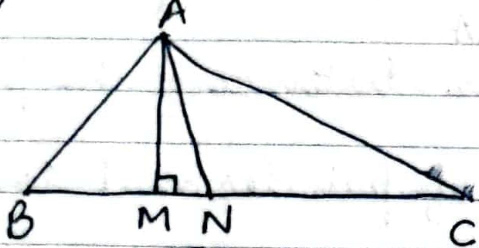
IX Revision-2

1) A field is in the shape of a trapezium. Its parallel sides are 25 m and 10 m and non-parallel sides are 14 m and 13 m. Find area of the field.

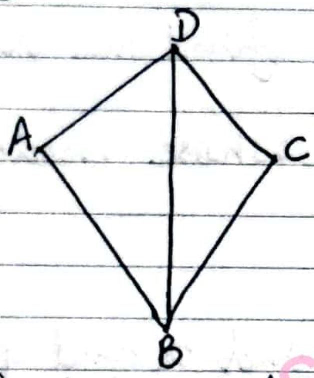
2) Three vertices of a rectangle are $(3,2)$, $(-4,2)$ and $(-4,5)$. Plot these points and find the coordinates of the fourth vertex. Find the area of the rectangle formed.

3)



$AM \perp BC$ and AN is the bisector of $\angle A$. If $\angle ABC = 70^\circ$ and $\angle ACB = 20^\circ$ find the value of $\angle MAN$.

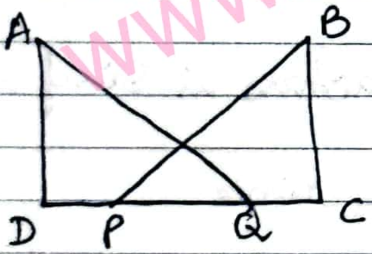
4)



$AD = CD$ and $AB = BC$, Prove that
(i) $\triangle ABD \cong \triangle CBD$
(ii) BD bisects $\angle ABC$

5) Find the value of a and b if $\frac{\sqrt{7}-1}{\sqrt{7}+1} - \frac{\sqrt{7}+1}{\sqrt{7}-1} = a + b\sqrt{7}$

6)



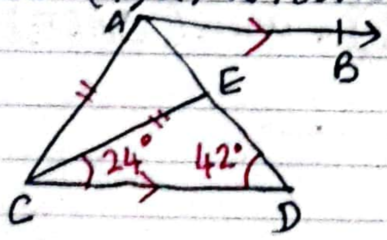
$AD \perp CD$ and $BC \perp CD$. If $AQ = BP$, $AD = BC$ Compare $\angle DAQ$ and $\angle CBP$. Write the reasons

7) y varies directly as x. If $y = 12$ and $x = 4$, then write a linear equation. What is the value of y when $x = 5$?

8) The cost of a toy horse is same as that of cost of 3 balls. Express this statement as a linear equation in two variables.

9) Write a linear equation $3x + 2y = 18$ in the form of $ax + by + c = 0$. Also write the values of a, b and c. Is $(1,2)$ a solution of this equation? Give reason.

10)



$AB \parallel CD$, $\angle ECD = 24^\circ$, $\angle EDC = 42^\circ$; $AC = CE$. Find $\angle BAD$, $\angle CAD$ and $\angle ACE$.

11) Find the value of $\frac{(16)^{\frac{3}{4}}}{(16)^{\frac{1}{4}}}$ as a whole number.

12) Factors of x^2-1 are

13) If $x^{11}+1$ is divided by $(x+1)$, what is the remainder?

14) In $\triangle ABC$, $AB = AC$ and the exterior angle $\angle ABE = 125^\circ$. Then find the measure of $\angle A$.

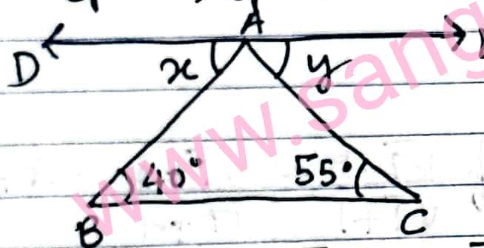
15) What is the perpendicular distance of the point $P(5, 7)$ from y-axis.

16) If $7p = 1$, find the value of p in decimal form.

17) If $2^x \times 4^x = 8^{\frac{1}{3}} \times (32)^{\frac{1}{5}}$, then find the value of x.

18) Find the volume of a cuboid whose measures are $(p-1)$, $(p+1)$ and (p^2+1)

19)

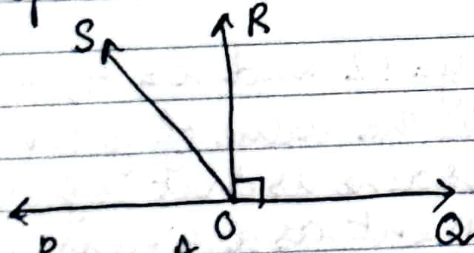


$DE \parallel BC$, find x and y. (mention the reasons)

20) Express $1.3\overline{2} + 0.\overline{35}$ as a fraction in simplest form.

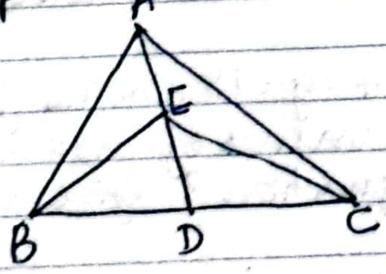
21) Represent $2+\sqrt{3}$ on the number line

22)



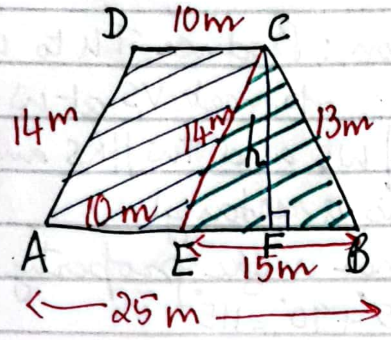
$OR \perp PQ$. OS lies between OP and OR. Prove that $\angle ROS = \frac{1}{2}(\angle QOS - \angle POS)$

23)



$AB = AC$
E is any point on median AD of $\triangle ABC$. Show that
area $(\triangle ABE)$ = area $(\triangle ACE)$

IX Revision – 2 (Answers)

1) 

Construction: draw CE ∥ DA meet AB at E. Draw CF ⊥ EB.
Thus AECD is a parallelogram with both pairs of opposite sides parallel.
Let $a = 14m$, $b = 15m$, $c = 13m$.

Using Heron's formula in $\triangle ECB$, $S = \frac{a+b+c}{2} = \frac{14+15+13}{2}$

$= \frac{42}{2} = 21\,m$

$\text{area}(\triangle CEB) = \sqrt{S(S-a)(S-b)(S-c)}$

$= \sqrt{21(21-15)(21-14)(21-13)}$

$= \sqrt{\underset{7\times3}{21} \times \underset{3\times2}{6} \times 7 \times \underset{2\times4}{8}} = 7 \times 3 \times 2 \times 2$

$= 84\,m^2$

$\text{area}(\triangle CEB) = \frac{1}{2} \times CF \times EB = 84$

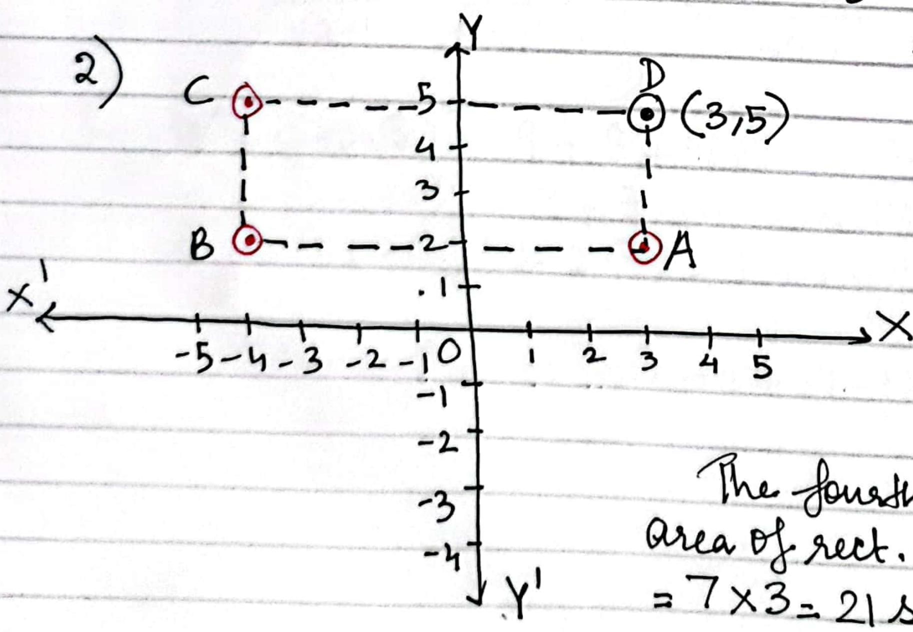
$\frac{1}{2} \times h \times 15 = 84$

$h = \frac{\cancel{84}^{28} \times 2}{\cancel{15}_{5}} = \frac{56}{5}\,m$

$\therefore$ area of the field $= \frac{1}{2}(AB + DC) \times h$

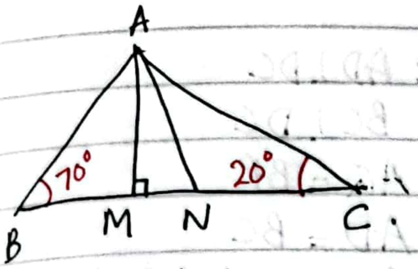
$= \frac{1}{2}(25+10) \times \frac{56}{5} = \frac{1}{\cancel{2}_1} \times \cancel{35}^{7} \times \frac{\cancel{56}^{28}}{\cancel{5}_1}$

$= 196\,m^2$

2) 

The fourth vertex is (3,5)
area of rect. ABCD = AB × AD
= 7 × 3 = 21 sq. units.

3)



$AM \perp BC$

$\Rightarrow \angle AMB = \angle AMC = 90^\circ$

AN bisects $\angle A$

$\Rightarrow \angle BAN = \angle NAC = \frac{1}{2}\angle A$

In $\triangle ABC$, using angle sum property, $\angle A = 180^\circ - (\angle B + \angle C)$

$= 180^\circ - (70^\circ + 20^\circ)$

$= 180^\circ - 90^\circ = 90^\circ.$

$\therefore \angle BAN = \frac{90^\circ}{2} = 45^\circ$

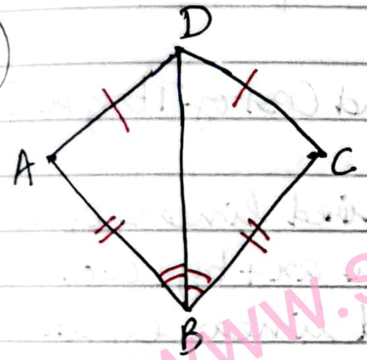
In rt. $\triangle ABM$, using angle sum property,

$\angle BAM = 180^\circ - (90^\circ + 70^\circ) = 180^\circ - 160^\circ = 20^\circ$

$\therefore \angle MAN = \angle BAN - \angle BAM = 45^\circ - 20^\circ$

$= \underline{\underline{25^\circ}}$

4)



Given: $AD = CD$ and $AB = BC$.

To prove: (i) $\triangle ABD \cong \triangle CBD$

(ii) BD bisects $\angle ABC$

Proof: In $\triangle ABD$ and $\triangle CBD$,

$AD = CD$ (given)

$AB = BC$ (given)

$BD = BD$ (common side)

$\therefore \triangle ABD \cong \triangle CBD$ (SSS congruency)

Thus $\angle ABD = \angle CBD$ (by CPCT)

Hence Proved.

5) $\dfrac{\sqrt{7}-1}{\sqrt{7}+1} = \dfrac{(\sqrt{7}-1)^2}{(\sqrt{7})^2 - 1^2} = \dfrac{7+1-2\sqrt{7}}{7-1} = \dfrac{8-2\sqrt{7}}{6} = \dfrac{\cancel{2}(4-\sqrt{7})}{\cancel{6}\,3}$

$= \dfrac{4-\sqrt{7}}{3}$

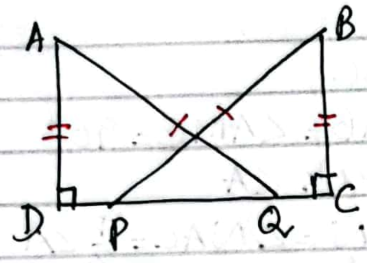
$\dfrac{\sqrt{7}+1}{\sqrt{7}-1} = \dfrac{(\sqrt{7}+1)^2}{(\sqrt{7})^2 - 1^2} = \dfrac{7+1+2\sqrt{7}}{7-1} = \dfrac{8+2\sqrt{7}}{6} = \dfrac{\cancel{2}(4+\sqrt{7})}{\cancel{6}\,3}$

$= \dfrac{4+\sqrt{7}}{3}$

$\therefore \dfrac{\sqrt{7}-1}{\sqrt{7}+1} - \dfrac{\sqrt{7}+1}{\sqrt{7}-1} = \dfrac{4-\sqrt{7}}{3} - \dfrac{4+\sqrt{7}}{3} = \dfrac{\cancel{4}-\sqrt{7}-\cancel{4}-\sqrt{7}}{3} = \dfrac{-2\sqrt{7}}{3}$

$= 0 - \frac{2}{3}\sqrt{7}$

$\therefore a = 0, b = -2/3$

6) 

Given: $AD \perp DC$
$BC \perp DC$
$AQ = BP$
$AD = BC$

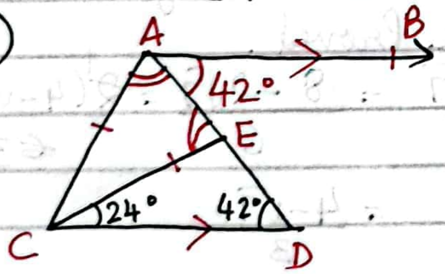
In $\triangle ADQ$ and $\triangle BCP$, $\angle ADQ = \angle BCP$ (each $90°$)
$AQ = BP$ (given)
$AD = BC$ (given)
$\therefore \triangle ADQ \cong \triangle BCP$ (RHS Congruency)

Thus $\angle DAQ = \angle CBP$ (by cpct)

7) $y = 12$; $x = 4$
$\Rightarrow y = 3x$
$\Rightarrow 3x - y + 0 = 0$ is the required linear equation in the form $ax + by + c = 0$
When $x = 5$, $y = 3 \times 5 = \underline{\underline{15}}$

8) Let the Cost of 1 ball be ₹x and Cost of 1 toy be ₹y
Then, $y = 3x$
$\Rightarrow 3x - y + 0 = 0$ is the required linear equation in the form $ax + by + c = 0$.

9) $3x + 2y - 18 = 0$ is the required linear equation in the form $ax + by + c = 0$; where $a = 3, b = 2, c = -18$.
When $x = 1$, $y = 2$
LHS, $3 \times 1 + 2 \times 2 - 18 = 3 + 4 - 18 = 12 - 18 = -6 \neq 0$
Hence $(1,2)$ is not a solution of the given equation.

10) 

Since $AB \parallel CD$ and AD is the transversal,
$\angle BAD = \angle ADC = 42°$ (alternate interior angles)

Using exterior angle property in $\triangle CDE$,
$\angle CEA = 24° + 42° = 66°$
Since $CE = AC \Rightarrow \angle AEC = \angle CAE = 66°$ (angles opposite to equal sides)
$\Rightarrow \angle CAD = 66°$
In $\triangle ACE$, using angle sum property,

$\angle ACE = 180° - (66° + 66°) = 180° - 132° = 48°$

11) $\dfrac{2^{\cancel{4}\times\frac{3}{\cancel{4}}}}{2^{\cancel{4}\times\frac{1}{\cancel{4}}}} = \dfrac{2^3}{2} = 2^2 = \underline{\underline{4}}$

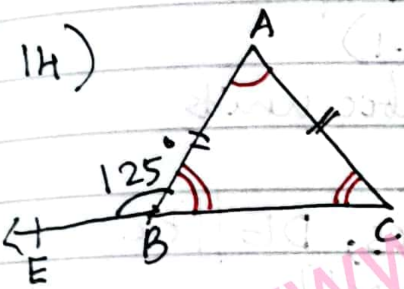
12) $x^2 - 1^2 = (x+1)(x-1)$ $\quad [a^2 - b^2 = (a+b)(a-b)]$

13) Let $p(x) = x^{11} + 1$

$p(-1) = (-1)^{11} + 1$

$= -1 + 1 = 0$

14)



$\angle ABE + \angle ABC = 180°$ (linear pair)

$\angle ABC = 180° - 125°$

$= 55°$

Since $AB = AC \Rightarrow \angle ABC = \angle ACB = 55°$

[angles opposite to equal sides]

Using exterior angle property in $\triangle ABC$

$\angle A = 180° - (55° + 55°)$

$= 180° - 110°$

$= \underline{\underline{70°}}$

15) The perpendicular distance of a point from y-axis its is x-coordinate, ie 5 units.

16) $7p = 1$

$p = \dfrac{1}{7} = 0.\overline{142857}$

17) $2^x \times 4^x = 8^{\frac{1}{3}} \times (32)^{\frac{1}{5}}$

$\Rightarrow 2^x \times 2^{2x} = 2^{\frac{3}{3}} \times 2^{\frac{5}{5}}$

$\Rightarrow 2^{x+2x} = 2^{1+1}$

$\therefore 3x = 2$

$x = \frac{2}{3}$ //

18) Volume of a Cuboid $= l \times b \times h$

$= (p-1)(p+1)(p^2+1)$

$= (p^2-1)(p^2+1)$

$= \underline{\underline{p^4 - 1}}$ cubic units

19) $x = 40^\circ$ [alternate interior angles, DE || BC and AB is the transversal]

$y = 55^\circ$ [alternate interior angles, DE || BC and AC is the transversal]

20) Let $x = 1.3222\ldots$

$10x = 13.222\ldots \rightarrow (1)$

$100x = 132.222\ldots \rightarrow (2)$

(2)−(1), $90x = 119$

$x = \frac{119}{90}$

Let $y = 0.353535 \rightarrow (3)$

$100y = 35.3535\ldots \rightarrow (4)$

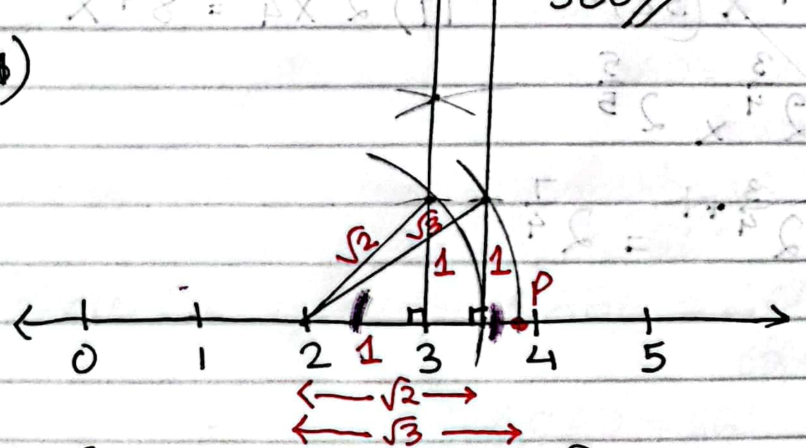
$99y = 35$

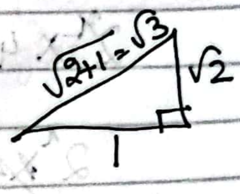
$y = \frac{35}{99}$

$\therefore \frac{119^{\times 11}}{90_{\times 11}} + \frac{35^{\times 10}}{99_{\times 10}} = \frac{1309 + 350}{990} = \frac{\cancel{1659}\ 553}{\cancel{990}\ 330}$

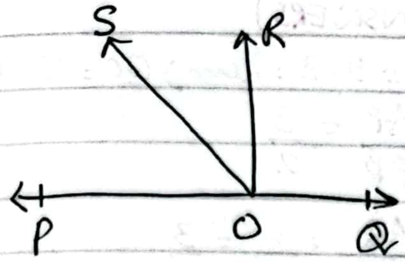
$= \frac{553}{330}$ //

21)





Thus, P represent $2+\sqrt{3}$ on the number line.

22) 

Given: $OR \perp PQ$

To prove: $\angle ROS = \frac{1}{2}(\angle QOS - \angle POS)$

Proof:- $\angle QOS = \angle QOR + \angle ROS \rightarrow (1)$

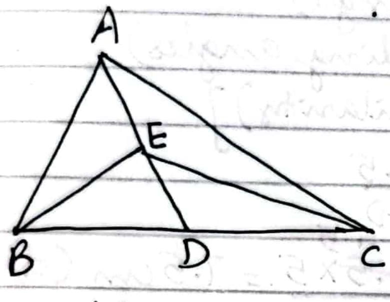
$\angle POS = \angle POR - \angle ROS \rightarrow (2)$

(1) − (2), $\angle QOS - \angle POS = \cancel{\angle QOR} + \angle ROS - \cancel{\angle POR} + \angle ROS$

$= 2\angle ROS$ [$\because \angle QOR = \angle POR = 90°$]

$\therefore \angle ROS = \frac{1}{2}(\angle QOS - \angle POS)$

Hence Proved.

23) 

Given: $AB = AC$

AD is a median.

To prove : area($\triangle ABE$) = area($\triangle ACE$)

Proof :- In $\triangle ABD$ and $\triangle ACD$, $AB = AC$ (given)

$BD = CD$ ($\because$ D is the mid-point of BC)

$AD = AD$ (common side)

$\therefore \triangle ABD \cong \triangle ACD$ [SSS congruency]

Thus $\angle BAD = \angle CAD$ (by cpct)

$\Rightarrow \angle BAE = \angle CAE \rightarrow (1)$

In $\triangle ABE$ and $\triangle ACE$, $AB = AC$ (given)

$\angle BAE = \angle CAE$ (from eq: (1))

$AE = AE$ (common side)

$\therefore \triangle ABE \cong \triangle ACE$ (SAS congruency)

$\Rightarrow$ area($\triangle ABE$) = area($\triangle ACE$) [Congruent $\triangle$s have equal areas]

Hence Proved