# *SUMMATIVE ASSESSMENT-1(2011)*

## *Mathematics*

## *CLASS-X*

**Time Allowed - 3hours** **M.M - 80 marks**

►***GENERAL INSTRUCTIONS***

(i) All questions are compulsory.

(ii) This question paper consists of **34 questions** divided into four *sections* ***A,B,C*** *and* ***D.***

(iii) ***SECTION A*** are multiple choice questions carrying **one mark** each.

(iv) ***SECTION B*** are very short answer type questions carrying **two marks** each.

(v) ***SECTION C*** are short answer type questions carrying **three marks** each.

(vi) ***SECTION D*** are long answer type questions carrying **four marks** each.

(vii) Use of **calculators** and **cell-phones** are not permitted in the Examination Hall.

### ***SECTION – A***

***Multiple choice questions Q1 to Q10, each carry 1 mark***

► Write the correct answer in each of the following:

**1.** The least common multiple and the greatest common divisor of two numbers are 336 and 8 respectively If one of the numbers is 48, then the second number is

A: 54 B: 56 C: 62 D: 64

**2.** If the number 7875 can be prime factorized as $7875 = 3^a \times b^3 \times c^1$, then what are the respective values of *a*, *b*, and *c*?

A: 2, 3 and 1 B: 2, 2 and 5 C: 2, 3 and 5 D: 2, 5 and 7

**3.** Tan A is equal to

A: $\frac{\cos A}{\sqrt{1-\cos^2 A}}$ B: $\frac{\sec A}{\sqrt{1-\sec^2 A}}$ C: $\frac{\sin A}{\sqrt{1-\sin^2 A}}$ D: $\frac{1}{\sqrt{1-\sin^2 A}}$

**4.** The triangles that are always similar are

A: isosceles triangles
B: scalene triangles
C: right triangles
D: equilateral triangles

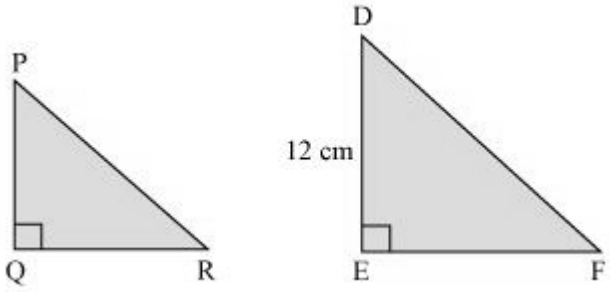
**5.** The pair of equations x = a and y = b graphically represent lines which are

A: parallel
B: intersecting at (b,a)
C: coincident
D: intersecting at (a,b)

**6.** The values of mean and median are 5 and 6 respectively. The value of mode in such a situation is approximately equal to

A: 4 B: 8 C: 16 D: 18

**7.** In the given figure, ΔPQR and ΔDEF are similar to each other. $\sin R = \frac{3}{5}$ and DE = 12 cm. The length of the side DF is




A: 15 B: 16 C: 20 D: 21

**8.** If sec A = cosec B = $\frac{15}{7}$, then A + B is equal to

A: Zero B: 90° C: $< 90°$ D: $> 90°$

**9.** Sin $(50° + \theta) - \text{Cos}\ (40° - \theta)$ is equal to

A: 1 B: 0 C: 2 D: none of these

**10.** Which of the following is the quadratic polynomial whose zeroes are $\frac{1}{2}$ and −3?

A: $x^2 + \frac{5}{2}x + \frac{3}{2}$ B: $x^2 - \frac{5}{2}x + \frac{3}{2}$ C: $x^2 + \frac{5}{2}x - \frac{3}{2}$ D: $x^2 - \frac{5}{2}x - \frac{3}{2}$

## ***SECTION - B***

***Very Short Answer type questions Q11 to Q18, each carry 2 Marks***

**11.** Explain why $7\times11\times13+13$ and $7\times6\times5\times4\times3\times2\times1+5$ are composite numbers.

**12.** Determine the value of k for which the system of equation

$$2x+ky=1$$
$$5x-7y=5$$

, has a unique solution.

**13.** Find the quadratic polynomial, the sum and product of zeroes are $\frac{1}{4},-1$

**14.** In two similar triangles ABC and DEF, If AB = 1.2 cm and DE = 1.4 cm, then find the ratio of the areas of ΔABC and ΔDEF.

**15.** A girl of height 90 cm is walking away from the base of a lamp – post at a speed of 1.2 m/s. If the lamp is 3.6 m above the ground, find the length of her shadow after 4 seconds.

**16.** If $\tan(A-B)=\frac{1}{\sqrt{3}}$ *and* $\tan(A+B)=\sqrt{3}, 0^0 < A+B \le 90^0, A>B$ *find A and B.*

**17.** If the mode of the following distribution is 68, then find the missing frequency ( $f_1$ ) corresponding to the class interval 60 − 80.

| **Class interval :** | 0 − 20 | 20 − 40 | 40 − 60 | 60 – 80 | 80 –100 |
|---|---|---|---|---|---|
| **Frequency :** | 7 | 14 | 8 | $f_1$ | 3 |

**18.** The following table gives production yield per hectare of wheat of 100 farms of a village.

| **Production yield (in kg/ha)** | 50 − 55 | 55 − 60 | 60 − 65 | 65 − 70 | 70 − 75 | 75 − 80 |
|---|---|---|---|---|---|---|
| **Number of farms** | 2 | 8 | 12 | 24 | 38 | 16 |

Change the distribution to a more than type distribution.

## ***SECTION - C***

***Short Answer type questions Q19 to Q28, each carry 3 Marks***

**19.** Prove that $\sqrt{3}$ is an irrational number.

**20.** Use Euclid's division lemma to show that the square of any positive integer is either of the form 3m or 3m + 1 for some integer m.

**21.** A two digit number is 4 times the sum of its digits. If 18 is added to the number; the digits are reversed. Find the number.

*OR*

Places A and B are 100 km apart on a highway. One car starts from A and another from B at the same time. If the cars travel in the same direction at different speeds, they meet in 5 hours. If they travel towards each other, they meet in 1 hour. What are the speeds of the two cars ?

*OR*

2 women and 5 men can together finish an embroidery work in 4 days, while 3 women and 6 men can finish it in 3 days. Find the time taken by 1 women alone to finish the work, and also that taken by 1 man alone.

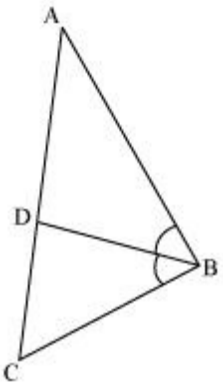
**22.** Obtain all other zeroes of $3x^4 + 6x^3 - 2x^2 - 10x - 5$, if two of its zeroes are $\sqrt{\frac{5}{3}}$ and $-\sqrt{\frac{5}{3}}$.

**23.** *If* $\cos\theta + \sin\theta = \sqrt{2}\sin\theta$, *showthat* $\sin\theta - \cos\theta = \sqrt{2}\cos\theta$.

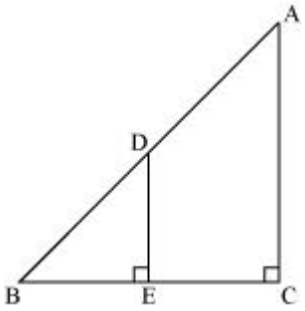
*OR*

*If* $\tan\theta + \sin\theta = m$, $\tan\theta - \sin\theta = n$, *then show that* $m^2 - n^2 = 4\sqrt{mn}$.

**24.** The given figure shows ΔABC in which the bisector of ∠B intersects AC at D. If BC = *a*, AC = *b*, and AB = *c*, then prove that the length of DC is $\frac{ab}{c+a}$




**25.** In the given figure, AC = 12 cm, DE = 8 cm, and BC = 9 cm. What is the length of EC?




**26.** In ΔOPQ, right- angled at P, OP = 7 cm and OQ – PQ = 1 cm. Determine the values of sin Q and cos Q.

**27.** The following table represents the average daily earnings of 50 general stores in a market during a certain week. Find the mean daily earning of these stores by using step deviation method.

| Daily earning (in rupees) | Number of stores |
|---|---|
| 1000 −1500 | 20 |
| 1500 −2000 | 10 |
| 2000 −2500 | 9 |
| 2500 −3000 | 6 |
| 3000 −3500 | 5 |

**28.** The following table shows the literacy (in %) of 20 cities. Here, it is known that the missing value $y > 10$. Find the value of $y$, if the median literacy rate is 62.5%.

| Literacy rate in % | Number of cities |
|---|---|
| More than equal to 0% | 20 |
| More than equal to 25% | 18 |
| More than equal to 50% | y |
| More than equal to 75% | 6 |

## ***SECTION - D***

***Long Answer type questions Q29 to Q34, each carry 4 Marks***

**29.** State and Prove **Pythagoras Theorem**

***OR***

Prove that, if a line is drawn parallel to one side of a triangle intersecting the other two sides, then it divides the two sides in the same ratio

**30.** Solve the following system of linear equations graphically :

$$3x + y - 11 = 0, \quad x - y - 1 = 0$$

Shade the region bounded by these lines and y – axis. Also, find the area of the region bounded by these lines and y – axis.

**31.** Using division algorithm, find the quotient and the remainder on dividing p(x) by g(x)

$p(x) = 21x - 12x^2 - 30 + 8x^4 + 8x^3, \quad g(x) = 3x + 2x^2 - 5$

**32.** Prove the identity:

$$\frac{\tan A + \sec A - 1}{\tan A - \sec A + 1} = \frac{1 + \sin A}{\cos A}$$

*OR*

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

**33.** If $\angle B and \angle Q$ are acute angles such that sinB = sinQ then show that $\angle B = \angle Q$

**34.** During the medical check-up of 35 students of a class, their weights were recorded as follows:

| Weight (in kg) | Number of students |
|---|---|
| Less than 38 | 0 |
| Less than 40 | 3 |
| Less than 42 | 5 |
| Less than 44 | 9 |
| Less than 46 | 14 |
| Less than 48 | 28 |
| Less than 50 | 32 |
| Less than 52 | 35 |

Draw a **less than type ogive** for the given data.