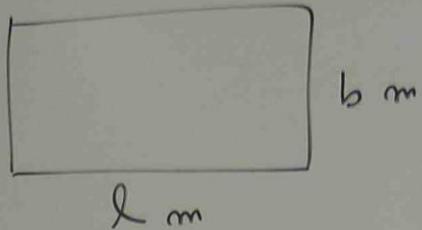


## MENSURATION

### RECTANGLE

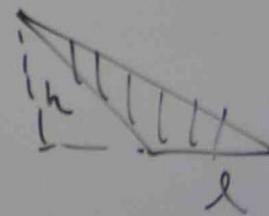
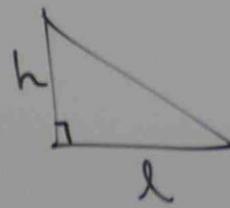
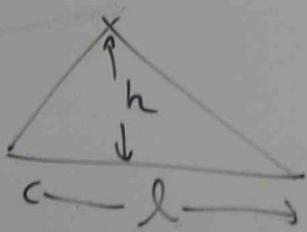


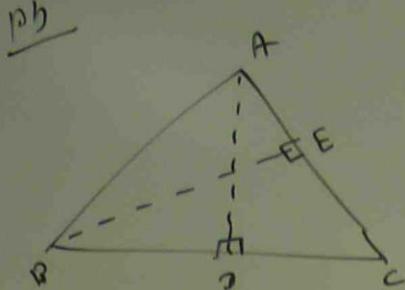
$$\text{AREA of RECTANGLE} = l \times b \text{ } \text{m}^2$$



$$\text{AREA of SQUARE} = l^2$$

$$\text{AREA OF TRIANGLE} = \frac{1}{2} l h$$





GIVEN THAT

$$BC = 6\text{ cm}, AD = 4\text{ cm}, BE = 5\text{ cm}$$

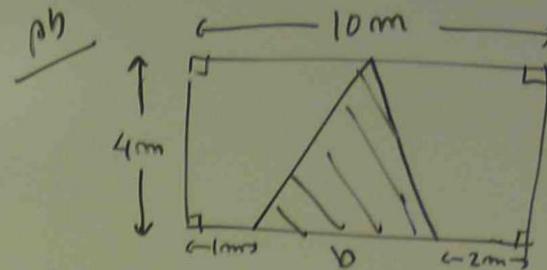
FIND THE LENGTH OF AC.

$$\begin{aligned}\text{AREA OF } \triangle ABC &= \frac{1}{2} \times BC \times AD \\ &= \frac{1}{2} \times 6 \times 4 \\ &= 12 \text{ cm}^2\end{aligned}$$

$$\begin{aligned}\text{AREA OF } \triangle ABC &= \frac{1}{2} \times AC \times BE \\ &= \frac{1}{2} \times AC \times 5 \\ &= 2.5AC\end{aligned}$$

$$\therefore 2.5AC = 12$$

$$AC = \frac{12}{2.5} = 4.8\text{ cm}$$

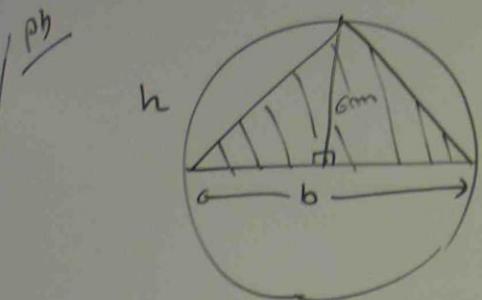


FIND THE AREA OF TRIANGLE  
IN SHADING.

$$\begin{aligned}b &= 10 - (1+2) \\ &= 7\text{ cm}\end{aligned}$$

$$h = 4\text{ cm}$$

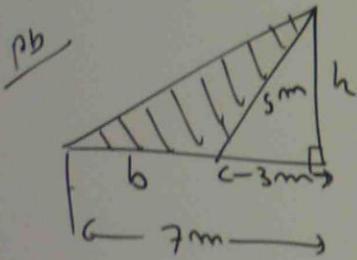
$$\begin{aligned}\text{AREA OF TRIANGLE} &= \frac{1}{2} b h \\ &= \frac{1}{2} \times 7 \times 4 \\ &= 14 \text{ cm}^2\end{aligned}$$



FIND AREA OF TRIANGLE.

$$b = 2 \quad h = 2 \times 6 = 12 \text{ m}$$

$$\text{AREA OF TRIANGLE} = \frac{1}{2} b h = \frac{1}{2} \times 12 \times 6 = 36 \text{ m}^2$$



FIND THE AREA OF TRIANGLE IN SHADING.

$$b = 7 - 3 = 4 \text{ m}$$

$$s^2 = 3^2 + h^2$$

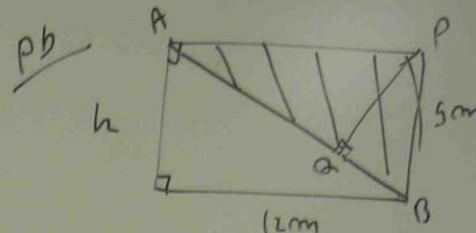
$$25 = 9 + h^2$$

$$h^2 = 25 - 9 = 16$$

$$h = \sqrt{16} = 4 \text{ m}$$

$$\text{AREA} = \frac{1}{2} b h$$

$$= \frac{1}{2} \times 4 \times 4 \\ = 8 \text{ m}^2$$



FIND THE AREA OF SHADED TRIANGLE AND LENGTH PA.

$$\text{HEIGHT} = 5 \text{ m}$$

$$\text{BASE} = 12 \text{ m}$$

$$\begin{aligned} \text{AREA} &= \frac{1}{2} b h \\ &= \frac{1}{2} \times 12 \times 5 \\ &= 30 \text{ m}^2 \end{aligned}$$

$$\begin{array}{c} \text{AREA OF SHADeD} = \text{AREA OF NONSHADeD} \\ \triangle \qquad \triangle \end{array}$$

$$\text{AREA OF SHADeD } \triangle = 30 \text{ m}^2$$

$$\frac{1}{2} \times AP \times PQ = 30$$

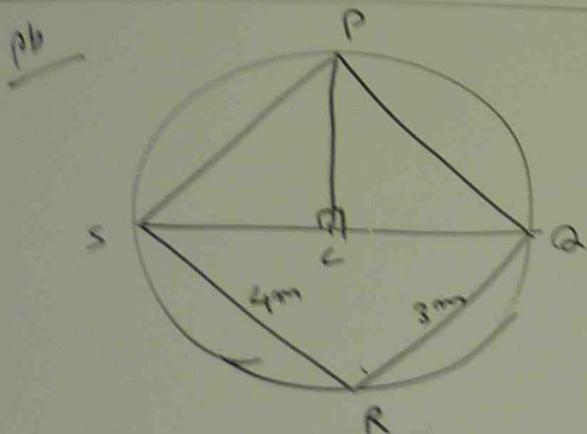
$$AP^2 = 12^2 + h^2$$

$$AP^2 = 12^2 + s^2 = 169 \rightarrow AP = \sqrt{169} = 13$$

$$\frac{1}{2} \times 13 \times PQ = 30$$

$$PQ = \frac{30 \times 2}{13}$$

$$= 4.615$$



C IS THE CENTRE OF CIRCLE.

FIND THE AREA OF QUADRILATERAL PQRS

$\widehat{R}$  IS SUBJECT TO  $SQ$  (DIAMETER)

$$\widehat{R} = 90^\circ$$

$$\begin{aligned}\triangle SQR \text{ AREA} &= \frac{1}{2} \times RQ \times SR \\ &= \frac{1}{2} \times 3 \times 4 \\ &= 6 \text{ m}^2\end{aligned}$$

$\triangle SQR$  IS RIGHT ANGLE  $\triangle$

$$\begin{aligned}SR^2 + RQ^2 &= SQ^2 \\ 4^2 + 3^2 &= SQ^2\end{aligned}$$

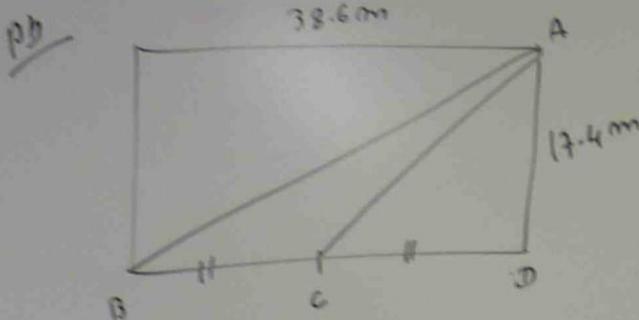
$$SQ = \sqrt{4^2 + 3^2} = \sqrt{25} = 5$$

$$SQ = \text{DIAMETER} = 2 SC = 2 CB = 2 PC$$

$$\therefore SC = CB = PC = \frac{SQ}{2} = \frac{5}{2} = 2.5$$

$$\triangle PSQ \text{ AREA} = \frac{1}{2} \times SQ \times PC$$

$$= \frac{1}{2} \times 5 \times 2.5 = 6.25 \text{ m}^2$$



- FIND (a) THE AREA OF  $\triangle ABC$   
 (b) THE AREA OF  $\triangle ACD$

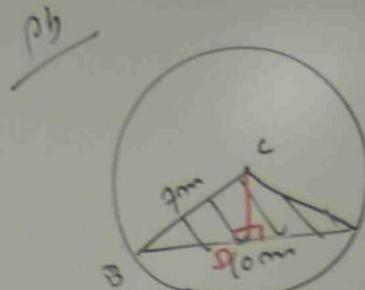
$$BD = 38.6 \text{ m}$$

$$BC = CD = \frac{BD}{2} = \frac{38.6}{2} = 19.3 \text{ m}$$

$$\triangle ABC = \frac{1}{2} \times BC \times AD$$

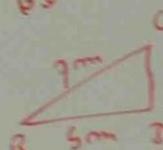
$$= \frac{1}{2} \times 19.3 \times 17.4 \\ = 167.91 \text{ m}^2$$

$$\triangle ACD = \frac{1}{2} \times CD \times AD \\ = \frac{1}{2} \times 19.3 \times 17.4 \\ = 167.91 \text{ m}^2$$



FIND THE AREA  
 $\triangle ABC$

$$BD = AD = 7 \text{ m}$$

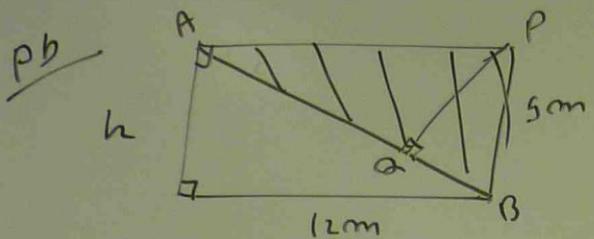


$$BC^2 = BD^2 + CD^2$$

$$7^2 = 5^2 + CD^2$$

$$CD = \sqrt{7^2 - 5^2} = \sqrt{49 - 25} = \sqrt{24} = 4.89$$

$$\begin{aligned}\triangle ABC &= \frac{1}{2} \times BA \times CD \\ &= \frac{1}{2} \times 10 \times 4.89 \\ &= 24.49 \text{ m}^2\end{aligned}$$



FIND THE AREA OF SHADeD TRIANGLE  
AND LENGTH PQ.

$$\text{HEIGHT} = 5 \text{ cm}$$

$$\text{BASE} = 12 \text{ m}$$

$$\begin{aligned}\text{AREA} &= \frac{1}{2} b h \\ &= \frac{1}{2} \times 12 \times 5 \\ &= 30 \text{ m}^2\end{aligned}$$

$$\text{AREA OF SHADeD } \triangle = \text{AREA OF NONSHADeD } \triangle$$

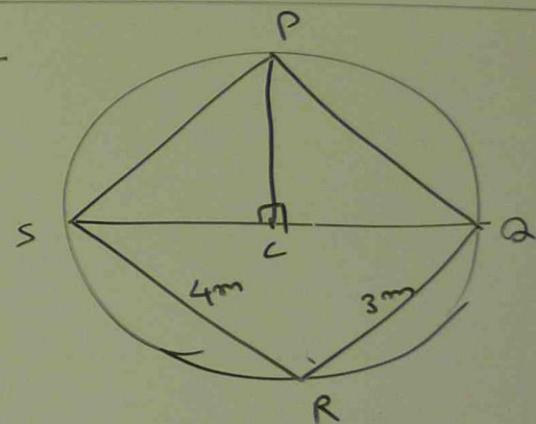
$$\text{AREA OF SHADeD } \triangle = 30 \text{ m}^2$$

$$\frac{1}{2} \times AP \times PQ = 30$$

$$AP^2 = 12^2 + h^2$$

$$AP^2 = 12^2 + 5^2 = 169 \rightarrow AP = \sqrt{169} = 13$$

$$\begin{aligned}\frac{1}{2} \times 13 \times PQ &= 30 \\ PQ &= \frac{30 \times 2}{13} \\ &= 4.615\end{aligned}$$



C IS THE CENTRE OF CIRCLE.

FIND THE AREA OF QUADRILATERAL PQRS

$\widehat{R}$  IS SUBJECT TO SR (DIAMETER)

$$\widehat{R} = 90^\circ$$

$$\begin{aligned}\triangle SAR \text{ AREA} &= \frac{1}{2} \times RQ \times SR \\ &= \frac{1}{2} \times 3 \times 4 \\ &= 6 \text{ m}^2\end{aligned}$$

$\triangle SAR$  IS RIGHT ANGLE  $\triangle$

$$SR^2 + RQ^2 = SQ^2$$

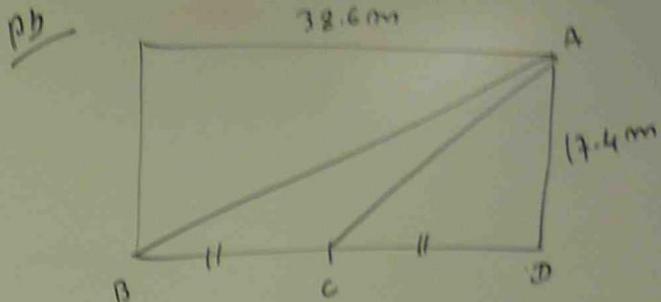
$$4^2 + 3^2 = SQ^2$$

$$SQ = \sqrt{4^2 + 3^2} = \sqrt{25} = 5$$

$$SQ = \text{Diameter} = 2 SC = 2 CD = 2 PC$$

$$\therefore SC = CD = PC = \frac{SQ}{2} = \frac{5}{2} = 2.5$$

$$\begin{aligned}\triangle PSQ \text{ AREA} &= \frac{1}{2} \times SQ \times PC \\ &\approx \frac{1}{2} \times 5 \times 2.5 = 6.25 \text{ m}^2\end{aligned}$$



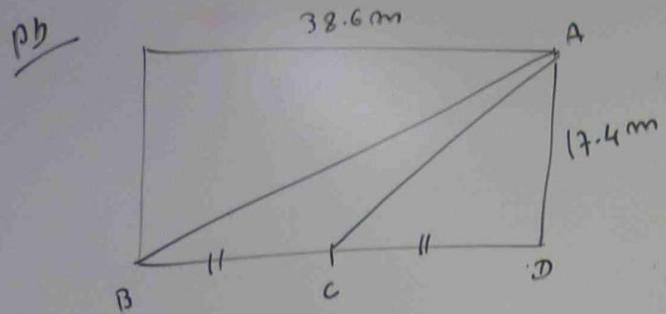
- FIND (a) THE AREA OF  $\triangle ABC$   
 (b) THE AREA OF  $\triangle ACD$

$$BD = 38.6 \text{ m}$$

$$BC = CD = \frac{BD}{2} = \frac{38.6}{2} = 19.3 \text{ m}$$

$$\begin{aligned}\triangle ABC &= \frac{1}{2} \times BC \times AD \\ &= \frac{1}{2} \times 19.3 \times 17.4 \\ &\approx 169.91 \text{ m}^2\end{aligned}$$

$$\begin{aligned}\triangle ACD &= \frac{1}{2} \times CD \times AD \\ &= \frac{1}{2} \times 19.3 \times 17.4 \\ &\approx 169.91 \text{ m}^2\end{aligned}$$



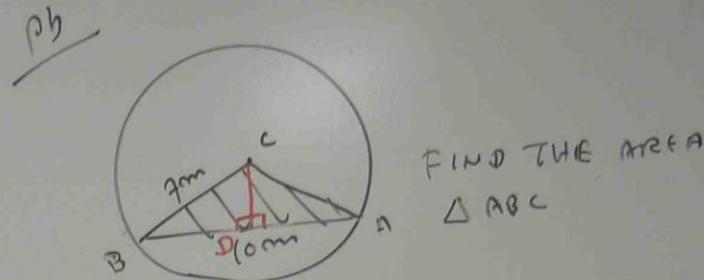
- FIND (a) THE AREA OF  $\triangle ABC$   
 (b) THE AREA OF  $\triangle ACD$

$$BD = 38.6 \text{ m}$$

$$BC = CD = \frac{BD}{2} = \frac{38.6}{2} = 19.3 \text{ m}$$

$$\begin{aligned}\triangle ABC &= \frac{1}{2} \times BC \times AD \\ &= \frac{1}{2} \times 19.3 \times 17.4 \\ &= 167.91 \text{ m}^2\end{aligned}$$

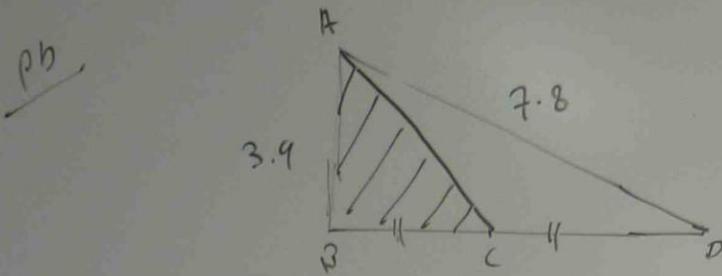
$$\begin{aligned}\triangle ACD &= \frac{1}{2} \times CD \times AD \\ &= \frac{1}{2} \times 19.3 \times 17.4 \\ &= 167.91 \text{ m}^2\end{aligned}$$



FIND THE AREA  
 $\triangle ABC$

$$\begin{aligned}BD &= AD = 5 \text{ m} \\ BC^2 &= BD^2 + CD^2 \\ 7^2 &= 5^2 + CD^2 \\ CD &= \sqrt{7^2 - 5^2} = \sqrt{49 - 25} = \sqrt{24} = 4.89\end{aligned}$$

$$\begin{aligned}\triangle ABC &= \frac{1}{2} \times BC \times CD \\ &= \frac{1}{2} \times 10 \times 4.89 \\ &= 24.49 \text{ m}^2\end{aligned}$$



FIND AREA OF  $\triangle ABC$

$$AD^2 = AB^2 - BD^2$$

$$7.8^2 = 3.9^2 + BD^2$$

$$BD^2 = 7.8^2 - 3.9^2 = 45.63$$

$$BD = \sqrt{45.63} = 6.75$$

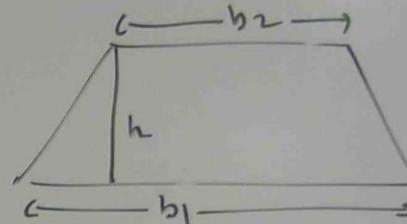
$$BC = CD = \frac{BD}{2} = \frac{6.75}{2} = 3.375$$

$$\triangle ABC = \frac{1}{2} \times BC \times AB$$

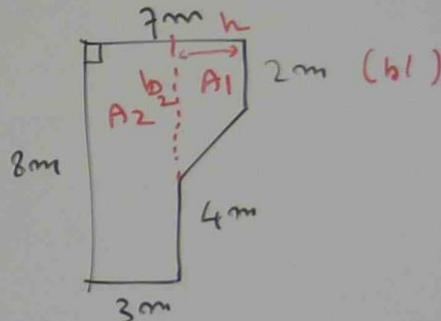
$$= \frac{1}{2} \times 3.375 \times 3.9$$

$$= 6.58 \text{ m}^2$$

### TRAPEZOIDAL AREA



$$A = \frac{1}{2} h (b_1 + b_2)$$



$$b_2 = 8 - 4 = 4 \text{ m}$$

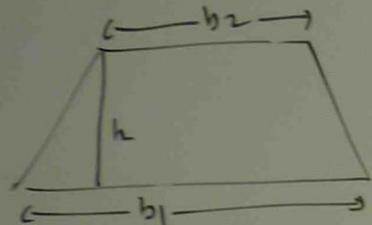
$$b_1 = 2 \text{ m}$$

$$h = 7 - 3 = 4 \text{ m}$$

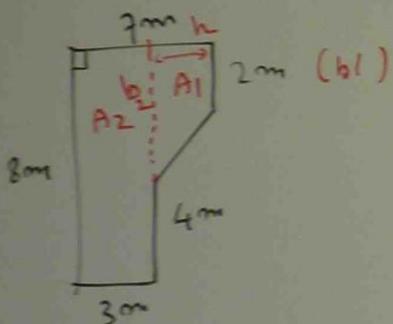
$$A_1 = \frac{1}{2} h (b_1 + b_2) = \frac{1}{2} \times 4 \times (4+2)$$

$$= 2 \times 6 = 12 \text{ m}^2$$

## TRIPODIAL AREA



$$A = \frac{1}{2} h (b_1 + b_2)$$



$$b_2 = 8 - 4 = 4\text{m}$$

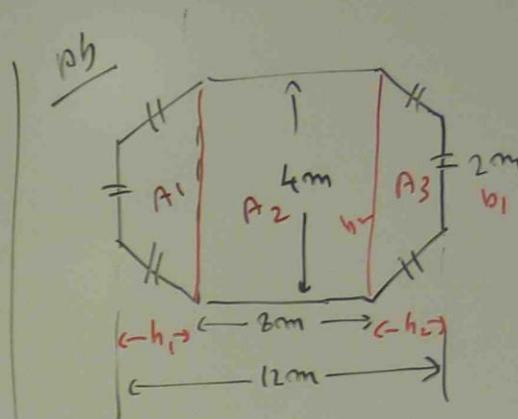
$$b_1 = 2\text{m}$$

$$h = 7 - 3 = 4\text{m}$$

$$A_1 = \frac{1}{2} h (b_1 + b_2) = \frac{1}{2} \times 4 \times (4+2) \\ = 2 \times 6 = 12\text{ m}^2$$

$$A_2 = 8 \times 3 = 24\text{ m}^2$$

$$A_T = A_1 + A_2 \\ = 12 + 24 \\ = 36\text{ m}^2$$



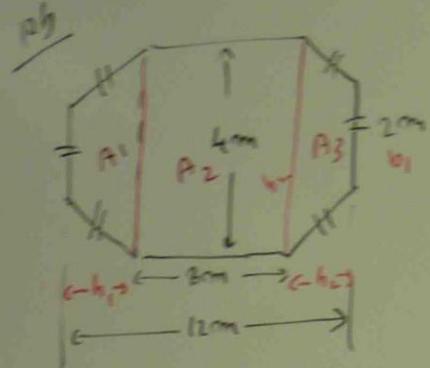
$$h_1 = h_2 = \frac{12 - 2}{2} = \frac{4}{2} = 2\text{m}$$

$$A_3 = A_1 = \frac{1}{2} \times h_2 \times (b_1 + b_2) \\ = \frac{1}{2} \times 2 \times (2 + 4) \\ = 6$$

$$A_2 = 8 \times 4 = 32$$

$$A_T = A_1 + A_2 + A_3$$

$$= 6 + 32 + 6 \\ = 44\text{ m}^2$$



$$h_1 = h_2 = \frac{12 - 3}{2} = \frac{9}{2} = 4.5 \text{ m}$$

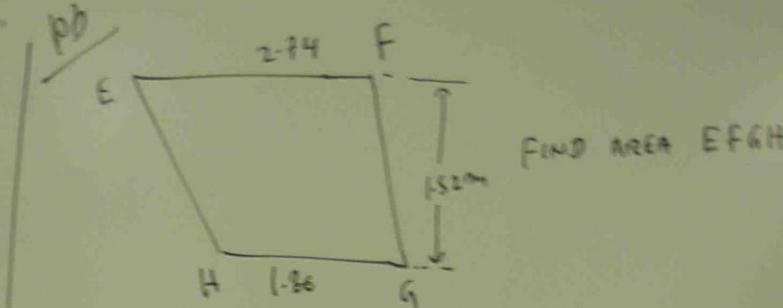
$$\begin{aligned} A_3 &= A_1 = \frac{1}{2} \times h_2 \times (b_1 + b_2) \\ &= \frac{1}{2} \times 2 \times (2 + 4) \\ &= 6 \end{aligned}$$

$$A_2 = 8 \times 4 = 32$$

$$A_T = A_1 + A_2 + A_3$$

$$= 6 + 32 + 6$$

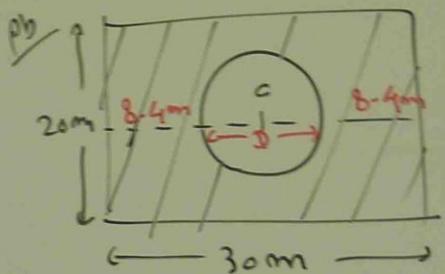
$$= 44 \text{ m}^2$$



AREA OF CIRCLE

$$= \frac{\pi}{4} D^2$$

$$EFGH = \frac{1}{2} \times 1.52 \times (2.74 + 1.86) = 3.496 \text{ m}^2$$

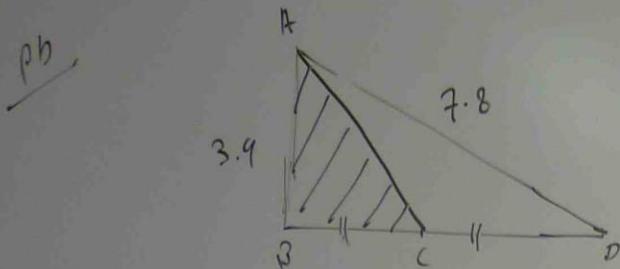


$$D = 30 - 2 \times 8.4 = 13.2 \text{ m}$$

$$\begin{aligned} \text{AREA} &= \frac{\pi}{4} D^2 = 0.7854 \times (13.2)^2 \\ &= 136.8 \text{ m}^2 \end{aligned}$$

$$\text{ALL } \square \text{ AREA} = 30 \times 20 = 600 \text{ m}^2$$

$$\text{SHADED AREA} = 600 - 136.8 = 463.2 \text{ m}^2$$



FIND AREA OF  $\triangle ABC$

$$AD^2 = AB^2 + BD^2$$

$$7.8^2 = 3.9^2 + BD^2$$

$$BD^2 = 7.8^2 - 3.9^2 = 45.63$$

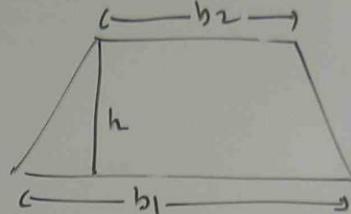
$$BD = \sqrt{45.63} = 6.75$$

$$BC = CD = \frac{BD}{2} = \frac{6.75}{2} = 3.375$$

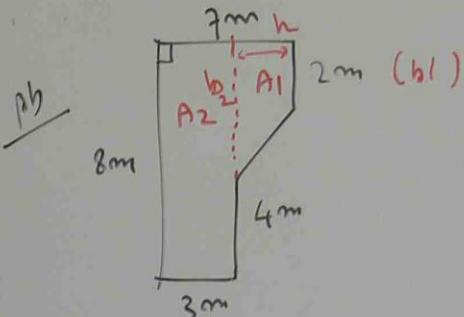
$$\begin{aligned}\triangle ABC &= \frac{1}{2} \times BC \times AP \\ &= \frac{1}{2} \times 3.375 \times 3.9\end{aligned}$$

$$= 6.58 \text{ m}^2$$

### TRIPLICIAL AREA



$$A = \frac{1}{2} h (b_1 + b_2)$$



$$b_2 = 8 - 4 = 4 \text{ m}$$

$$b_1 = 2 \text{ m}$$

$$h = 7 - 3 = 4 \text{ m}$$

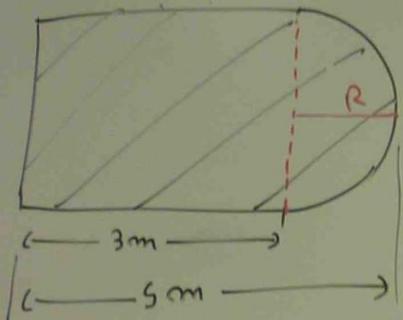
$$\begin{aligned}A_T &= \frac{1}{2} h (b_1 + b_2) = \frac{1}{2} \times 4 \times (4+2) \\ &= 2 \times 6 = 12 \text{ m}^2\end{aligned}$$

$$A_2 = 8 \times 3 = 24 \text{ m}^2$$

$$A_T = A_1 + A_2$$

$$\begin{aligned}&= 12 + 24 \\ &= 36 \text{ m}^2\end{aligned}$$

PB



$$R = 5 - 3 = 2 \text{ m}$$

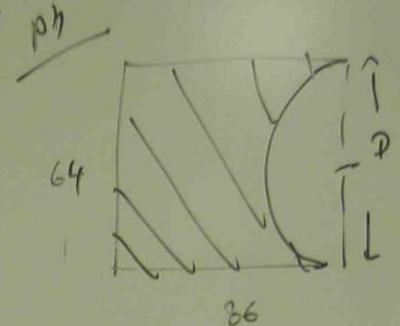
$$\text{D} = 2 \times 2 = 4 \text{ m}$$

$$\text{TOTAL AREA} = \square + \text{D}$$

$$= 3 \times 4 + \frac{1}{2} \times \frac{\pi}{4} \times 4^2$$

$$= 12 + \frac{1}{2} \times 0.7854 \times 16$$

$$= 18.28 \text{ m}^2$$



$$\text{D} = 64$$

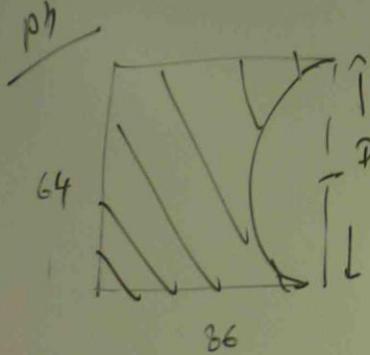
SHADDED AREA =

$$\square - \text{D}$$

$$= 36 \times 64 - \frac{1}{2} \times \frac{\pi}{4} \times 28^2$$

$$= 36 \times 64 - \frac{1}{2} \times 0.7854 \times 64^2$$

$$= 3895.5 \text{ m}^2$$



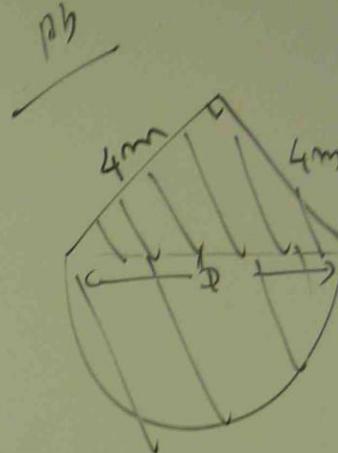
$$D = 64$$

SHADDED AREA =  $\square - \triangle$

$$= 86 \times 64 - \frac{1}{2} \times \frac{\pi}{4} D^2$$

$$= 86 \times 64 - \frac{1}{2} \times 0.7854 \times 64^2$$

$$= 3895.5 \text{ m}^2$$



$$D^2 = 4^2 + 4^2$$

$$D = \sqrt{16+16} = 5.65$$

TOTAL =  $\square + \triangle$

$$= \frac{1}{2} \times \frac{\pi}{4} D^2 + \frac{1}{2} \times b \times h$$

$$= \frac{1}{2} \times 0.7854 \times 5.65^2 + \frac{1}{2} \times 4 \times 4$$

$$= 20.5 \text{ m}^2$$