10th CBSE MATHEMATICS

2008-09

1 SECTION A

1.1. Complete the missing entries in the following factor tree :

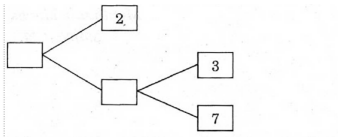

Fig. 1.1.

1.2. If $(x+a)$ is a factor of $2x2+2ax+5x+10$, find a.

1.3. Show that $x = -3$ is a solution of $x2+6x+9=0$.

1.4. The first term of an $A.P.$ is p and its common difference is q. Find its 10^{th} term.

1.5. If $\tan A = \frac{5}{12}$, find the value of $(\sin A + \cos A)\sec A$.

1.6. The lengths of the diagonals of a rhombus are $30cm$ and $40cm$. Find the side of the rhombus.

1.7. In Figure 1.7, $PQ||BC$ and $AP : PB = 1 : 2$. Find $\frac{ar(\triangle APQ)}{ar(\triangle ABC)}$.

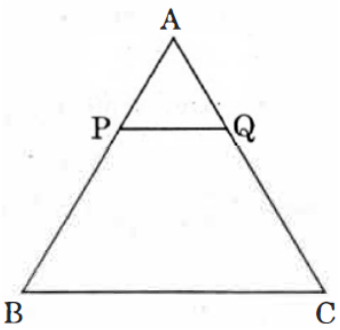

Fig. 1.7.

1.8. The surface area of a sphere is 616 cm^2. Find its radius.

1.9. A die is thrown once. Find the probability of getting a number less than 3.

1.10. Find the class marks of classes $10-25$ and $35-55$.

2 SECTION B

2.1. Find all the zeros of the polynomial $x^4 + x^3 - 34x^2 - 4x = 120$, if two of its zeros are $2, -2$.

2.2. A pair of dice is thrown once. Find the probability of getting the same number on each dice.

2.3. If $\sec 4A = \text{cosec}\,(A-20^\circ)$, where $4A$ is an acute angle, find the value of A.

OR

In a ,$\triangle ABC$, right-angled at C, if $\tan A = \frac{1}{\sqrt{3}}$, find the value of $\sin A\cos B + \cos A\sin B$.

2.4. Find the value of k if the points $(k,3),(6,-2)$ and $(-3,4)$ are collinear.

2.5. E is a point on the side AD produced of a $\|^{gm}$ $ABCD$ and BE intersects CD at F. Show that $\triangle ABE \sim \triangle CFB$.

3 SECTION C

3.1. 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.

3.2. Represent the following pair of equations graphically and write the coordinates of pointswhere the lines intersect $y-axis$:

$x + 3y = 6$
$2x - 3y = 12$

3.3. For what value of n are the n^{th} terms of two A.P.'s $63, 65, 67,$ ... and $3, 10, 17,$ ... equal ?

OR

If m times the m^{th} term of an $A.P.$ is equal to n times its n^{th} term, find the $(m+n)^{th}$ term of the $A.P.$

3.4. In an $A, P.$, the first term is 8, n^{th} term is 33 and sum to first n terms is 123. Find n and d, the common difference.

3.5. Prove that:
$(1 + \cot A + \tan A)(\sin A - \cos A) = \sin A \tan A - \cot A \cos A.$

OR

Without using trigonometric tables, evaluate the following:
$2\frac{\cos 58^\circ}{\sin 32^\circ} - \sqrt{3}\frac{\cos 38^\circ \operatorname{cosec} 52^\circ}{\tan 15^\circ \tan 60^\circ \tan 75^\circ}$

3.6. If P divides the join of $A(-2,-2) and B(2,-4)$ such that $\frac{AP}{AB} = \frac{3}{7}$, find the coordinates of P.

3.7. The mid-points of the sides of a triangle are $(3,4), (4,6)$ and $(5,7)$. Find the coordinates of the vertices of the triangle.

3.8. Draw a right triangle in which the sides containing the right angle are 5 cm and 4 cm. Construct a similar triangle whose sides are. $\frac{5}{3}$ times the sides of the above triangle.

3.9. Prove that a parallelogram circumscribing a circle is a rhombus.

OR

In Figure 3.9, $AD \perp BC$.
Prove that $AB^2 + CO^2 = B0^2 + AC^2$.

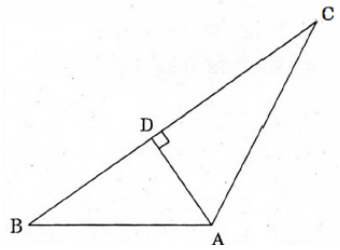

Fig. 3.9.

3.10. In Figure 3.10, ABC is a quadrant of a circle of radius $14cm$ and a semi-circle is drawn with BC as diameter. Find the area of the shaded region.

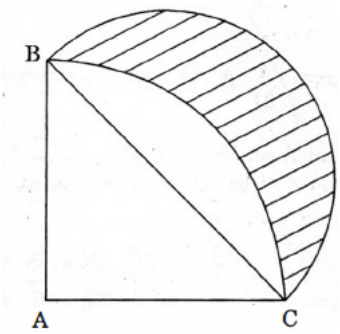

Fig. 3.10.

4 SECTION D

4.1. A peacock is sitting on the top of a pillar, which is $9m$ high. From a point $27m$ away from the bottom of the pillar, a snake is coming to its hole at the base of the pillar. Seeing the snake the peacock pounces on it. If their speeds are equal, at what distance from the hole is the snake caught ?

OR

The difference of two numbers is 4. If the difference of their reciprocals $\frac{4}{21}$ is , find the two numbers.

4.2. The angle of elevation of an aeroplane from a point A on the ground is 60°. After a flight of 30 seconds, the angle of elevation changes to 30°. If the plane is flying at a constant height of $3600\sqrt{3}m$, find the speed, in km/hour, of the plane .

4.3. If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, prove that the other two sides are divided in the same ratio.
Using the above, prove the following :

In Figure 4.3, $AB \parallel DE$ and $BC \parallel EF$. Prove that $AC \parallel DF$.

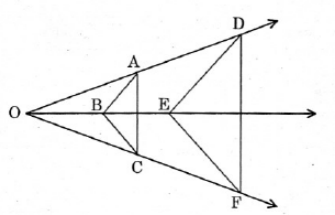

Fig. 4.3.

OR

Prove that the lengths of tangents drawn from an external point to a circle are equal. Using the above, prove the following :
ABC is an isosceles triangle in which $AB = AC$, circumscribed about a circle, as shown in Figure 4.3. Prove that the base is bisected by the point of contact.

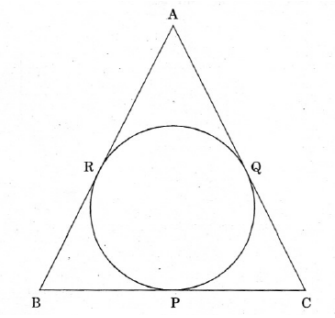

Fig. 4.3.

4.4. If the radii of the circular ends of a conical bucket, which is $16cm$ high, are $20cm$ and $8cm$, find the capacity and total surface area of the bucket. (Use $\pi = \frac{22}{7}$)

1) Find mean, median and mode of the following data :

Class	Frequency
0-20	6
20-40	8
40-60	10
60-80	12
80-100	6
100-120	5
120-140	3