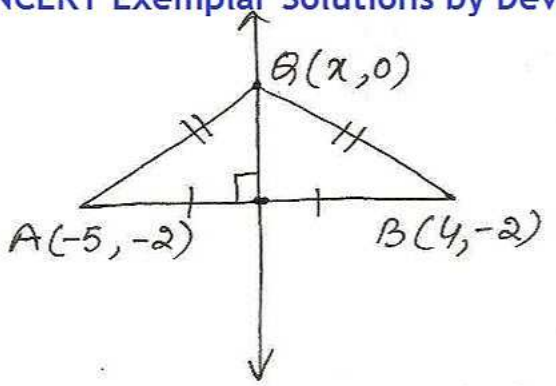
⑥



Let $P(x,0)$ be point on x axis

$\because$ a lies on the per. bisector of AB

$AQ = BQ$

$\Rightarrow AQ^2 = BQ^2$

$(x+5)^2 + (0+2)^2 = (x-4)^2 + (0+2)^2$

$x^2 + 25 + 10x = x^2 + 16 - 8x$

$\Rightarrow 18x = -9$

$\Rightarrow x = -\frac{9}{18}$

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

$\therefore Q(-\frac{1}{2}, 0)$

$\triangle QAB$ is isosceles

⑦ Points $A(5,1)$, $B(-2,-3)$ and $C(8,2m)$ are collinear

$\therefore ar(\triangle ABC) = 0$

$$\frac{1}{2}\begin{vmatrix} 5 & 1 \\ -2 & -3 \\ 8 & 2m \\ 5 & 1 \end{vmatrix} = 0$$

$\Rightarrow -15 + 2 - 4m + 24 + 8 - 10m = 0$

$\Rightarrow -14m = -19$

$\Rightarrow m = \frac{-19}{-14}$

$= \frac{19}{14}$

⑧ $A(2,-4)$ is equidistant from $P(3,8)$ and $Q(-10,y)$

$\therefore AP = AQ$

$\Rightarrow AP^2 = AQ^2$

$(3-2)^2 + (8+4)^2 = (-10-2)^2 + (y+4)^2$

$1^2 + 144 = 144 + (y+4)^2$

$y + 4 = \pm 1$

$\Rightarrow y = -4 \pm 1$

$y = -4-1 = -5$; $y = -4+1 = -3$

$\therefore Q(-10,-3)$ or $Q(-10,-5)$

$PQ = \sqrt{(-10-3)^2 + (-3-8)^2}$

$= \sqrt{(-13)^2 + (-11)^2}$

$= \sqrt{169 + 121}$

$= \sqrt{290}$