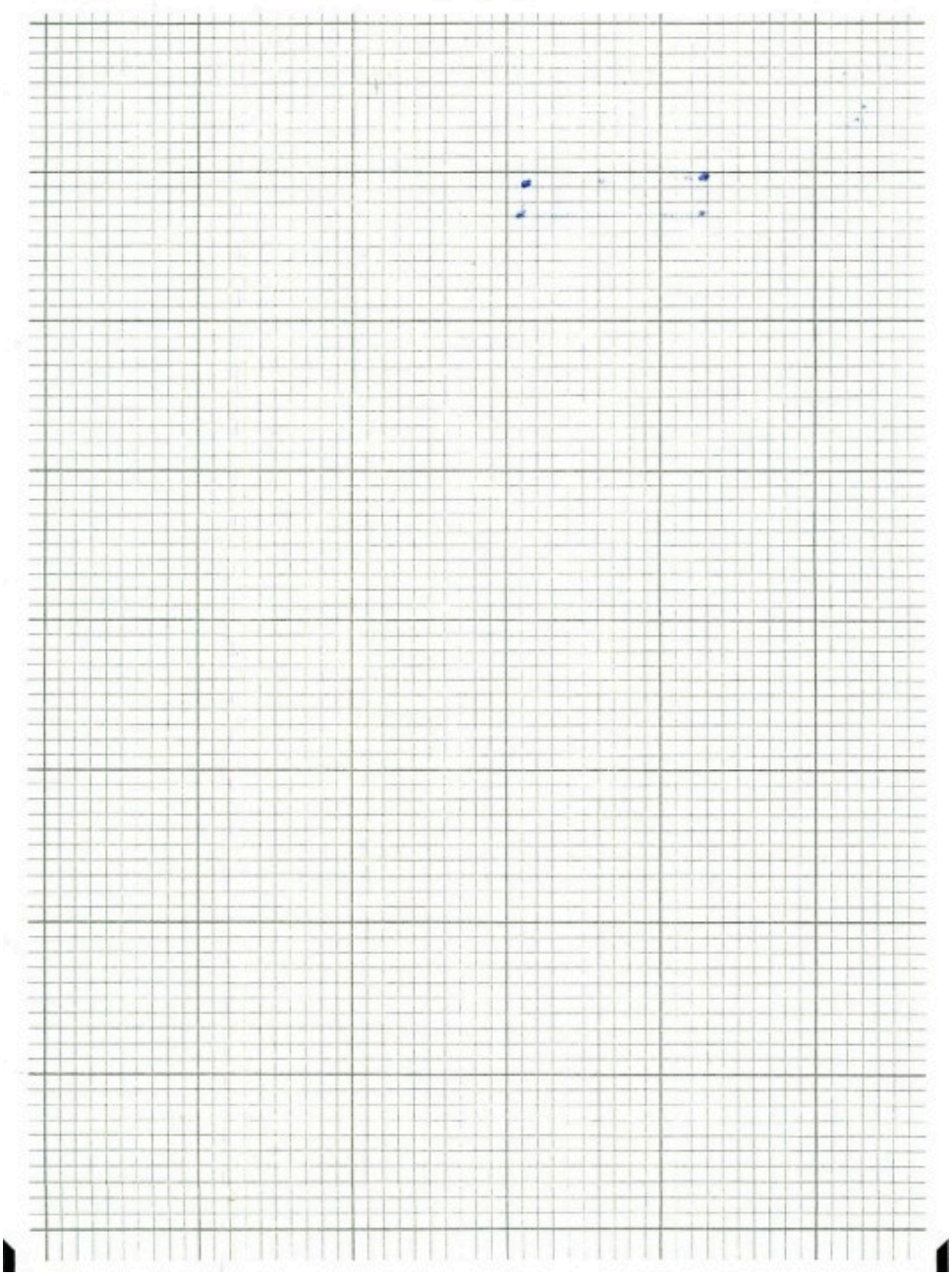
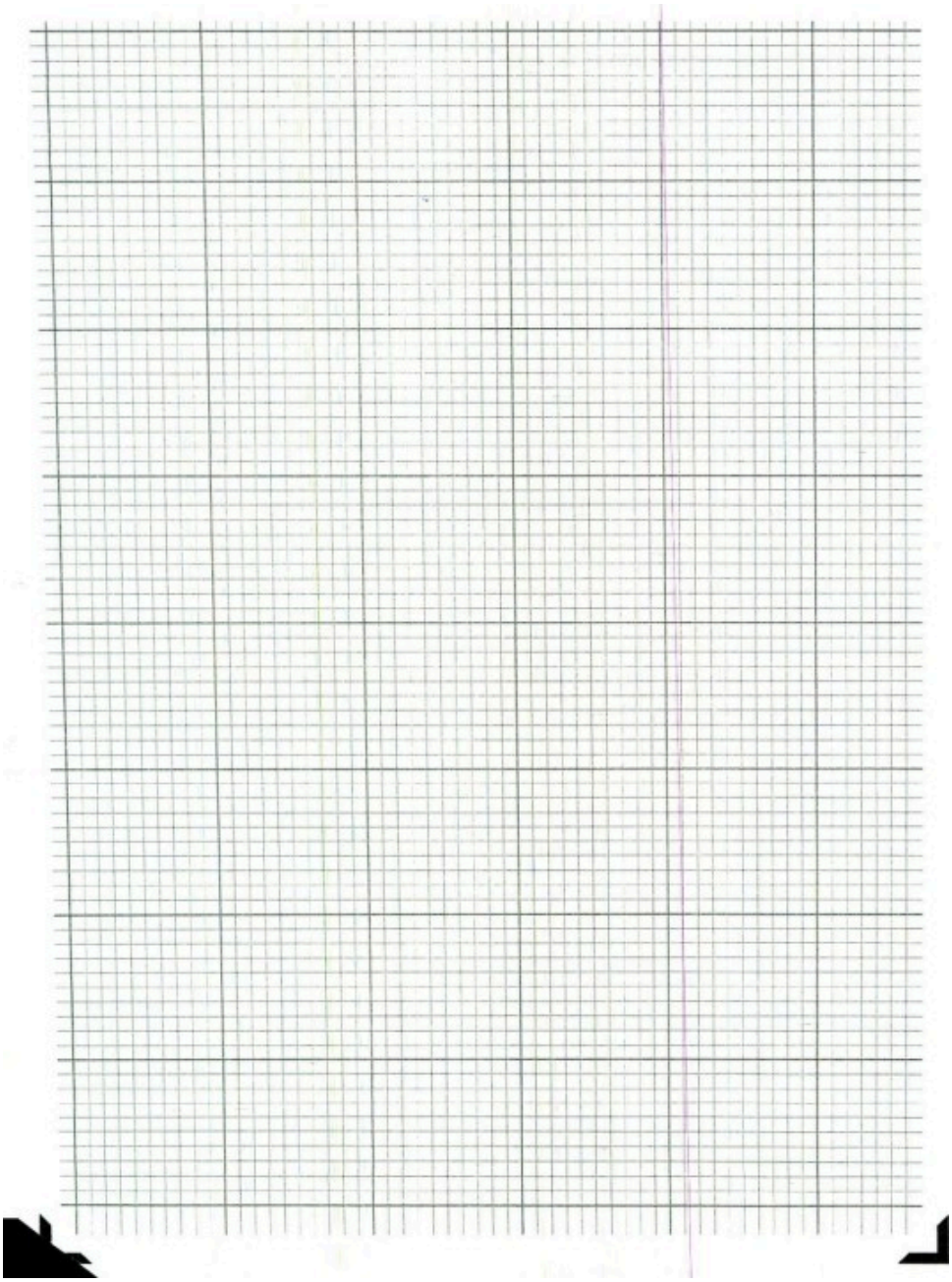






Q. No. 2 Part (I) $\frac{3+4i}{5-2i}$

$$= \frac{3+4i}{5-2i} \times \frac{5+2i}{5+2i}$$

$$= \frac{(3+4i)(5+2i)}{(5-2i)(5+2i)}$$

$$= \frac{15+6i+20i+8i^2}{(5)^2-(2i)^2}$$

$$= \frac{15+8(-1)+26i}{25-4i^2}$$

$$= \frac{15-8+26i}{25-4(-1)}$$

$$= \frac{7+26i}{25+4}$$

$$= \frac{7+26i}{29}$$

$$= \boxed{\frac{7}{29} + \frac{26}{29}i}$$ Ans

Q. No. 2 Part (ii) $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$, $A^{-} = ?$

$A^{-} = \frac{1}{|A|} Adj\, A$

$\Rightarrow |A| = (1 \times 4) - (2 \times 3)$

$= 4 - 6$

$= \boxed{-2}$

Since $|A| \neq 0$; Finding A is possible

$\Rightarrow \boxed{Adj\ A = \begin{bmatrix} 4 & -2 \\ -3 & 1 \end{bmatrix}}$

Now;

$\Rightarrow A^{-} = \frac{1}{|A|} Adj A$

$A^{-} = \frac{1}{-2} \begin{bmatrix} 4 & -2 \\ -3 & 1 \end{bmatrix}$

$A^{-} = \begin{bmatrix} 4 \times \frac{1}{-2} & -2 \times \frac{1}{-2} \\ -3 \times \frac{1}{-2} & 1 \times \frac{1}{-2} \end{bmatrix}$

$\boxed{A^{-} = \begin{bmatrix} -2 & 1 \\ \frac{3}{2} & -\frac{1}{2} \end{bmatrix}}$ Ans

Q. No. 2 Part (iii) **Data:**

Time taken by Ali = 6 hrs

Time taken by Ahmed = 12 hrs

Total time = x

Solution:

⇒ Work rate of Ali = $\frac{1}{t}$

$= \boxed{\frac{1}{6}}$

⇒ Work rate of Ahmed = $\frac{1}{t}$

$= \boxed{\frac{1}{12}}$

⇒ Total work rate = Work rate of Ali + Work rate of

$= \frac{1}{6} + \frac{1}{12}$

$= \frac{1+2}{12}$

$= \frac{3}{12}$

$= \boxed{\frac{1}{4}}$

⇒ Total time = $\frac{1}{\text{total work rate}}$

$= \frac{1}{\left(\frac{1}{4}\right)}$

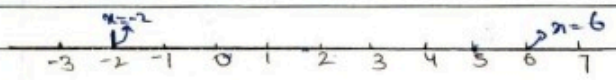
$= \boxed{4 \text{ hrs}}$ **Ans**

Q. No. 2 Part (iv) $\left|\frac{2x-4}{6}\right| = \frac{4}{3}$

$= \frac{2x-4}{6} = \pm\frac{4}{3}$

$\frac{2x-4}{6} = \frac{4}{3}$	$\frac{2x-4}{6} = -\frac{4}{3}$
$2x-4 = \frac{4}{3_1} \times 6^2$	$2x-4 = -\frac{4}{3_1} \times 6^2$
$2x-4 = 8$	$2x-4 = -8$
$2x = 8+4$	$2x = -8+4$
$2x = 12$	$2x = -4$
$x = \frac{12^6}{2}$	$x = \frac{-4^2}{2_1}$
$x = 6$	$x = -2$

S.Set = {6, -2}



Q. No. 2 Part (v) $P(-1, 4)$, $v = [3, -2]$

(a) $Q = ?$

$= Q\ (x_1 + x_2\ ,\ y_1 + y_2)$

$= Q\ (-1 + 3\ ,\ 4 - 2)$

$= \boxed{Q\ (2, 2)}$ Ans

(b) $R\ (5, 7)$, $v = [3, -2]$, is $S = (8, 5)$

$= S\ (x_1 + x_2\ ,\ y_1 + y_2)$

$= S\ (5 + 3\ ,\ 7 - 2)$

$= \boxed{S\ (8, 5)}$

So, S is equal to (8,5) after translation

Q. No. 2 Part (vi) $\frac{2}{x-1} + \frac{3}{x+1} = 1$

$= \frac{2(x+1) + 3(x-1)}{(x+1)(x-1)} = 1$

$= \frac{2x + 2 + 3x - 3}{x^2 - 1} = 1$

$= \frac{5x - 1}{x^2 - 1} = 1$

$= 5x - 1 = 1(x^2 - 1)$

$= 5x - 1 = x^2 - 1$

$= -x^2 + 5x - 1 + 1 = 0$

$= -x^2 + 5x = 0$

$= x^2 - 5x = 0$

$= x(x - 5)$

$x = 0$ | $x - 5 = 0$, $x = +5$

Check

For $x = 0$

$\frac{2}{0-1} + \frac{3}{0+1} \stackrel{?}{=} 1$

$-2 + 3 \stackrel{?}{=} 1$

$1 = 1$

For $x = +5$

$\frac{2}{+5-1} + \frac{3}{+5+1} \stackrel{?}{=} 1$

$\frac{2}{4} + \frac{3}{6} \stackrel{?}{=} 1$

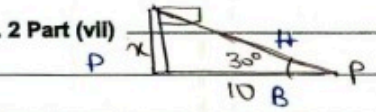
$\frac{1}{2} + \frac{1}{2} \stackrel{?}{=} 1$

$\frac{2}{2} \stackrel{?}{=} 1$

$1 = 1$

S.set $= \{0, 5\}$

Q. No. 2 Part (vii)



$\tan\theta = \frac{P}{B}$

$\tan(30) = \frac{x}{10}$

$0.5773 \times 10 = x$

$x = 5.77$ m Ans

So the flagstaff is 5.77 m tall.

Q. No. 2 Part (viii) $\frac{x^2-5x+6}{x^2-4} \times \frac{x+2}{x^2+x-6}$

$= \frac{x^2-2x-3x+6}{(x)^2-(2)^2} \times \frac{x+2}{x^2+2x+3x-6}$

$= \frac{x(x-2)-3(x-2)}{(x+2)(x-2)} \times \frac{(x+2)}{x(x-2)+3(x-2)}$

$= \frac{(x-2)(x-3)}{(x-2)} \times \frac{1}{(x-2)(x+3)}$

$= \boxed{\frac{x-3}{(x-2)(x+3)}}$ Ans

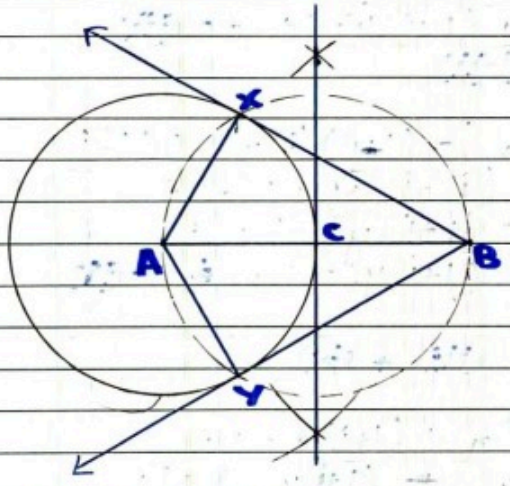
Q. No. 2 Part (ix) **Data:**

$r = 3cm$

$d = 6\ cm$

Tangents = ?

Construction:



Construction steps:

(i) Construct $\overline{AB} = 6cm$

(ii) Construct circle of $r = 3cm$ at A.

(iii) Construct $\perp$ bisector of AB.

(iv) From C, construct circle of $r = \overline{BC}$.

(v) Connect A to X and Y to form radii.

(vi) Construct tangents From B i.e BX and BY.

(vii) Tangents of circle are formed.

Q. No. 3 (Page 1) $(2+i)x + (1-i)y = 3$ — (i)

$(1+i)x - iy = 2$ — (ii)

~~Formula~~

$i(i) + (1-i)(ii)$

So $i(i)$

$(i)(2+i)x + (1-i)(i)y = 3i$

$(2i+i^2)x + (i-i^2)y = 3i$

$(-1+2i)x + (1+i)y = 3i$ — (iii)

And $(1-i)(ii)$

$(1-i)(1+i)x - (1-i)(i)y = 2(1-i)$

$(1-i^2)x - (i-i^2)y = 2-2i$

$(1+1)x - (1+i)y = 2-2i$.

$2x - (1+i)y = 2-2i$ — (iv)

Now (iii) + (iv)

$(-1+2i)x + (1+i)y = 3i$

$2x - (1+i)y = 2-2i$

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

$x = \frac{2+i}{1+2i}$

$x = \frac{2+i}{1+2i} \times \frac{1-2i}{1-2i}$

$x = \frac{(2+i)(1-2i)}{(1+2i)(1-2i)}$

$x = \frac{2-4i+i-2i^2}{(1)^2-(2i)^2}$

Q. No. 3 (Page 2) $x = \frac{2 - 2(-1) - 3i}{1 - 4i^2}$

$x = \frac{2 + 2 - 3i}{1 - 4(-1)}$

$x = \frac{4 - 3i}{1 + 4}$

$x = \frac{4 - 3i}{5} \Big/ \frac{4}{5} - \frac{3i}{5}$

x in (ii)

$(1+i)\left(\frac{4 - 3i}{5}\right) - iy = 2$

$\frac{4 - 3i + 4i - 3i^2}{5} - iy = 2$

$\frac{4 - 3(-1) + i}{5} - iy = 2$

$\frac{7 + i}{5} - iy = 2$

$-iy = 2 - \frac{7 + i}{5}$

$-iy = \frac{10 - 7 - i}{5}$

$-iy = \frac{3 - i}{5}$

$y = \frac{3 - i}{-5i} \times \frac{(5i)}{(5i)}$

$y = \frac{5i(3 - i)}{(-5i)(5i)}$

$y = \frac{15i - 5i^2}{-25i^2}$

$y = \frac{15i - 5(-1)}{-25(-1)}$

$y = \frac{15i + 5}{25}$

$y = \frac{5 + 15i}{25}$

$y = \frac{1}{5}(1 + 3i)$

$y = \frac{1 + 3i}{5}$

$y = \frac{1}{5} + \frac{3i}{5}$

Q. No. 4 (Page 1) A(1,2), B(5,2), C(7,6), D(3,6)

(i) Reference points

⇒ OA = (1-0, 2-0)
= (1,2) Ans

⇒ OB = (5-0, 2-0)
= (5,2) Ans

⇒ OC = (7-0, 6-0)
= (7,6) Ans

⇒ OD = (3-0, 6-0)
= (3,6) Ans

(ii) $\overline{AB}$ = ?, $\overline{DC}$ = ?, $\overline{AD}$ = ?, $\overline{BC}$ = ?

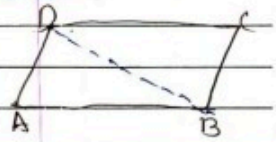
⇒ $\overline{AB}$ = $(x_2 - x_1, y_2 - y_1)$
= (5-1, 2-2)
= (4,0) Ans

⇒ $\overline{DC}$ = $(x_2 - x_1, y_2 - y_1)$
= (3-7, 6-6)
= (-4,0) Ans

⇒ $\overline{AD}$ = $(x_2 - x_1, y_2 - y_1)$
= (3-1, 6-2)
= (2,4) Ans

⇒ $\overline{BC}$ = $(x_2 - x_1, y_2 - y_1)$
= (7-5, 6-2)
= (2,4) Ans

Q. No. 4 (Page 2) (iii) Above points are parallelogram



$\Rightarrow |\overline{AB}| = \sqrt{(x)^2 + (y)^2}$

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

$= \sqrt{16+0}$

$= \sqrt{16}$

$= \boxed{4}$

$\Rightarrow |\overline{DC}| = \sqrt{(x)^2 + (y)^2}$

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

$= \sqrt{16+0}$

$= \sqrt{16}$

$= \boxed{4}$

$\Rightarrow |\overline{AD}| = \sqrt{(x)^2 + (y)^2}$

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

$= \sqrt{4+16}$

$= \boxed{\sqrt{20} \;/\; 2\sqrt{5}}$

$\Rightarrow |\overline{BC}| = \sqrt{(x)^2 + (y)^2}$

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

$= \sqrt{4+16}$

$= \boxed{\sqrt{20} \;/\; 2\sqrt{5}}$

Now:

$\Rightarrow \overline{BD} = (3-5, 6-2)$

$= \boxed{(-2, 4)}$

$\Rightarrow |\overline{BD}| = \sqrt{(-2)^2 + (4)^2}$

$= \sqrt{4+16}$

$= \boxed{\sqrt{20} \;/\; 2\sqrt{5}}$

Check for right angle

$(|\overline{BD}|)^2 \stackrel{?}{=} (|\overline{AD}|)^2 + (|\overline{AB}|)^2$

$(\sqrt{20})^2 \stackrel{?}{=} (\sqrt{20})^2 + (4)^2$

$20 \stackrel{?}{=} 20 + 16$

$20 \neq 36$

So $\angle A \neq 90°$, and $|\overline{AB}| = |\overline{DC}|$, $|\overline{AD}| = |\overline{BC}|$

So the points are vertices of parallelogram

∴ Hence proved

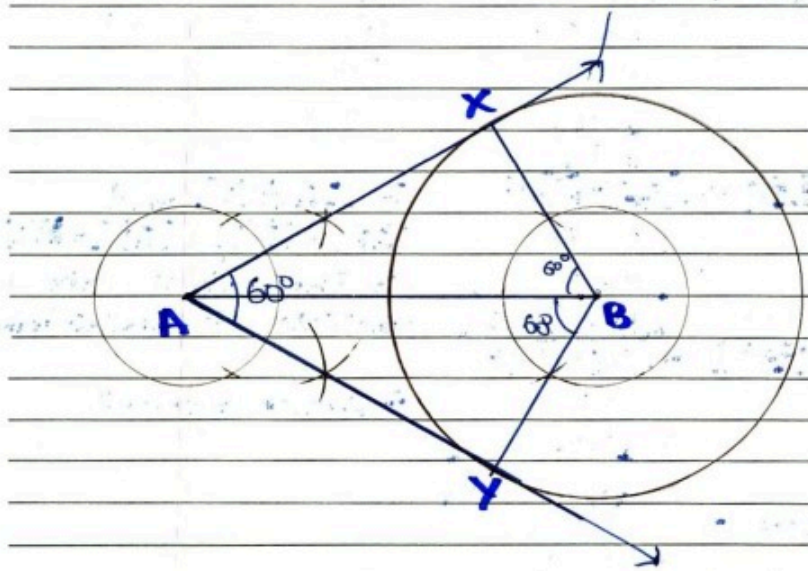
Q. No. 5 (Page 1) **Data:**

$r = 4$ cm

$\theta = 60^\circ$

tangents = ?

Construction:



Construction steps:

(i) Construct $\overline{AB}$

(ii) From B, construct circle of radius 4 cm.

(iii) Construct radii BX and BY at 60°.

(iv) Construct lines AX and AY each at 30°.

(v) Tangents of circle from point A are formed.

Q. No. 5 (Page 2) (iii) The Angle between tangents are 60° as $\angle A = \angle AX + \angle AY$

So

$\angle A = 30° + 30°$

$\boxed{\angle A = 60°}$