CBSE QUESTION PAPER
CLASS-X
MATHS

SECTION - A

Question 1: Which of the following numbers has terminating decimal expansion?

$(a).\ \frac{21}{2^3 5^6}$

$(b).\ \frac{17}{49}$

$(c).\ \frac{89}{2^2 3^2}$

$(d).\ \frac{37}{45}$

Question 2: If $\theta = 45°$, the value of $\text{cosec}^2\,\theta$ is

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

$(b)\quad 1$

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

$(d)\quad 2$

Question 3: If $\sin(60° + \theta) - \cos(30° - \theta)$ is equal to

$(a)\ 2\cos\theta$

$(b)\ 2\sin\theta$

$(c)\quad 1$

$(d)\quad 0$

Question 4: The $[HCF \times LCM]$ for the number 50 and 20 is

(a) 10
(b) 1000
(c) 100
(d) 110

Question 5: The value of k for which the pair of linear equations

$$4x + 6y - 1 = 0 \; and \; 2x + ky - 7 = 0, represents \; parallel \; lines \; is$$

(a) $k = 3$
(b) $k = -3$
(c) 2
(d) -2

Question 6: The value of $[(\sec\theta + \tan\theta)(1 - \sin\theta)]$is equal to

(a) $\tan^2\theta$
(b) $\sin^2\theta$
(c) $\cos\theta$
(d) $\sin\theta$

Question 7: If $A = 45° \; and \; B = 30°, \; then \; the \; value \; \sin A\cos B + \cos A\sin B$ is

$(a)\dfrac{\sqrt{3}+1}{2\sqrt{2}}$

$(b)\dfrac{\sqrt{3}+1}{2\sqrt{3}}$

$(c)\dfrac{\sqrt{3}-1}{2\sqrt{2}}$

$(d)\dfrac{\sqrt{3}-1}{2\sqrt{3}}$

Question 8: If the pair of linear equations

$$3x + 2y = 1$$

$$(2k + 1)x + (k + 2)y = k - 1$$

Has infinitely many solution, then the value of k is

(a) 2
(b) 4
(c) 3
(d) 5

Question 9: If the HCF of 210 and 55 is expressible in the form $210 \times 5 + 55 \times p$, then the value of p is

(a) -17
(b) -18
(c) -20
(d) -19

Question 10:

The mean of first 20 natural numbers is

(a) 7.5
(b) 8.5
(c) 9.5
(d) 10.5

SECTION - B

Question 11:

If α and β are the zeroes of the quadratic polynomial $p(x) = x^2 - (k + 6)x + 2(2k - 1)$, then find the value of k, $if\ \alpha + \beta = \frac{1}{2}\alpha\beta$.

Question 12:

Find a quadratic polynomial with zeroes $3 + \sqrt{2}\ and\ 3 - \sqrt{2}$.

Question 13:

$$If\ \cot\theta = \frac{7}{8}, \text{Find the value of } \frac{(1+\sin\theta)(1-\sin\theta)}{(1+\cos\theta)(1-\cos\theta)}$$

Question 14:

Solve for x and y

$$\left.\begin{aligned}\frac{5}{x}+\frac{1}{y}&=2\\ \frac{6}{x}-\frac{3}{y}&=1\end{aligned}\right\} \quad x\neq 0, y\neq 0$$

Question15:

$$\frac{\sqrt{\text{cosec}\,A-1}}{\sqrt{\text{cosec}\,A+1}}+\frac{\sqrt{\text{cosec}\,A+1}}{\sqrt{\text{cosec}\,A-1}}=2\sec A$$

OR

If ABC is a right angle triangle, right-angles at C. If $\angle A = 30°\ and\ AB = 50$ units, find the remaining two sides and $\angle B\ of\ \Delta ABC$.

Question 16:

If ABC is an equilateral triangle with AD⊥ BC, then prove $AD^2 = 3DC^2$

Solution:

Question 17:

The length of 42 leaves of a plant are measure correct up to the nearest millimeter and the data is as under:

Length (in m)	**118-126**	**126-134**	**134-142**	**142-150**	**150-158**	**158-166**
Number of leaves	**4**	**5**	**10**	**14**	**4**	**5**

Find the mode length of the leaves.

Question 18:

A and B each have certain number of oranges. A says to B, "If you give me 10 of your oranges, I will have twice the number of oranges left with you". B replies, "If you give me 10 of your oranges, I will have the same number of oranges as left with you". Find the number of oranges with A and B separately.

SECTION - C

Question 19:

Prove that $\sqrt{5}$ is an irrational number

OR

Prove that $5 + 3\sqrt{2}$ is an irrational number

Question 20:

Prove that for any positive integer n, $n^3 - n$ is divisible by 6.

Question 21:

A two-digit number is obtained by either multiplying sum of the digits by 8 and adding 1 or by multiplying the difference of the digits by 13 and adding 2. Find the numbers.

Question 22:

If α and β are the zeroes of the quadratic polynomial $f(x) = x^2 - 1$,

find a quadratic polynomial whose zeroes are $\frac{2\alpha}{\beta}$ and $\frac{2\beta}{\alpha}$

Question 23:

In figure, ABC is a triangle right-angled at B, $AB = 5cm, \angle ACB = 30°$.Find the length of BC and AC.

Question 24:

$$\frac{\tan\theta}{1-\cot\theta} = \frac{\cot\theta}{1-\tan\theta} = 1 + \tan\theta + \cot\theta$$

Question 25:

$$\frac{1-\sin\theta}{1+\sin\theta} - (\sec\theta - \tan\theta)^2$$

Question 26:

The diagonals of a trapezium ABCD with AB||DC intersect each other at point O. If AB = 2CD, find the ratio of the areas of triangles AOB and COD

Question 27. The table below gives the percentage distribution of female teachers in primary schools of rural areas of various states and union territories (U.T.) of India. Find the mean percentage of female teachers by using step-deviation method.

Percentage of female teachers	**15-25**	**25-35**	**35-45**	**45-55**	**55-65**	**65-75**	**75-85**
No. of states/ U.T.	**6**	**11**	**7**	**4**	**4**	**2**	**1**

OR

Classes	**0-2**	**2-4**	**4-6**	**6-8**	**8-10**	**10-12**	**12-14**
Frequency	**1**	**2**	**1**	**P**	**6**	**2**	**3**

Question 28. The following distribution shows the number of runs scored by some top batsman of the world in one-day cricket matches:

Runs-scored	**Number of batsman**
3000-4000	**4**
4000-5000	**18**
5000-6000	**9**
6000-7000	**7**
7000-8000	**6**
8000-9000	**3**
9000-10000	**1**
10000-11000	**1**

Find the mode

Q.29 Find the zeroes of the polynomial $\mathbf{f(x) = x^3 - 5x^2 - 16x + 80}$, ***if its two zeroes are equal in magnitude but opposite in sign.***

Question 30:

Prove that the ratio of the areas of two similar triangles is equal to the square of the ratio of their corresponding sides.

Or

Prove that in a right angle triangle, the square of the hypotenuse is equal to the sum of squares of the other two sides.

Question 31:

Prove that:

$$\boldsymbol{tan^2A - tan^2B = \frac{cos^2B - cos^2A}{cos^2B\, cos^2A} = \frac{sin^2A - sin^2B}{cos^2A\, cos^2B}}$$

Question 33:

If $\mathbf{A = B = 60°}$. $\boldsymbol{Verify}$

$(i)\ \cos(A - B) = \cos A \cos B + \sin A \sin B$

$(ii)\ \sin(A - B) = \sin A \cos B + \cos A \sin B$

$(iii)\ \tan(A - B) = \dfrac{\tan A - \tan B}{1 + \tan A \tan B}$

Question 34:

Prove that:

$$\boldsymbol{(cosec\, A - sin\, A)(secA - cos\, A) = \frac{1}{tan\, A + cot\, A}}$$