Class : IX	Subject: Mathematics

Q1   Which of the following is an irrational number :
(a) $\sqrt{9}$ (b) 3.026026026…… (c) 4.020020002………… (d) 22/7

Q2   If x = 2 +$\sqrt{3}$, then $(x + \frac{1}{x})$ =
(a) -2$\sqrt{3}$ (b) 2   (c) 4 (d) 4 - 2$\sqrt{3}$

Q3   Which of the following numbers has terminating decimal form:
(a) $\frac{37}{45}$ (b)21/2^3 5^6 (c) 17/49 (d) 89/$2^2 3^2$

Q4   What will be the value of a if x + a is a factor of x^3 +ax^2 -2x +a +6 :
(a) 3 (b) 4 (c) -2 (d) -3

Q5   The degree of the polynomial 8x^4 -36x +5x^7 +1 is :
(a) 4 (b) 1   (c) 5 (d) 7

Q6   Find two rational numbers lying between 1/2 and 2/5 .
Q7   Express 0.2562626262….in the form of p/q.
Q8   Give an example of two irrational numbers, whose
(i) Product is a rational number.
(ii) Difference is a rational number.
Q9   Simplify: (i) (15 $^{1/3}$ /9 ^{¼}) $^{-6}$ (ii) 1/(27) $^{-1/3}$ + 1/(625) $^{-1/4}$
Q10   Find the value of a and b if $\frac{5+ \sqrt{6}}{5- \sqrt{6}}$ = a +b$\sqrt{6}$.

Q11   If the polynomials px^3 +4 x^2 +3x – 4 and x^3 – 4x +p are divided by x – 3
then the remainder in each case is the same. Find the value of p.
Q.12   Factorize: (i) 9x^2 – 22x +8. (ii)x^3 – x^2 - 14x +24(by using factor theorem)

1. Explain each of the following in p/q form:

2. (i) 0.675 (ii) $0.3\overline{2}$ (iii) $0.12\overline{3}$ (iv) $0.003\overline{52}$ (v) $4.\overline{32}$ (vi) $2.317317317\ldots$

3. Find two irrational numbers and two rational numbers between 0.5 and 0.55

4. Simplify each of the following by rationalizing the denominator.

5. (i) $\dfrac{7+3\sqrt{5}}{7-3\sqrt{5}}$ (ii) $\dfrac{2\sqrt{3}-\sqrt{5}}{2\sqrt{2}+3\sqrt{3}}$ (iii) $\dfrac{7\sqrt{3}-5\sqrt{2}}{\sqrt{48}+\sqrt{18}}$

6. Simplify:- a) $3\sqrt{5}+-\sqrt{5}+\sqrt{180}$ (b) $\sqrt{54}+\sqrt{150}$

7. Give an example each of two irrational numbers, whose

   (i) difference is a rational number
   (ii) difference is an irrational number
   (iii) sum is a rational number
   (iv) sum is an irrational number
   (v) product is a rational number
   (vi) product is an irrational number
   (vii) quotient is a rational number
   (viii) quotient is an irrational number

8. Without actual division decide which of following rational numbers have terminating decimal representation:-

   (i) $\dfrac{33}{375}$ (ii) $\dfrac{15}{28}$ (iii) $\dfrac{16}{45}$ (iv) $\dfrac{12}{35}$ (v) $\dfrac{80}{27}$ (vi) $\dfrac{123}{1250}$

9. Examine whether the following numbers are rational or irrational

10. (i) $\dfrac{3\sqrt{8}}{\sqrt{2}}$ (ii) $\left(\sqrt{2}+\dfrac{1}{2}\right)^2$ (iii) $\dfrac{22/7}{5\Pi}$ (iv) $(3+\sqrt{2})(2-\sqrt{3})(3-\sqrt{2})$

    $(2+\sqrt{3})$

11. Represent $\dfrac{8}{5}$ and $\sqrt{20}$ on a number line.

12. (a) Represent $\sqrt{5.2}$ on a number line. (b) Visualize 0.436 on the number line

13. Insert 6 rational numbers between $\dfrac{-2}{3}$ and $\dfrac{3}{4}$

14. Find two irrational numbers between $\sqrt{3}$ and 2.

15. Rationalise the denominator of $\dfrac{1}{1-\sqrt{7}}$

16. Given $\sqrt{3}=1.732$ app., find to three places of decimal the value of $\dfrac{1+2\sqrt{3}}{2-\sqrt{3}}$

17. Find the values of 'a' and 'b' if

18. (a) $\dfrac{5+2\sqrt{3}}{7+4\sqrt{3}}=a+b\sqrt{3}$ (b) $\dfrac{5+\sqrt{3}}{\sqrt{5}-\sqrt{3}}=\dfrac{1}{2}a+3b\sqrt{15}$

19. Simplify:- (a) $\dfrac{3}{\sqrt{5}-\sqrt{3}}$ (b) $\dfrac{2\sqrt{7}}{\sqrt{5}+\sqrt{3}}$

21. Evaluate:- a) $(390625|6561)^{1/2}$ (b) $(1296)^{1/4} \times (1296)^{1/2}$

Section - A

Q.1   Which of the following expressions is polynomial?

(i) $x^5 - 2x^3 + x + 7$ (ii) $y^3 - \sqrt{3}y$

(iii) $5\sqrt{z} - 6$ (iv) $x - \frac{1}{x}$ (v) $x^{108} - 1$

(vi) $\sqrt[3]{x} - 27$ (vii) $x^{-2} + 2x^{-1} + 3$

Q.2   Write the degree of each of the following polynomial.

(i) $2x - \sqrt{5}$ (ii) $3 - x + x^2 - 6x^3$ (iii) 9

(iv) $8x^4 - 36x + 5x^7$ (v) $x^9 - x^5 + 3x^{10} + 8$ (vi) $2 - 3x^2$

Q.3   (i) Give an example of a binomial of degree 27.

(ii) Give an example of a monomial of degree 16.

(iii) Give an example of trinomial of degree 3.

Section - B

Q.4   If $p(x) = 5 - 4x + 2x^2$ find (i) $p(0)$ (ii) $p(3)$ (iii) $p(-2)$

Q.5   Find the zeros of the polynomials given below :

(i) $p(x) = x - 5$ (ii) $q(x) = x + 4$ (iii) $h(x) = 6x - 1$

(iv) $p(x) = ax + b$ (v) $r(x) = x^2 + 3x$ (vi) $l(x) = x^2 + 2x + 1$

Q.6   Find the remainder when $f(x) = 12x^3 - 13x^2 - 5x + 7$ is divided by $(3x + 2)$?

Q.7   Show that $(x + 5)$ is a factor of the polynomial

$f(x) = x^3 + x^2 + 3x + 115$

Q.8   Find the value of a for which $(x - a)$ is a factor of the polynomial.

$f(x) = x^5 - a^2x^3 + 2x + a - 3$

Section - C

Q.9 Factorize the following expressions.

(i) $5x^2 - 20xy$

(ii) $5a(b+c) - 7b(b+c)$

(iii) $x(x-y)^2 + 3x^2y(x-y)$

(iv) $6ab - b^2 + 12ac - 2bc$

(v) $x^2 + \frac{1}{x^2} + 2 - 2x - \frac{2}{x}$

Q.10 Factorize :

(i) $9x^2 - 16y^2$ (ii) $x^3 - x$

Q.11 Factorize:

$a(a-1) - b(b-1)$

Q.12 Factorize following expressions.

(i) $x^2 + 9x + 18$

(ii) $x^2 - 4x - 21$

(iii) $x^2 - 9x + 18$

(iv) $x^2 - 19x + 78$

Q.13 Calculate $(997)^2$ using algebraic identities.

Q.14 Calculate 103 X 107 using algebraic identities.

Q.15 Expand $(2a + 3b + 4c)^2$.

Q.16 Factorize $4x^2 + y^2 + z^2 - 4xy - 2yz + 4xz$.

Q.17 Expand (i) $(4a + 5b)^3$ (ii) $(5x - 3y)^3$

Q.18 Evaluate (i) $(95)^3$ (ii) $(106)^3$

Q.19 Factorize   (i) $x^3 + 64$ (ii) $27x^3 + 125y^3$

                 (iii) $8a^3 - 27b^3$ (iv) $1 - 64a^3$

Section - D

Q.20 Factorize

$a^3 + 27b^3 + 8c^3 - 18abc$

Q.21 Factorize

$(p - q)^3 + (q - r)^3 + (r - p)^3$

Q.22 Find the product

$(3x - 5y - 4)(9x^2 + 25y^2 + 15xy + 12x - 20y + 16)$

Q.23 If $If\ x + y + z = 9\ and\ xy + yz + zx = 23$ then find the value of

$(x^3 + y^3 + z^3 - 3xyz)?$

Self Evaluation

Q.24 Which of the following expression is a polynomial?

(a) $\sqrt{x} - 1$ (b) $\frac{x-1}{x+1}$ (c) $x^2 - \frac{2}{x^2} + 5$ (d) $x^2 + \frac{2x^{3/2}}{\sqrt{x}} + 6$

Q.25 Degree of zero polynomial is

(a) 1 (b) 0 (c) not defined (d) none of these

Q.26 For what value of k is the polynomial $p(x) = 2x^3 - kx^2 + 3x + 10$ exactly divisible by $(x + 2)$?

(a) $\frac{-1}{3}$ (b) $\frac{1}{3}$ (c) 3 (d) -3

Q.27 The zeroes of the polynomial $p(x) = 3x^2 - 1\ are$

(a) $\frac{1}{3}$ (b) $\frac{1}{\sqrt{3}}$ (c) $\frac{-1}{\sqrt{3}}$ (d) $\frac{1}{\sqrt{3}}\ and\ \frac{-1}{\sqrt{3}}$

Q.28 If $\frac{x}{y} + \frac{y}{x} = -1$ where $x \neq 0,\ y \neq 0$ then $find\ the\ value\ of\ x^3 - y^3$.

Q.29 If $(x + 2)and\ (x - 1)are\ factors\ of\ (x^3 + 10x^2 + m\,x + n)$ then find value of m & n?

Q.30 Find the value of $(369)^2 - (368)^2$

Q.31 Find value of 104 X 96

Q.32 If $a + b + c = 0$ find value of $\left(\frac{a^2}{bc} + \frac{b^2}{ca} + \frac{c^2}{ab}\right)$?

Section - A

Q.1 In the given figure, $x - 30^0$

The value of y is

(a) 10^0 (b) 40^0 (c) 36^0 (d) 45^0
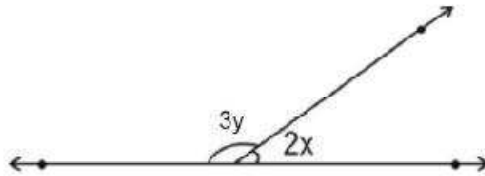
Q.2 An exterior angle of a triangle is 75^0 and its two interior opposite angles are equal. Each of these equal angles is

(a) 105^0 (b) 50.5^0 (c) 52^0 (d) 37.5^0

Q.3 The compliment of an angle 'm' is:

(a) m   (b) 90^0+m (c) 90^0-m (d) m X 90^0

Q.4 If one angle of a triangle is equal to the sum of the other two equal angles, then the triangle is

(a) an isosceles triangle   (b) an obtuse triangle

(c) an equilateral triangle   (d) a right triangle

Q.5 In the given figure $\angle a$ and $\angle b$

form a linear pair if a-b = 100^0

then a and b are

(a) $120^0, 20^0$ (b) $40^0, 140^0$

(c) $50^0, 150^0$ (d) $140^0, 40^0$
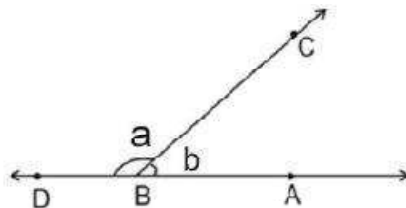
Q.6 Angle of a triangle are in the ratio 2 : 4 : 3. The smallest angle of the triangle is

(a) 60^0 (b) 40^0 (c) 80^0 (d) 20^0

Section - B

Q.7   Two adjacent angles are equal. Is it necessary that each of these angles will be a right angle? Justify your answer.

Q.8   In the following figures which of the two lines are parallel and why?
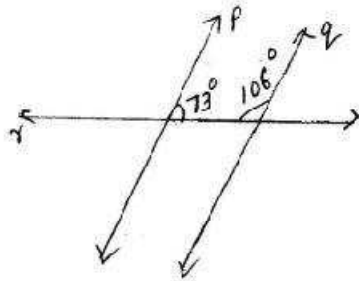
(i)   (ii)
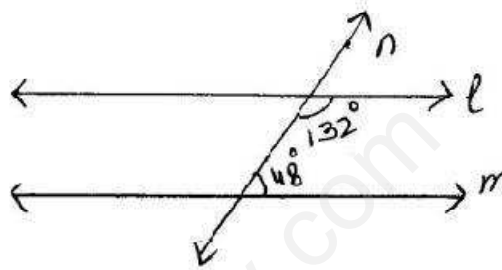
Q.9   In the given fig. sides QP and RQ of $\triangle PQR$ are produced to point S and T respectively. If $\angle PQT = 110^0$ and $\angle SPR = 135^0$ find $\angle PRQ$
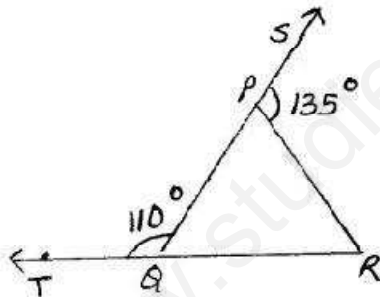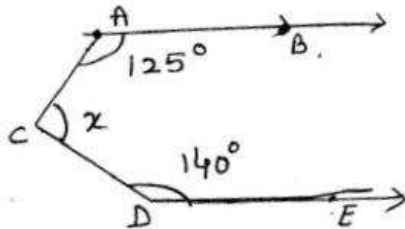

Q.10   In the fig. $l_1 \parallel l_2$ and $m_1 \parallel m_2$ if $\angle 1 = 115^0$ find $\angle 2$
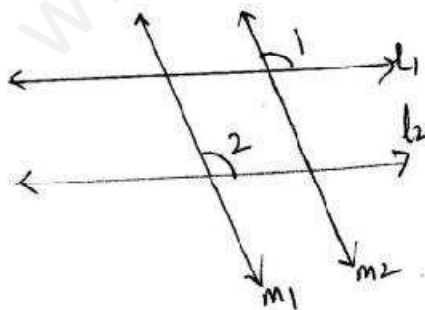
Q.11 Sum of two angles of a triangle is 90^0 and their difference is 50^0. Find all the angles of the triangle.

Q.12 In the adjoining figure, $AB \parallel DE$, find the value of x.

Section - C

Q.13 In the given figure AB and CD intersect each other at O. If $\angle AOE = 75^0$ find the value of x, y and z.
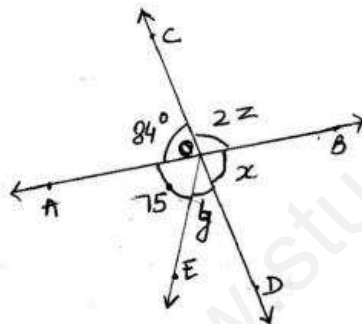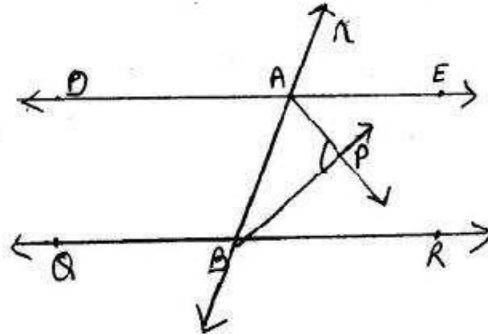

Q.14 Prove that vertically opposite angle are equal.

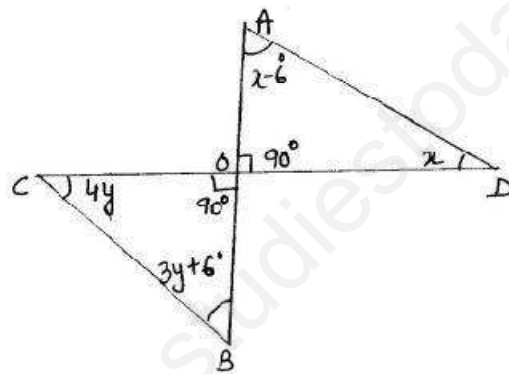Q.15 In the given figure $x = y$ and $a = b$ prove that $l \parallel n$
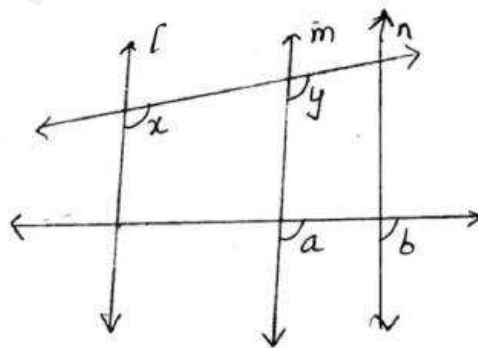
Q.16 In the given figure $DE \parallel QR$ and AP and BP are bisectors of $\angle EAB$ and $\angle RBA$ respectively find $\angle APB$

Q.17 The angles of a triangle are in the ratio 2: 3: 5 find the angles of the triangle.

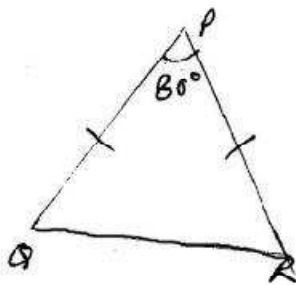Q.18 Find x and y in the following figure.

Q.19 In figure find x.
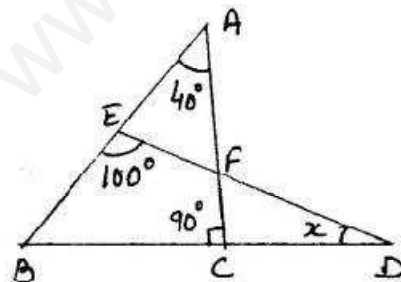
Section - A

Q.1 Which of the following is not a criterion for congruence of triangles?

(a) SAS   (b) SSA   (c) ASA   (d) SSS

Q.2 If AB=QR, BC=PR and CA=PQ then

(a) $\triangle ABC \cong \triangle PQR$ (b) $\triangle CBA \cong \triangle PRQ$

(c) $\triangle BAC \cong \triangle RPQ$ (d) $\triangle PQR \cong \triangle BCA$

Q.3 In $\triangle$ PQR, if $\angle R > \angle Q$ then

(a) $QR > PR$ (b) $PQ > PR$ (c) $PQ < PR$ (d) $QR < PR$

Q.4 $\triangle ABC \cong \triangle DEF$ and if $AB = 3 = DE$ and BC = EF = 4 then necessary condition is

(a) $\angle A = \angle D$ (b) $\angle B = \angle E$ (c) $\angle C = \angle F$ (d) $CA = FD$

Q.5 In the given figure, if OA=OB, OD=OC then $\triangle AOD \cong \triangle BOC$ by congruence rule.

(a) SSS   (b) ASA

(c) SAS   (d) RHS
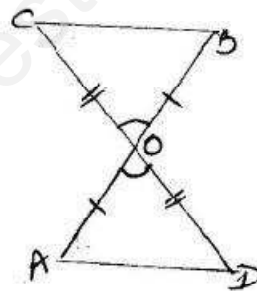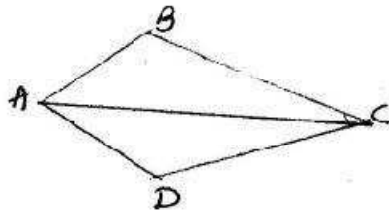

Q.6 In the figure if PQ=PR and $\angle P = 80^0$, then measure of Q is

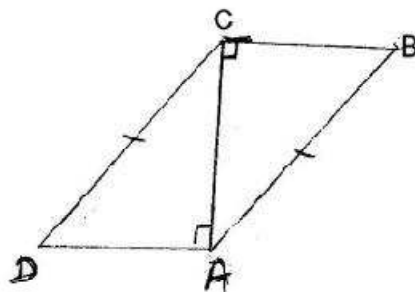(a) 100^0 (b) 50^0 (c) 80^0 (d) 40^0

Q.7 In the figure $\triangle ABC \cong \triangle ADC$, if $\angle ACB = 25^0$ and $\angle B = 125^0$, then $\angle CAD$ is

(a) 25^0 (b) 65^0 (c) 30^0 (d) 75^0

Q.8 In the figure, if $\triangle ABC \cong \triangle CDA$, the property of congruence is

(a) SSS   (b) SAS   (c) RHS   (d) ASA

Q.9 It is not possible to construct a triangle when its sides are

(a) 8.3cm, 3.4cm, 6.1cm   (b) 5.4cm, 2.3cm, 3.1cm

(c) 6cm, 7cm, 10cm   (d) 3cm, 5cm, 5cm

Q.10 In a $\triangle ABC$, if AB=AC and BC is produced to D such that $\angle ACD = 100^0$ then $\angle A$

(a) 20^0 (b) 40^0 (c) 60^0 (d) 80^0

Q.11 If $\triangle PQR \cong \triangle EFD$, then $\angle E -$

(a) $\angle P$ (b) $\angle Q$ (c) $\angle R$ (d) None of these
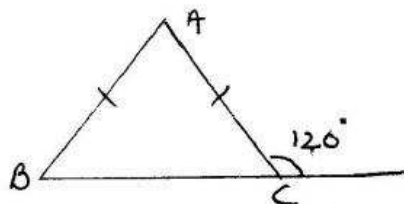
Q.12 If $\triangle PQR \cong \triangle EFD$, then $ED =$

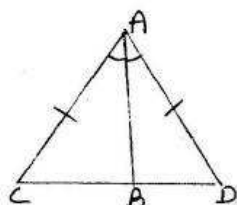(a) PQ   (b) QR   (c) PR   (d) None of these

Section - B

Q.13 In the figure AB=AC and

$\angle ACD = 120^0 \ find \ \angle A$

Q.14 In a $\triangle ABC \ if \ \angle A = 45^0 \ and \ \angle B = 70^0$ determine the shortest and largest sides of the triangle.

Q.15 In the given figure AB is bisector of $\angle A$ and AC=AD Prove that BC=BD and
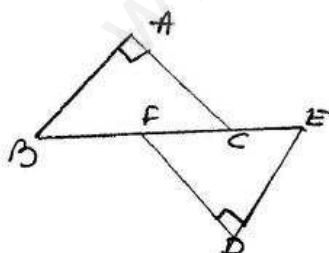
$\angle C = \angle D$

Q.16 AD is an altitude of an isosceles triangle ABC is which AB=AC. Prove that

$\angle BAD = \angle DAC$

Q.17 In an acute angled $\triangle ABC$, S is any point on BC. Prove that AB+BC+CA > 2AS

Q.18 In the given figure $BA \perp AC, DE \perp DF$

such that BA=DE and BF=EC
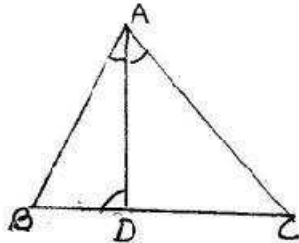
show that $\triangle ABC \cong \triangle DEF$

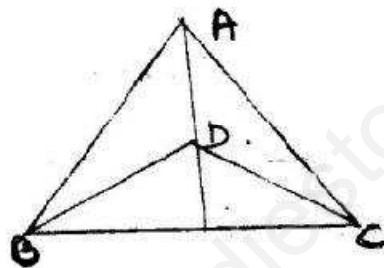Q.19 Q is a point on the side SR of A $\triangle PSR$ such that PQ=PR. Prove that PS>PQ

Section - C

Q.20 In the given figure if AD is the bisector of $\angle A$ show that
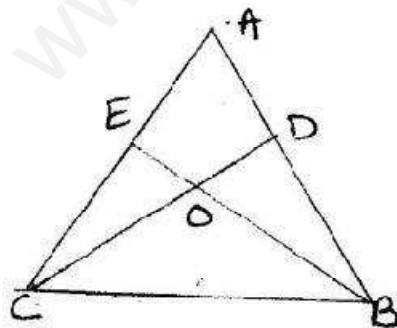
(i) AB>BD   (ii) AC>CD

Q.21 In the given figure AB=AC, D is the point is the interior of $\triangle ABC$ such that $\angle DBC = \angle DCB$ Prove that AD bisects $\angle BAC$ of $\triangle ABC$

Q.22 Prove that if two angles of a triangle are equal then sides opposite to them are also equal.

Q.23 In the figure, it is given that AE=AD and BD=CE. Prove that $\triangle AEB \cong \triangle ADC$


Q.24 Prove that angles opposite to two equal sides of a triangle are equal.

Heron's Formula

Q 1 Write Heron's formula to find the area of a triangle.

Mark (1)

Q 2 Write the area of the rhombus , if d_1 and d_2 are the lengths of its diagonals .

Mark (1)

Q 3 What is the area of equilateral triangle whose side is a units ?

Mark (1)

Q 4 What is the area of an isosceles right angled triangle whose equal side is a units ?

Mark (1)

Q 5 What is the side of a rhombus whose diagonal is d_1 and d_2?

Mark (1)

Q 6 Find the area of a triangle whose sides are 13cm, 14cm and 15cm.

Marks (2)

Q 7 The perimeter of a triangular field is 450 m and its sides are in the ratio 13:12:15. Find the area of the triangle.

Marks (2)

Q 8 Find the area of a triangle whose two sides are 8 cm and 11cm and the perimeter is 32cm.

Marks (2)

Q 9 The lengths of the sides of a triangle are 5 cm, 12 cm and 13 cm. Find the length of the perpendicular from the opposite vertex to the side whose length is 13 cm.

Marks (2)

Q 10 If the sides of the triangle are 26 cm, 28 cm and 30 cm, find the area of the triangle.

Marks (2)

Q 11 The perimeter of a right triangle is 450 m. If its sides are in the ratio 13 : 12 : 5. Find the area of the triangle.

Marks (2)

Q 12 There is a slide in a park. One of its side walls has been painted in some colours with a message "KEEP THE PARK GREEN AND CLEAN". If the sides of the wall are 15m, 11m and 6m, find the area painted in colour.

Marks (2)

Q 13 If the side of an equilateral triangle is 'a', then find the altitude of the equilateral triangle.

Marks (2)

Q 14 Find the area of a triangle whose two sides are 8 cm and 11cm and the perimeter is 32cm.

Marks (2)

Q 15 A rhombus shaped field has green grass for 18 horses to graze. If each side of the rhombus is 30m and its longer diagonal is 48m, how much area of grass field will each Horse be grazing?

Marks (2)

Q 16 Find the area of a quadrilateral ABCD whose sides are 9m, 40m, 28m and 15m respectively and the angle between the first two sides is a right angle.

Marks (2)

Q 17 Find the area of a rhombus whose perimeter is 80m and one of diagonal is 24m.

Marks (2)

Q 18 A floral design on a floor is made up of 16 tiles that are triangular, the sides of the triangle being 9cm, 28cm and 35cm. Find the area of the floral design.

Marks (2)
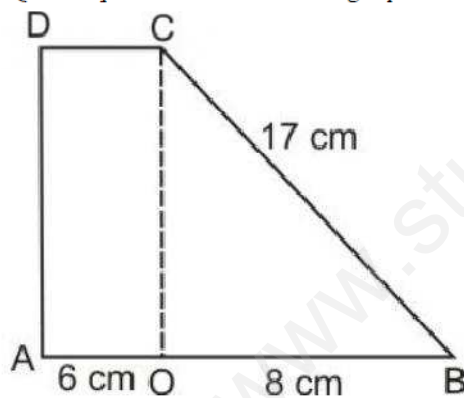
Q 19 Compute the area of trapezium.
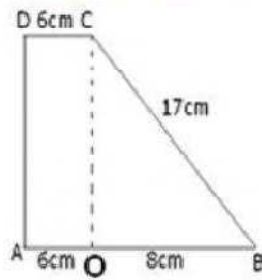
Marks (2)

Q 20 In fig. given below, BD is the diagonal of quadrilateral ABCD. Find the area of ABCD.
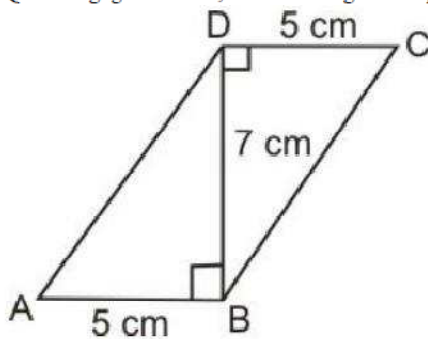
Marks (3)

Q 21 Compute the area of the following trapezium:

Marks (3)

Q 22 Find area and perimeter of triangle whose sides are 8cm ,19cm and 15 cm.

Marks (3)

Q 23 Find the area of triangle whose sides are 5cm,12cm, 13 cm . Also find the Shortest altitude.

Marks (3)

Q 24 In a rectangular field of dimension 50 ft x 30 ft, a triangular park is constructed. If the dimension of the triangular park is 14 ft, 15 ft and 13 ft, find the area of the remaining field.

Marks (3)

Q 25 Sanya owns a piece of land which is in the shape of a rhombus. She wants her daughter and son to work on the land and produce different crops to suffice the needs of their family. She divided the land in two equal parts. If the perimeter of the land is 400 m and one of the diagonals is 160 m, how much area each of them will get?
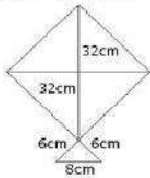
Marks (3)

Q 26 An umbrella is made by stitching 10 triangular pieces of cloth of two different colours, each piece measuring 20 cm, 50 cm and 50 cm. How much cloth of each colour is required for the umbrella?

Marks (3)

Q 27 Find the area of triangle whose sides are 5cm, 12cm, 13 cm. Also find the shortest altitude.

Marks (3)

Q 28 A kite is in the shape of a square with diagonal 32 cm and an isosceles triangle of base 8cm and equal sides are 6cm. How much paper is required to build the kite?
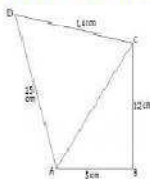

Marks (3)

Q 29 Find the area of the trapezium whose parallel sides are 25 cm, 13 cm and other sides are 15 cm and 15 cm.

Marks (3)

Q 30 The side of a quadrilateral taken in order are 5,12,14 and 15 metres respectively and the angle formed by the first two sides is a right angles find its area.
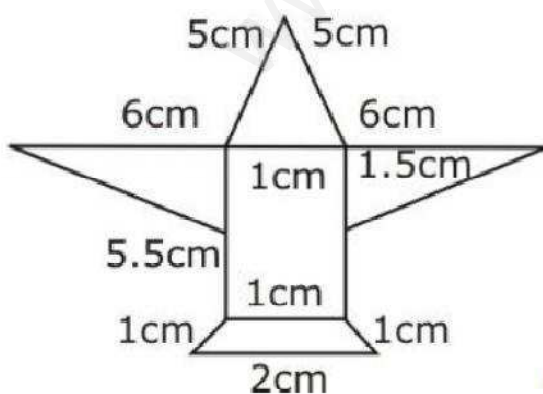

Marks (3)

Q 31 Find the area and perimeter of triangle whose sides are 8cm, 19cm and 15 cm.

Marks (3)

Q 32 Find the area of a quadrilateral ABCD which AD = 24 cm, $\angle$ BAD = 90° and $\triangle$ BCD is an equilateral triangle whose each side is 26cm.

Marks (4)

Q 33 Mayank made a picture of an aeroplane with paper as shown in figure calculate total area of paper used.
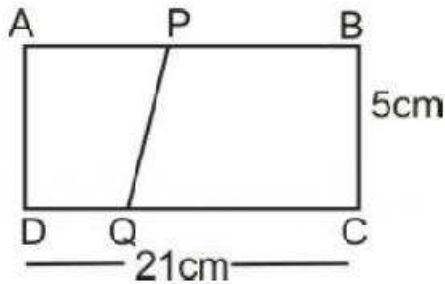

Marks (4)

Q 34 A kite in the shape of a square with diagonal 32 cm and an isosceles triangle of base 8 cm and equal sides are 6cm how much paper is required to build the kite.

Marks (4)

Q 35 The perimeter of a right triangle is 60 cm and its hypotenuse is 26 cm. Find area of triangle and its other two sides.

Marks (4)

Q 36 A trapezium PBCQ with its parallel sides QC and PB in the ratio 7:5 is cut from a rectangle ABCD, if area of trapezium is 4/7 part of the area of rectangle, find the length of QC and PB.

Marks (4)

Q 37 A trapezium whose parallel sides are 25 cm and 10 cm. The non-parallel sides are 14 cm and 13 cm. find the area of the trapezium .

Marks (4)

Q 38 The sides of a quadrilateral ABCD, taken in order are 5 cm,12 cm,14 cm and 15 cm respectively, and angle contained between first two sides is a right angle. Find its area.
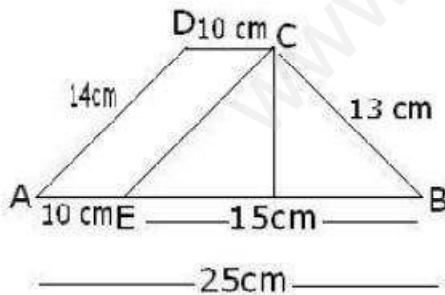
Marks (4)

Q 39 A rhombus sheet, whose perimeter is 32 cm and whose one diagonal is 10 cm long, is painted on both sides at the rate of 5 per sq. cm. Find the cost of painting.

Marks (4)

Q 40 The perimeter of a right triangle is 60 cm and its hypotenuse is 26 cm. Find other two sides and area of triangle?

Marks (4)

Q 41 A field is in the shape of trapezium whose parallel sides are 25m and 10m. The non-parallel sides are 14m and 13m. Find the area of the field.

Marks (4)