertices of a parallelogram then,the value of k is:

- A. 2
- B. 1
- C. -1
- D. -2

Answer: D



Sol: Given:

The points A(1, 2), B(4, 3), C(1, 0), and D(k, -1) are the vertices of a parallelogram.

Concept Used:

In a parallelogram, the diagonals bisect each other. Hence, the midpoint of diagonal AC should be the same as the midpoint of diagonal BD.

Solution:

Midpoint of AC:

The coordinates of A and C are (1, 2) and (1, 0), respectively.

The midpoint of AC is calculated as:

$$\left(\frac{1+1}{2}, \frac{2+0}{2} \right) = (1, 1)$$

Midpoint of BD:

The coordinates of B and D are (4, 3) and (k, -1), respectively.

The midpoint of BD is:

$$\left(\frac{4+k}{2}, \frac{3+(-1)}{2} \right) = \left(\frac{4+k}{2}, \frac{2}{2} \right) = \left(\frac{4+k}{2}, 1 \right)$$

Equating the midpoints of AC and BD:

Since the diagonals bisect each other, their midpoints must be the same. Thus:

$$(1, 1) = \left(\frac{4+k}{2}, 1 \right)$$

From the y-coordinates, we see that they are already equal. Now, equating the x-coordinates:

$$1 = \frac{4+k}{2}$$

$$2 = 4 + k$$

$$k = 2 - 4 = -2$$

Q.5 A shopkeeper bought an article for ₹740. At what price (in ₹) should he sell the article to make 20% profit?

- A. 876
- B. 900
- C. 592
- D. 888

Answer: D

Sol: Given:

Cost Price (CP) = ₹740

Profit Percentage = 20%

Formula Used:

$$\text{Selling Price (SP)} = \text{CP} \times \left(1 + \frac{\text{Profit Percentage}}{100} \right)$$

Solution:

$$\text{SP} = 740 \times \left(1 + \frac{20}{100} \right)$$

$$\text{SP} = 740 \times 1.2$$

$$\text{SP} = ₹888$$

The shopkeeper should sell the article for **₹888** to make a 20% profit.

Q.6 If $x + \frac{1}{x} = 8$, find $x^2 - \frac{1}{x^2}$

- A. 62
- B. $16\sqrt{15}$
- C. $10\sqrt{15}$
- D. $15\sqrt{15}$

Answer: B

Sol: Given:

$$x + \frac{1}{x} = 8$$

We must find: $x^2 - \frac{1}{x^2}$

Solution:

$$\left(x + \frac{1}{x}\right)^2 = 8^2$$

$$x^2 + \frac{1}{x^2} + 2 = 64$$

$$x^2 + \frac{1}{x^2} = 62$$

$$\text{Find } \left(x^2 - \frac{1}{x^2}\right)$$

We use:

$$\left(x - \frac{1}{x}\right)^2 = x^2 + \frac{1}{x^2} - 2$$

But we do NOT need $(x - 1/x)$.
Instead use identity:

$$\left(x^2 - \frac{1}{x^2}\right) = \left(x + \frac{1}{x}\right)\left(x - \frac{1}{x}\right)$$

First find $\left(x - \frac{1}{x}\right)$:

$$\left(x - \frac{1}{x}\right)^2 = 62 - 2 = 60$$

$$x - \frac{1}{x} = \sqrt{60} = 2\sqrt{15}$$

Final Step

$$x^2 - \frac{1}{x^2} = \left(x + \frac{1}{x}\right)\left(x - \frac{1}{x}\right)$$

$$= 8 \times 2\sqrt{15}$$

$$= 16\sqrt{15}$$

Q.7 A cylindrical rod has an outer curved surface area of 2200 cm^2 . If the length of the rod is 16 cm, then the outer radius (in cm) of the rod, correct to two places of decimal, is: (Take $\pi = 22/7$)

- A. 23.95
- B. 21.88
- C. 23.29
- D. 21.09

Answer: B

Sol: Given:

Outer curved surface area of the cylindrical rod = 2200 sq. cm.

Length of the rod = 16 cm

Value of $\pi = 22 / 7$

Formula Used:

Curved Surface Area of Cylinder = $2\pi rh$

Solution:

$$2\pi rh = 2200$$

$$r = \frac{2200}{2 \times \pi \times h}$$

$$r = \frac{2200}{2 \times \left(\frac{22}{7}\right) \times 16}$$

$$r = \frac{2200 \times 7}{704}$$

$$r = \frac{15400}{704}$$

$$r \approx 21.88 \text{ cm}$$

Q.8 The largest 7-digit number which is a perfect square is:

- A. 9999999
- B. 9999768
- C. 9998244
- D. 9998222

Answer: C

Sol: The greatest seven-digit number is 9 999 999.

$$\sqrt{9\,999\,999} \approx 3162.27$$

So the largest integer whose square is seven digits is 3162.

$$\begin{aligned} 3162^2 &= (3160 + 2)^2 \\ &= 3160^2 + 4 \times 3160 + 4 \\ &= 9\,985\,600 + 12\,640 + 4 \\ &= 9\,998\,244 \end{aligned}$$

The largest seven-digit perfect square is 9 998 244.

Q.9 3.13113111311113... is :

- A. a rational number
- B. an irrational number
- C. a whole number
- D. an integer

Answer: B

Sol: Given:

Number = 3.13113111311113...

Concept used:

A number is **rational** if its decimal expansion is either terminating or **repeating (recurring)**.
If it is **non-terminating and non-repeating**, it is **irrational**.

Solution:

Here, the digits after the decimal are:
13, 113, 1113, 11113, ...

The number of 1's before 3 keeps **increasing**, so the pattern **never repeats**.
Hence, the decimal is **non-terminating and non-repeating**.

Correct answer is (b) an irrational number.

- Q.10** The population of a district is 364000, out of which 178000 are males. 63% of the population is literate. If 63% males are literate, then what percentage of females are literate?
- A. 66%
B. 62%
C. 63%
D. 65%

Answer: C

Sol: Given:

Total population = 3,64,000

Number of males = 1,78,000

Therefore, number of females = 3,64,000 - 1,78,000 = 1,86,000

Total literate population = 63% of 3,64,000

63% of males are literate

Required: Percentage of females who are literate

Formula Used:

$$\text{Percentage of literate females} = \frac{\text{Literate females}}{\text{Total females}} \times 100$$

Solution:

$$\text{Literate population} = 3,64,000 \times \frac{63}{100}$$

$$= 3,64,000 \times 0.63$$

$$= 2,29,320$$

$$\text{Literate males} = 1,78,000 \times \frac{63}{100}$$

$$= 1,78,000 \times 0.63$$

$$= 1,12,140$$

$$\text{Literate females} = 2,29,320 - 1,12,140 = 1,17,180$$

$$\text{Total females} = 1,86,000$$

$$\therefore \frac{1,17,180}{1,86,000} \times 100$$

$$\text{Female literacy \%} = \frac{1,17,180}{1,86,000} \times 100$$

$$= \frac{11718}{186}$$

$$\approx 63\%$$

So, the percentage of females who are literate is 63%

Q.11 4 years ago, the age of a father was 37 years more than twice his son's age. After how many years, from now, will he be twice his son's age?

- A. 31
- B. 33
- C. 30
- D. 35

Answer: B

Sol: Given:

4 years ago, father's age = 37 years more than twice his son's age.

We need to find after how many years from now the father will be twice his son's age.

Solution:

Let present ages be:

Father = F years

Son = S years

Condition 4 years ago:

$$F - 4 = 2(S - 4) + 37$$

$$F - 4 = 2S - 8 + 37 = 2S + 29$$

$$F = 2S + 33 \dots\dots\dots(1)$$

Condition after (t) years (father twice son's age):

$$F + t = 2(S + t)$$

$$F + t = 2S + 2t$$

$$F = 2S + t \dots\dots\dots(2)$$

Now, Equating 1 and 2

$$2S + 33 = 2S + t$$

$$t = 33$$

So, after 33 years, the father will be twice his son's age.

Q.12 the diameter of the base of a conical tent is 28 feet and the slant height of the cone is 18 feet. Find the area (in ft²) of the canvas that is required for making this tent. Ignore the wastage of canvas. ($Use \pi = \frac{22}{7}$)

- A. 792
- B. 791
- C. 790
- D. 793

Answer: A

Sol: Given :

Diameter of conical tent = 28 ft

Radius r = 14 ft

Slant height l = 18 ft

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

Formula Used :

Canvas required = Curved Surface Area of cone

$$CSA = \pi r l$$

Solution :

$$CSA = \frac{22}{7} \times 14 \times 18$$

$$= 22 \times 2 \times 18$$

$$= 22 \times 36 = 792$$

Q.13 If 3.6 : 1.2 :: 1.2 : y, then the value of y is:

- A. 0.60
- B. 0.40
- C. 0.90
- D. 0.80

Answer: B

Sol: Given:

Proportion: 3.6 : 1.2 :: 1.2 : y

Formula Used:

In a proportion (a : b :: c : d),

$$\frac{a}{b} = \frac{c}{d}$$

Solution:

$$\frac{3.6}{1.2} = \frac{1.2}{y}$$

$$\frac{3.6}{1.2} = 3$$

$$3 = \frac{1.2}{y}$$

$$y = \frac{1.2}{3} = 0.4$$

Q.14 What smallest number should be added to 81661 so that the sum is completely divisible by 73?

- A. 25
- B. 24
- C. 26
- D. 30

Answer: C

Sol: Given:

Number = 81661

We need to find the smallest number to be added so that the result is completely divisible by 73.

Concept Used:

Remainder concept in divisibility:

If N leaves remainder r when divided by k, then the smallest number to be added to N to make it divisible by k is k - r

Formula Used:

$$N = k \times q + r$$

Required number to add = k - r, if (r $\neq$ 0)

Solution:

Divide 81661 by 73.

$$73 \times 1119 = 81687$$

Difference to next multiple of 73:

$$81687 - 81661 = 26$$

So, adding 26 makes it exactly divisible by 73.

Hence, the smallest number to be added is 26.

Q.15 If 75 percent of total articles are sold at a profit of 20 percent and remaining articles are sold at a loss of 20 percent, then what will be the overall profit percentage?

- A. 8 percent
- B. 10 percent
- C. 5 percent
- D. 12 percent

Answer: B

Sol: Given:

75% articles sold at 20% profit

25% articles sold at 20% loss

Formula Used:

$$\text{Overall Profit \%} = \left(\frac{(P_1 \times W_1) + (P_2 \times W_2)}{W_1 + W_2} \right)$$

Solution:

$P_1 = +20\%, W_1 = 75, P_2 = -20\%, W_2 = 25$

Articles% of TotalProfit/Loss %

Type I 75% +20%

Type II 25% -20%

Overall Profit% = $\frac{(20 \times 75) + (-20 \times 25)}{100} = \frac{1500 - 500}{100} = \frac{1000}{100} = 10\%$

Alternate Solution:

Assume total articles = 100, each costing ₹1

75 articles → profit = 20% of ₹1 = ₹0.20 → total profit = ₹15

25 articles → loss = 20% of ₹1 = ₹0.20 → total loss = ₹5

Net profit = ₹15 – ₹5 = ₹10

Cost price = ₹100

Profit % = $\frac{10}{100} \times 100 = 10\%$

Thus, the correct option is **(b) 10%**

- Q.16** Ram does the work in 30 days while Raju does it in 20 days. If they work alternatively with Ram beginning the work, in how many days will the work be finished?
- A. 20
 - B. 12
 - C. 24
 - D. 25

Answer: C

Sol: Given:

Ram completes work in 30 days

Raju completes work in 20 days

They work alternately, starting with Ram.

Solution:

Daily work:

Ram’s 1-day work = $\frac{1}{30}$

Raju’s 1-day work = $\frac{1}{20}$

Work done in 2 days (Ram + Raju)

$$\frac{1}{30} + \frac{1}{20} = \frac{2+3}{60} = \frac{5}{60} = \frac{1}{12}$$

So in 2 days → 1/12 of work done

Work in 24 days:

$$\frac{24}{2} = 12 \text{ cycles}$$
$$12 \times \frac{1}{12} = 1$$

Thus work completes exactly in a whole number of cycles.

Final Answer :

24 days

Alternate Method:

Take total work = LCM(30, 20) = 60 units

Ram’s rate = 60/30 = 2 units/day

Raju’s rate = 60/20 = 3 units/day

Work in 2 days:

$$2 + 3 = 5 \text{ units}$$

Total work = 60 units

$$60 \div 5 = 12 \text{ cycles}$$

Each cycle = 2 days:

$$12 \times 2 = 24 \text{ days}$$

Q.17 A student compares 4/9 and 3/8 and says: “4 is greater than 3, so 4/9 > 3/8.” What should the teacher do to correct the misconception?

- A. Tell the student to memorize cross-multiplication
- B. Explain comparison using decimals
- C. Ask the student to draw same-size models and shade 4/9 and 3/8
- D. Give extra fraction practice

Answer: C

Sol: The Correct answer: (C) Ask the student to draw same-size models and shade 4/9 and 3/8

Explanation:

The student compares only numerators and ignores denominators. Asking them to draw two same-size shapes (or use fraction strips/number line) and shade **4/9** and **3/8** lets them see that ninths are smaller pieces than eighths — so 4/9 is actually smaller than 3/8. A visual model corrects the misconception conceptually rather than giving a rote rule.

Why other options are weaker:

- (A)** Cross-multiplication works but is procedural; it doesn’t fix the underlying misconception.
- (B)** Decimals give the right answer but remain algorithmic and may encourage calculator dependence.
- (D)** More practice will only reinforce the wrong rule unless the conceptual error is addressed.

Q.18 Find x in the following expression: $5\frac{3}{7} - x = 3\frac{5}{14}$

- A. $4\frac{1}{7}$
- B. $2\frac{1}{14}$
- C. $5\frac{3}{7}$
- D. $3\frac{2}{14}$

Answer: B

Sol: Given:

$5\frac{3}{7} - x = 3\frac{5}{14}$

Solution:

$5\frac{3}{7} - x = 3\frac{5}{14}$

$\frac{38}{7} - x = \frac{47}{14}$

$\implies x = \frac{38}{7} - \frac{47}{14}$

$x = \frac{76 - 47}{14} = \frac{29}{14} = 2\frac{1}{14}$

Q.19 Three smaller cubes with sides of 3, 4, and 5 cm are melted together to form a large cube. What is the ratio of the total surface areas of the smaller cubes and the large cube?

- A. 5 : 3
- B. 4 : 1
- C. 25 : 18
- D. 7 : 3

Answer: C

Sol: Given:

Side of cubes = 3 cm, 4 cm, 5 cm

Formula Used:

Volume of cube = s^3

Surface area of cube = $6s^2$

Large cube side = $\sqrt[3]{\text{total volume}}$

Solution:

Volumes of small cubes:

$3^2 + 4^2 + 5^2$

$= 27 + 64 + 125 = 216$

Side of large cube = $\sqrt[3]{216} = 6$ cm

Surface areas:

Small cubes:

$6(3^2) + 6(4^2) + 6(5^2)$

$= 6(9 + 16 + 25) = 6 \times 50 = 300$

Large cube:

$6(6^2) = 6 \times 36 = 216$

Required ratio = $300 : 216 = 25 : 18$



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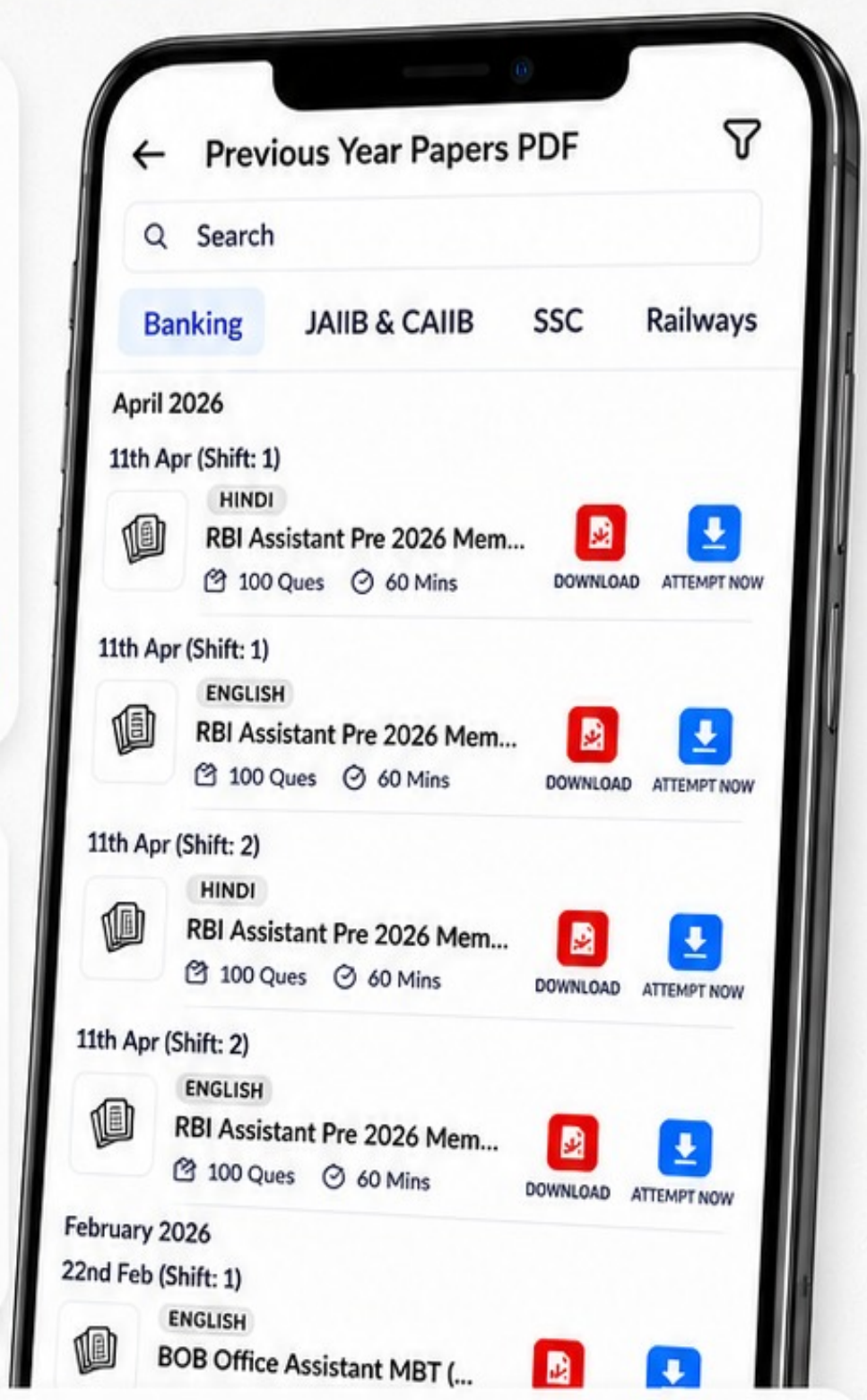
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Q.20 Which of the following number is a prime number?

- A. 15
- B. 23
- C. 12
- D. 75

Answer: B

- Sol:**
- A **prime number** is a number greater than 1 that has no divisors other than 1 and itself.
 - 15 is divisible by 1, 3, 5, and 15 (not prime).
 - 12 is divisible by 1, 2, 3, 4, 6, and 12 (not prime).
 - 75 is divisible by 1, 3, 5, 15, 25, and 75 (not prime).
 - **23** is divisible only by 1 and 23, so it is a prime number.

Correct answer is 23.

