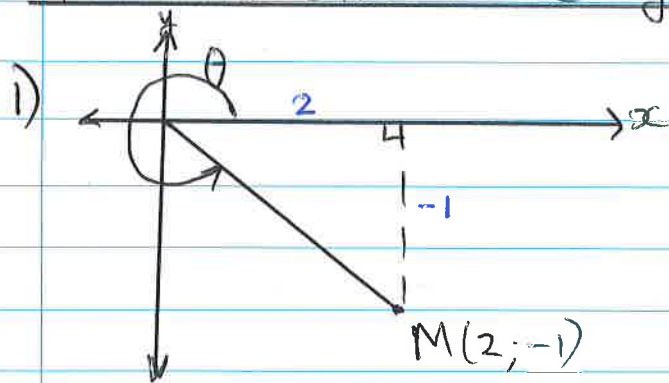


Revision Exercise (Trig. Ratios)

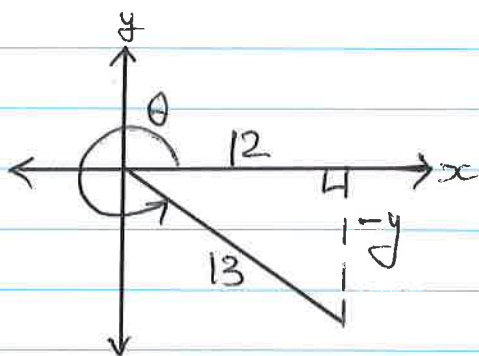


$$\begin{aligned}
 r^2 &= x^2 + y^2 && \text{Pyth} \\
 &= (2)^2 + (-1)^2 \\
 &= 4 + 1 \\
 &= 5 \\
 r &= \pm\sqrt{5} \\
 \therefore r &= \sqrt{5}
 \end{aligned}$$

$$a) \cos \theta = \frac{x}{r} = \frac{2}{\sqrt{5}} = \frac{2\sqrt{5}}{5} \text{ (rationalized)}$$

$$\begin{aligned}
 b) 1 - \sin^2 \theta &= 1 - \left(\frac{y}{r}\right)^2 \\
 &= 1 - \left(\frac{-1}{\sqrt{5}}\right)^2 \\
 &= 1 - \frac{1}{5} \\
 &= \frac{4}{5}
 \end{aligned}$$

$$\begin{aligned}
 2) 13 \cos \theta &= 12 && 180^\circ < \theta < 360^\circ \\
 \cos \theta &= \frac{12}{13} && \frac{x}{r}
 \end{aligned}$$



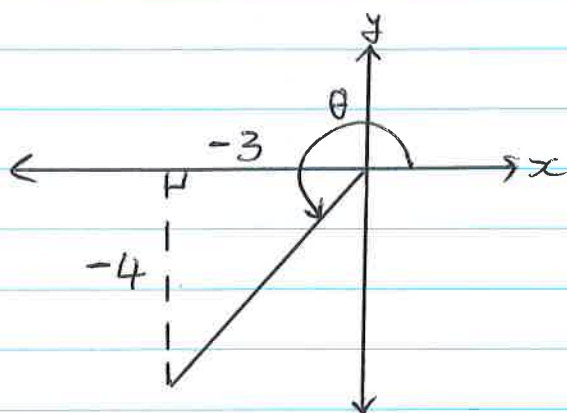
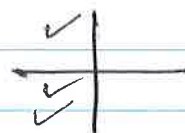
$$\begin{aligned}
 y^2 &= r^2 - x^2 && \text{Pyth.} \\
 &= (13)^2 - (12)^2 \\
 &= 169 - 144 \\
 &= 25 \\
 y &= \pm\sqrt{25} \\
 \therefore y &= -5
 \end{aligned}$$

$$a) \tan \theta = \frac{y}{x} = \frac{-5}{12}$$

$$\begin{aligned}
 b) (\sin \theta + \cos \theta)^2 &= (\sin \theta + \cos \theta)(\sin \theta + \cos \theta) \\
 &= \sin^2 \theta + 2 \sin \theta \cos \theta + \cos^2 \theta \\
 &= \left(\frac{y}{r}\right)^2 + 2 \left(\frac{y}{r}\right) \left(\frac{x}{r}\right) + \left(\frac{x}{r}\right)^2 \\
 &= \left(\frac{-5}{13}\right)^2 + 2 \left(\frac{-5}{13}\right) \left(\frac{12}{13}\right) + \left(\frac{12}{13}\right)^2 \\
 &= \frac{49}{169}
 \end{aligned}$$

$$3) \quad 3 \tan \theta - 4 = 0 \quad \& \quad \cos \theta < 0$$

$$\tan \theta = \frac{4}{3} \quad \frac{y}{x}$$



$$r^2 = x^2 + y^2 \quad \text{Pyth.}$$

$$= (-3)^2 + (-4)^2$$

$$= 9 + 16$$

$$= 25$$

$$r = \pm \sqrt{25} = \pm 5$$

$$\therefore r = 5$$

$$a) \quad \frac{\sin \theta}{\cos \theta} = \frac{y}{r} \div \frac{x}{r} = \frac{y}{r} \times \frac{r}{x} = \frac{y}{x}$$

$$= \frac{-4}{-3}$$

$$= \frac{4}{3}$$

$$b) \quad 10 \sin \theta - 25 \cos^2 \theta$$

$$= 10 \left(\frac{y}{r} \right) - 25 \left(\frac{x}{r} \right)^2$$

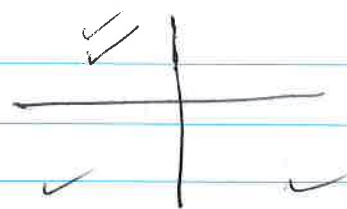
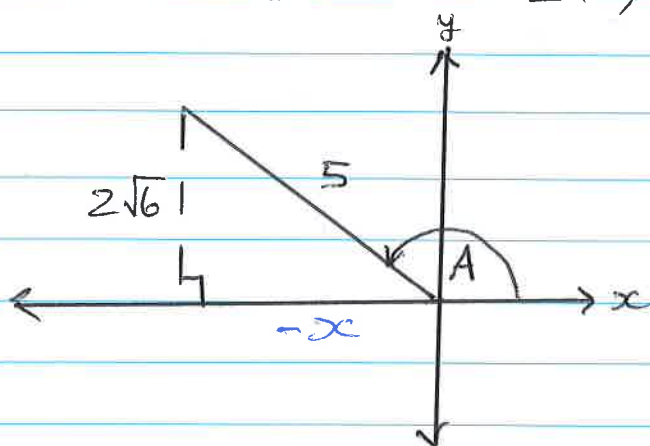
$$= 10 \left(\frac{-4}{5} \right) - 25 \left(\frac{-3}{5} \right)^2$$

$$= -8 - 25 \left(\frac{9}{25} \right)$$

$$= -8 - 9$$

$$= -17$$

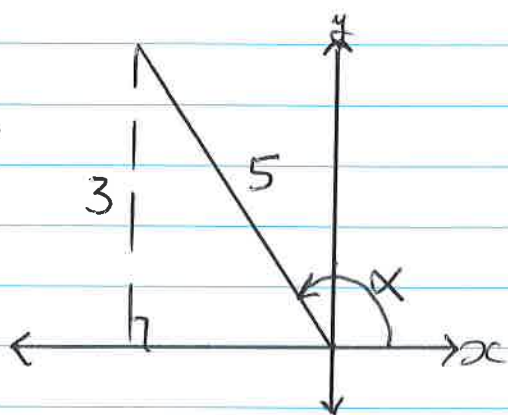
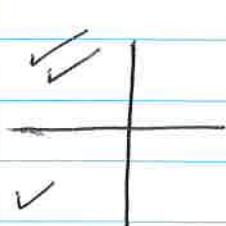
4) $\sin A = \frac{2\sqrt{6}}{5}$ $A \in [90^\circ; 360^\circ]$



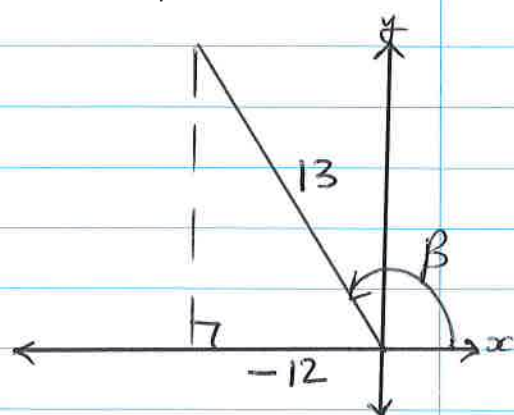
$$\begin{aligned} x^2 &= r^2 - y^2 \quad \text{Pyth.} \\ &= (5)^2 - (2\sqrt{6})^2 \\ &= 25 - 24 \\ &= 1 \\ x &= \pm\sqrt{1} = -1 \end{aligned}$$

$$\begin{aligned} \therefore 15 \tan A \cos A \\ &= 15 \left(\frac{y}{x} \right) \left(\frac{x}{r} \right) \\ &= 15 \left(\frac{2\sqrt{6}}{-1} \right) \left(\frac{-1}{5} \right) \\ &= 6\sqrt{6} \end{aligned}$$

5) $\sin \alpha = \frac{3}{5}$ $\alpha \in [90^\circ; 270^\circ]$ & $\cos \beta = \frac{-12}{13}$



&



$$\begin{aligned} x^2 &= r^2 - y^2 \quad \text{Pyth.} \\ &= (5)^2 - (3)^2 \\ &= 25 - 9 \\ &= 16 \end{aligned}$$

$$\begin{aligned} x &= \pm\sqrt{16} = \pm 4 \\ \therefore x &= -4 \end{aligned}$$

$$\begin{aligned} y^2 &= r^2 - x^2 \quad \text{Pyth.} \\ &= (13)^2 - (-12)^2 \\ &= 169 - 144 \\ &= 25 \end{aligned}$$

$$\begin{aligned} y &= \pm\sqrt{25} = \pm 5 \\ \therefore y &= 5 \end{aligned}$$



$$\cos \alpha + \tan \beta$$
$$\left(\frac{x}{r}\right) \text{ for } \alpha + \left(\frac{y}{x}\right) \text{ for } \beta$$

$$= \frac{-4}{5} + \frac{5}{-12}$$

$$= \frac{-73}{60} \rightarrow$$