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## DAV BR PUBLIC SCHOOL, BINA <br> HALF YEARLY SAMPLE PAPER SESSION 2023-24 <br> Class: X <br> Time Allowed: 3 Hrs <br> Subject: Mathematics <br> MM: 80

## Section A

1 The largest number that divides 70 and 125, which leaves the remainders 5 and 8 , is:
(a) 15
(c) 17
(b) 13
(d) 25

2 If the sum of the zeroes of the quadratic polynomial $k x^{2}+2 x+3 k$ is equal to their product, then $k$ equals
(a) $\frac{1}{3}$
(c) $-\frac{1}{3}$
(b) $\frac{2}{3}$
(d) $-\frac{2}{3}$

3 If one zero of the quadratic polynomial $x^{2}+3 x+k$ is 2 , then the value of $k$ is
(a) 10
(c) -10
(b) -7
(d) -2

4 The number of polynomials having zeroes as -2 and 5 is
(a) 1
(c) 3
(b) 2
(d) more than 3

5 The pairs of equations $9 x+3 y+12=0$ and $18 x+6 y+26=0$ have
(a) Unique solution
(c) Infinitely many solutions
(b) Exactly two solutions
(d) No solution

6 The pair of equations $5 x-15 y=8$ and $3 x-9 y=24 / 5$ has
(a) one solution
(c) infinitely many solutions
(b) two solutions
(d) no solution

7 The sum of the digits of a two-digit number is 9 . If 27 is added to it, the digits of the number get reversed. The number is
(a) 25
(c) 63
(b) 72
(d) 36

8 Which of the following equations has no real roots?
(a) $x^{2}-4 x+3 \sqrt{2}=0$
(c) $x^{2}-4 x-3 \sqrt{ } 2=0$
(b) $x^{2}+4 x-3 \sqrt{2}=0$
(d) $3 x^{2}+4 \sqrt{ } 3 x+4=0$

9 If $1 / 2$ is a root of the quadratic equation $x^{2}-m x-5 / 4=0$, then value of $m$ is:
(a) 2
(c) -3
(b) 3
(d) 2
$10\left(x^{2}+1\right)^{2}-x^{2}=0$ has
1
(a) four real roots
(c) no real roots
(b) two real roots
(d) one real root.

11 The list of numbers $-10,-6,-2,2, \ldots$ is
(a) an AP with $\mathrm{d}=-16$
(c) an AP with $\mathrm{d}=-4$
(b) an AP with $\mathrm{d}=4$
(d) not an AP

12 The first four terms of an AP, whose first term is -2 and the common difference is -2 , are
(a) $-2,0,2,4$
(c) $-2,-4,-6,-8$
(b) $-2,4,-8,16$
(d) $-2,-4,-8,-16$

13 If the common difference of an AP is 5 , then what is $\mathrm{a}_{18}-\mathrm{a}_{13}$ ?
(a) 5
(c) 25
(b) 20
(d) 30
$14 D$ and $E$ are respectively the points on the sides $A B$ and $A C$ of a triangle $A B C$ such that $\mathrm{AD}=2 \mathrm{~cm}, \mathrm{BD}=3 \mathrm{~cm}, \mathrm{BC}=7.5 \mathrm{~cm}$ and $\mathrm{DE}|\mid \mathrm{BC}$. Then, length of DE (in cm) is
(a) 2.5
(c) 5
(b) 3
(d) 6

15 It is given that $\triangle A B C \sim \triangle D E F, \angle A=50^{\circ}, \angle B=50$, then which one is true
(a) $\angle F=50^{\circ}$
(c) $\angle F=100^{\circ}$
(b) $\angle D=100^{\circ}$
(d) $\angle D=50^{\circ}$

16 In the given figure, $\mathrm{DE}|\mid \mathrm{BC}$. The value of EC is

(a) 1.5 cm
(c) 3 cm
(b) 2 cm
(d) 1 cm

17 If the distance between the points $A(4, p)$ and $B(1,0)$ is 5 units then the value(s) of $p$ is(are)
(a) 4
(c) -4
(b) $\pm 4$
(d) 0

18 In which ratio the $y$-axis divides the line segment joining the points $(5,-6)$ and $(-1,-4)$ ?
(a) $1: 5$
(c) $5: 1$
(b) $1: 1$
(d) $1: 2$

19 Assertion: The H.C.F. of two numbers is 16 and their product is 3072 . Then their L.C.M. = 162 .
Reason: If $a$ and $b$ are two positive integers, then H.C.F. $\times$ L.C.M. $=a \times b$.
(a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
(b) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).
(c) Assertion (A) is true but Reason (R) is false.
(d) Assertion (A) is false but Reason (R) is true.

20 Assertion (A): The point $(0,4)$ lies on y-axis.
Reason ( $\mathbf{R}$ ): The x -coordinate on the point on y -axis is zero.
(a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
(b) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).
(c) Assertion (A) is true but Reason (R) is false.
(d) Assertion (A) is false but Reason (R) is true.

## Section B

21 Show that $5-\sqrt{ } 3$ is irrational.
22 Find a quadratic polynomial $1 / 4,-1$ as the sum and product of its zeroes respectively
23 Find the 20th term from the last term of the AP : 3, 8, 13, ..., 253.
24 Prove that if a line divides any two sides of a triangle in the same ratio, then the line is parallel to the third side.
25 Find a relation between x and y such that the point $(\mathrm{x}, \mathrm{y})$ is equidistant from the point $(3,6)$ and $(-3,4)$.

## Section C

26 A sweetseller has 420 kaju barfis and 130 badam barfis. She wants to stack them in such a way that each stack has the same number, and they take up the least area of the tray. What is the number of that can be placed in each stack for this purpose?
27 For what values of $k$ will the following pair of linear equations have infinitely many solutions?

$$
\begin{gathered}
2 x+3 y-7=0 \\
2 k x+(k+8) y=28
\end{gathered}
$$

28 If a line intersects sides AB and AC of a $\triangle \mathrm{ABC}$ at D and E respectively and is parallel to $B C$, prove that $\frac{A D}{A B}=\frac{A E}{A C}$

(OR)
In Fig. 6.20, DE || OQ and DF \|| OR. Show that EF \|| QR.


29 Find the zeroes of the polynomial $x^{2}-3$ and verify the relationship between the zeroes and the coefficients.
30 A sum of ${ }^{-} 1000$ is invested at $8 \%$ simple interest per year. Calculate the interest at the end of each year. Do these interests form an AP? If so, find the interest at the end of 30 years making use of this fact.
31 A motor boat whose speed is $18 \mathrm{~km} / \mathrm{h}$ in still water takes 1 hour more to go 24 km upstream than to return downstream to the same spot. Find the speed of the stream.

## Section D

32 A cottage industry produces a certain number of pottery articles in a day. It was observed on a particular day that the cost of production of each article (in rupees) was 3 more than twice the number of articles produced on that day. If the total cost of production on that day was 90 , find the number of articles produced and the cost of each article.
(OR)
A rectangular park is to be designed whose breadth is 3 m less than its length. Its area is to be 4 square metres more than the area of a park that has already been made in the shape of an isosceles triangle with its base as the breadth of the rectangular park and of altitude 12 m as shown in fig. Find its length and breadth.


33 Prove that If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, the other two sides are divided in the same ratio. In figure, $D E \| B C$. Find $A D$


34 A manufacturer of TV sets produced 600 sets in the third year and 700 sets in the seventh year. Assuming that the production increases uniformly by a fixed number every year, find :
(i) the production in the 1st year
(ii) the production in the 10th year
(iii) the total production in first 7 years

35 The taxi charges in a city consist of a fixed charge together with the charge for the distance covered. For a distance of 10 km , the charge paid is 105 and for a journey of 15 km , the charge paid is ${ }^{-} 155$. What are the fixed charges and the charge per km? How much does a person have to pay for travelling a distance of 25 km ?

## Section E

36 Your friend Veer wants to participate in a 200 m race. He can currently run that distance in 51 seconds and with each day of practice it takes him 2 seconds less. He wants to do in 31 seconds.

(i) What is the minimum number of days he needs to practice till his goal is achieved
(ii) If nth term of an AP is given by an $=2 n+3$ then what is common difference of an AP
(OR)
Which of the following terms is/are in AP for the given situation (a) $51,53,55 \ldots$
(b) $51,49,47 \ldots$

37 The class X students school in krishnagar have been allotted a rectangular plot of land for their gardening activity. Saplings of Gulmohar are planted on the boundary at a distance of 1 m from each other. There is triangular grassy lawn in the plot as shown in the figure. The students are to sow seeds of flowering plants on the remaining area of the plot.

(i) Taking A as origin, find the coordinates of P
(ii) What will be the coordinates of R , if C is the origin?
(iii) What will be the coordinates of Q , if C is the origin?
(OR)
Calculate the area of the triangles if A is the origin
38 Raj and Ajay are very close friends. Both the families decide to go to Ajay's car travels $5 \mathrm{~km} / \mathrm{h}$ faster than Raj's car. Raj took 4 hours more than

Ajay to complete the journey of 400 km .


1. What will be the distance covered by Ajay's car in two hours?
2. Which of the following quadratic equation describe the speed of Raj's car?
3. What is the speed of Raj's car?

## (OR)

How much time took Ajay to travel 400 km ?

