SA - I   IX Class

Section - A $20 \times 1 = 20M$

1 D	6 D	11 C	16 A
2 C	7 D	12 D	17 D
3 A	8 B	13 C	18 C
4 B	9 A	14 C	19 B
5 C	10 C	15 B	20 B

Section - B $4 \times 2 = 8$

(21) Examples of non-terminating, non-recurring decimals

(1) 1.414213.......

(2) 3.141592.......

(22) 102×108

$(100+2) \times (100+8)$

The suitable identity is $(x+a)(x+b) = x^2+(a+b)x+ab$

Here $x = 100$ $a = 2$ and $b = 8$

$(100+2)(100+8) = (100)^2 + (2+8)100 + (2)(8)$

$= 10000 + (10)(100) + 16$

$= 10000 + 1000 + 16 = 11016$

(23) Linear equation $3x - 5y = k$

Since $(2, 5)$ is a solution, substitute $x = 2$; $y = 5$ into the equation $3x - 5y = k$

$3(2) - 5(5) = k$

$6 - 25 = k$

$-19 = k$

The value of k is -19.

(24)

$\angle 1, \angle 3 \longrightarrow$ Vertically opposite angles

$\angle 2, \angle 7 \longrightarrow$ Alternate exterior angles

$\angle 2, \angle 3 \longrightarrow$ Consecutive interior angles

$\angle 4, \angle 5 \longrightarrow$ Alternate interior angles

Section - C $\boxed{5\times4=20}$

(25)

① Draw a numberline and mark a point 'O' as the origin 'O' and a point A.

② Representing the number 1. The distance OA is 1 unit.

③ At A, construct a line segment AB perpendicular to OA, also of length 1 unit (AB = 1 unit)

④ Join B. By the Pythagorean theorem in the right-angled triangle OAB

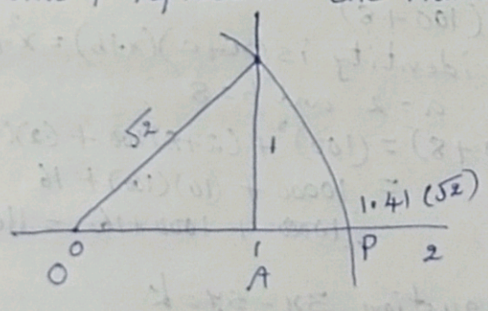
$OB^2 = OA^2 + AB^2$

$OB^2 = 1^2 + 1^2 = 1+1 = 2$

$OB = \sqrt{2}$

⑤ Using a compass with 'O' as the center and OB as the radius, draw an arc that intersects the number line at a point P

⑥ The point P represents the number $\sqrt{2}$



(26) $P(t) = 5 - t + t^2 - t^3$

$P(-2) = 5 - (-2) + (-2)^2 - (-2)^3$

$P(-2) = 5 + 2 + 4 - (-8)$

$P(-2) = 5 + 2 + 4 + 8 = 19$

$P(t) = 5 - t + t^2 - t^3$

$P(3) = 5 - 3 + (3)^2 - (3)^3$

$P(3) = 5 - 3 + 9 - 27 = 14 - 30 = -16$

$\therefore P(-2) = 19 \quad P(3) = -16$

(27) $y = \frac{9}{5}x + 32$

Let $x = 0$

$y = \frac{9}{5} \times 0 + 32 = 0 + 32 = 32$

$(x, y) = (0, 32)$ — (1)

Let $x = 10$

$y = \frac{9}{\cancel{5}} \times \cancel{10}^{2} + 32 = 18 + 32 = 50$

$(x, y) = (10, 50)$ — (2)

Let $x = -10$

$y = \frac{9}{\cancel{5}} \times -\cancel{10}^{2} + 32 = -18 + 32 = 14$

$(x, y) = (-10, 14)$ — (3)

Let $x = -40$

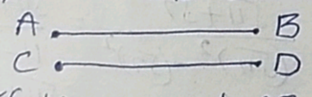
$y = \frac{9}{\cancel{5}} \times -\cancel{40}^{8} + 32 = -72 + 32 = -40$

$(x, y) = (-40, -40)$ — (4)

Four different temperature pairs (x, y) that satisfy the equation are $(0, 32)$ $(10, 50)$ $(-10, 14)$ and $(-40, -40)$

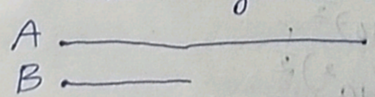
(28) Euclid axioms

(1) Things which coincide with one another are equal to one another.



If line segment AB perfectly overlaps with line segment CD, then their lengths are equal.

(2) The whole is greater than the part



If B is a part of A, then $A > B$.

(29) A ray OS stands on a Line POQ

$\angle SOQ = 40°$

OR is the angle bisector of $\angle POS$

OT is the angle bisector of $\angle SOQ$.

$\boxed{\angle ROT = \angle ROS + \angle SOT}$

$\angle ROS = \frac{1}{2} \angle POS$ (OR bisects $\angle POS$)

$= \frac{1}{2} \times 140 = 70°$

$\angle SOT = \frac{1}{2} \angle SOQ$ (OT bisects $\angle SOQ$)

$= \frac{1}{2} \times 40° = 20°$

$\angle ROT = \angle ROS + \angle SOT$

$\angle ROT = 70 + 20 = 90°$

$\therefore \angle ROT = 90°$

Section - D

$\boxed{4 \times 8 = 32}$

(30) (A) (i) $(5+\sqrt{2})(2+\sqrt{5})$

$\Rightarrow 5(2) + 5\sqrt{5} + \sqrt{2}(2) + \sqrt{2}(\sqrt{5})$

$\Rightarrow 10 + 5\sqrt{5} + 2\sqrt{2} + \sqrt{10}$

(ii) $\frac{1}{\sqrt{11}-\sqrt{7}}$

$\Rightarrow \frac{1}{\sqrt{11}-\sqrt{7}} \times \frac{\sqrt{11}+\sqrt{7}}{\sqrt{11}+\sqrt{7}} = \frac{\sqrt{11}+\sqrt{7}}{(\sqrt{11})^2-(\sqrt{7})^2} = \frac{\sqrt{11}+\sqrt{7}}{11-7}$

$= \frac{\sqrt{11}+\sqrt{7}}{4}$

(or)

(B) $(125)^{3/2} \times (5)^{-\frac{2}{5}} \times (100)^{\frac{1}{2}}$

$= (5^3)^{\frac{3}{2}} \times (5)^{-\frac{2}{5}} \times (10^2)^{\frac{1}{2}}$

$= (5^3)^{\frac{3}{2}} \times (5)^{-\frac{2}{5}} \times [(2\times5)^2]^{1/2}$

$= 5^{\frac{9}{2}} \times 5^{-\frac{2}{5}} \times 2^{2\times 1/2} \times 5^{2\times 1/2}$

$= 5^{9/2} \times 5^{-2/3} \times 2^{1} \times 5^{1}$

$= 5^{\frac{9}{2}+\left(\frac{-2}{3}\right)+1} \times 2^{1}$

$= 5^{\frac{9}{2}-\frac{2}{3}+1} \times 2$

$= 5^{\frac{45-4+10}{10}} \times 2$

$= 5^{\frac{55-4}{10}} \times 2$

$= 5^{\frac{51}{10}} \times 2$

(ii) $(2)^{\frac{-1}{3}} \div (2)^{\frac{-2}{3}}$

$\dfrac{(2)^{\frac{-1}{3}}}{(2)^{\frac{-2}{3}}} \Rightarrow (2)^{\frac{-1}{3}-\left(\frac{-2}{3}\right)} \Rightarrow (2)^{\frac{-1}{3}+\frac{2}{3}} = 2^{\frac{-1+2}{3}}$

$= 2^{\frac{1}{3}}$

$\boxed{\dfrac{a^m}{a^n} = a^{m-n}}$

(iii) $\sqrt[3]{5} \times \sqrt[3]{(5)^{-1}} \times \sqrt[3]{0.001}$

$= 5^{\frac{1}{3}} \times 5^{\frac{-1}{3}} \times \sqrt[3]{\frac{1}{1000}}$

$= 5^{\frac{1}{3}} \times 5^{\frac{-1}{3}} \times \sqrt[3]{\frac{1}{10^3}}$

$= 5^{\frac{1}{3}} \times 5^{\frac{-1}{3}} \times \sqrt[3]{(10)^{-3}}$

$= 5^{\frac{1}{3}} \times 5^{\frac{-1}{3}} \times 10^{\frac{-3}{3}}$

$= 5^{\frac{1}{3}} \times 5^{\frac{-1}{3}} \times 10^{-1}$

$= 5^{\frac{1}{3}+\left(\frac{-1}{3}\right)} \times 10^{-1}$

$= 5^{\frac{1}{3}-\frac{1}{3}} \times 10^{-1}$ $\boxed{(a^0 = 1) \quad a^{-1} = \frac{1}{a}}$

$= 5^{0} \times 10^{-1}$

$= 1 \times 10^{-1} = 10^{-1} = \frac{1}{10}$

(iv) $(64)^{-\frac{1}{3}} \times (4)^{\frac{1}{2}}$

$(2^6)^{-\frac{1}{3}} \times (2^2)^{\frac{1}{2}}$

$= 2^{6 \times -\frac{1}{3}} \times 2^{2 \times \frac{1}{2}}$

$= 2^{-2} \times 2^{1}$

$= 2^{-2+1} = 2^{-1} = \frac{1}{2}$

31) (A)

(i) Area of rectangle = length × breadth

Area of rectangle = $2x^2+7x+3$ (Given)

$2x^2+7x+3$

$= 2x^2+1x+6x+3$

$= x(2x+1)+3(2x+1)$

$= (2x+1)(x+3)$

Possible expressions for the length and breadth are $(x+3)$ and $(2x+1)$.

(ii) The student approach is correct.

The given expression

$55^3 + 3 \times 55^2 \times 45 + 3 \times 55 \times 45^2 + 45^3$

matches the form $a^3+3a^2b+3ab^2+b^3$

Where $a=55$ and $b=45$.

$a^3+3a^2b+3ab^2+b^3 = (a+b)^3$

$= (55+45)^3$

$= (100)^3$

$= 1000000$

(31) (B) The volume of the cuboid $= l \times b \times h$

Given Expression $V(x) = x^3 + 4x^2 + 4x$

$$V(x) = x\left[x^2 + 4x + 4\right]$$

$$V(x) = x(x+2)(x+2)$$

$x^2 + 4x + 4$

$x^2 + 2x + 2x + 4$

$x(x+2) + 2(x+2)$

$(x+2)(x+2)$

$\therefore$ The three dimensions of the block are x, $(x+2)$ and $(x+2)$

(32)

(A) (1) $U = (-4,4)$ $V(-4,-5)$ $W(5,-5)$ $X(5,4)$

(2) Length of sides of UVWX

Length of $UV = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

$= \sqrt{[(-4) - (-4)]^2 + [(-5) - (4)]^2}$

$= \sqrt{(-4+4)^2 + (-5-4)^2}$

$= \sqrt{(0)^2 + (-9)^2} = \sqrt{81} = 9$ units

Length of $VW = \sqrt{(5 - (-4))^2 + (-5 - (-5))^2}$

$= \sqrt{(5+4)^2 + (0)^2}$

$= \sqrt{(9)^2} = \sqrt{81} = 9$ units

Length of $WX = \sqrt{(5-5)^2 + (4 - (-5))^2}$

$= \sqrt{(0)^2 + (9)^2} = \sqrt{81} = 9$ units

Length of $XU = \sqrt{((-4) - 5)^2 + (4-4)^2}$

$= \sqrt{(-9)^2 + (0)^2} = \sqrt{81} = 9$ units

(3) The quadrilateral is a square

Reason :- All sides are equal ($UV = VW = WX = XU$)

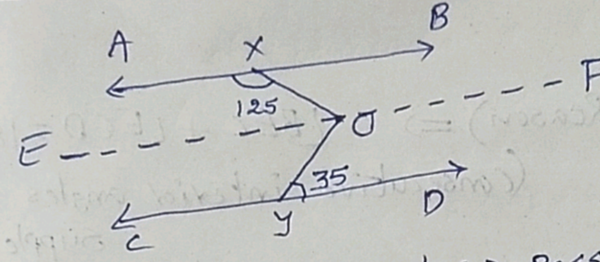
(4) The perimeter of quadrilateral UVWX

$= UV + VW + WX + XU$

$= 9 + 9 + 9 + 9 = 36$ units

3) (A)

(i)



EF is parallel to AB and CD passing through 'O'

Since AB ∥ EF, $\angle AXO + \angle XOF = 180^\circ$
(consecutive interior angles)

$125^\circ + \angle XOF = 180^\circ$

$\angle XOF = 180 - 125$

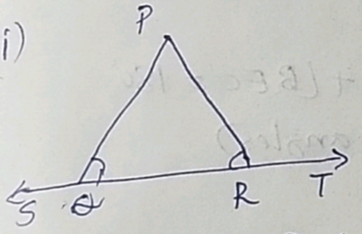
$\angle XOF = 55^\circ$

Since CD ∥ EF, $\angle DYO = \angle YOF$
(alternate interior angles)

$\therefore \angle DYO = \angle YOF = 35^\circ$

$\angle XOY = \angle XOF + \angle YOF = 55^\circ + 35^\circ = 90^\circ$

(ii)



PQR is a triangle, and SQRT are the points of straight line.

$\angle PQR + \angle PQS = 180^\circ$ (Linear pair) — ①

$\angle PRQ + \angle PRT = 180^\circ$ (Linear pair) — ②

$\angle PQR = \angle PRQ$ (given in)

Since $\angle PQS = 180 - \angle PQR$

$\angle PRT = 180^\circ - \angle PRQ$

It follows that $\angle PQS = \angle PRT$.

(33) (B)

step I (Reason) $\Rightarrow$ $\angle BEC + \angle ECD = 180^\circ$
(Consecutive interior angles are supplementary)

step II (Reason) $\Rightarrow$ $\angle AEF = 50^\circ$
(Complementary angles)

In the Right angle triangle AFE,

$\angle A = 40^\circ$

$\angle AFE + \angle AEF + \angle FAE = 180^\circ$ (Sum of angles of a $\Delta = 180^\circ$)

$40^\circ + \angle AEF + 90^\circ = 180^\circ$

$\angle AEF = 180 - 130 = 50^\circ$

step III (Reason) $\angle AEF = \angle BEC$
(Vertically opposite angles)

step IV Reason $\angle BEF + \angle BEC = 180^\circ$
(Linear Pair of angles)

(or)

32

(B)

① The co-ordinates of point P are $(1, 1)$
The co-ordinates of point S are $(2, 1)$

② The co-ordinates of point T are $(4, -2)$

- The perpendicular distances from point T to the x-axis is (absolutely value of y-co-ordinate) $|-2| = 2$ units.
- The perpendicular distances from point T to the y-axis is (absolutely value of x-co-ordinate) $|4| = 4$ units.

③ $T = (\underline{4}, -2)$ $R = (\underline{-2}, -3)$
Sum of the Abscissae of Points T and R is
$= 4 + (-2) = 4 - 2 = 2$

④ The point of intersection of axes is Origin. and its co-ordinates are $(0, 0)$.