

$$u = -0.3y^2 + 12y$$

$$\frac{du}{dy} = -0.6y + 12$$

$$\left(\frac{du}{dy}\right)_{at y=0} = 12 \quad \left(\frac{du}{dy}\right)_{at y=20} = 0$$

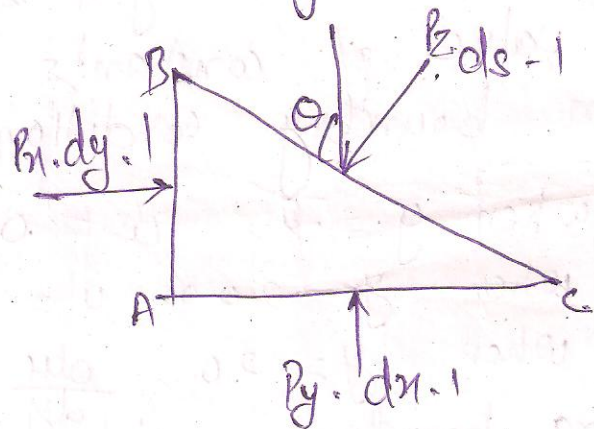
$$(17)_{at y=10} = 6$$

$\tau = u \frac{du}{dy}$   $\tau$  can be calculated for above three.

\* Pascal's Law :— It states that the pressure or intensity of pressure at a point in a static fluid is equal in all directions, let the element is very small dimensions  $dx, dy$  and  $dz$ .

Let the width of the element is ~~very small~~  $\perp$  to the plane of paper is unity.

$P_x, P_y$  &  $P_z$  are intensities of pressure at AB, AC & BC. Forces acting on the faces.



Force on face AB

$$= P_x \cdot dy \cdot 1$$

Force on face AC

$$= P_y \cdot dx \cdot 1$$

~~Force~~ on BC =  $P_z \cdot ds \cdot 1$

Weight of element = mass  $\times g$  = Volume  $\times \rho \times g$   
 $= \frac{AB \times AC}{2} \times \rho \times g$

Resolving the forces in  $x$ -direction

$$P_x \cdot dy \cdot 1 - P_z (ds \cdot 1) \sin(90^\circ - \theta) = 0$$

$$P_x \cdot dy \cdot 1 - P_z \cdot ds \cdot \cos \theta = 0$$

$$ds \cdot \cos \theta = AB = dy$$

$$P_x \cdot dy = P_z \cdot dy \Rightarrow \therefore P_x = P_z$$

Resolving in vertical direction

$$P_y \cdot dx \cdot 1 - P_z \cdot ds \cdot 1 \cos(90^\circ - \theta) = \frac{dx \cdot dy}{2} \times \rho \times g = 0$$