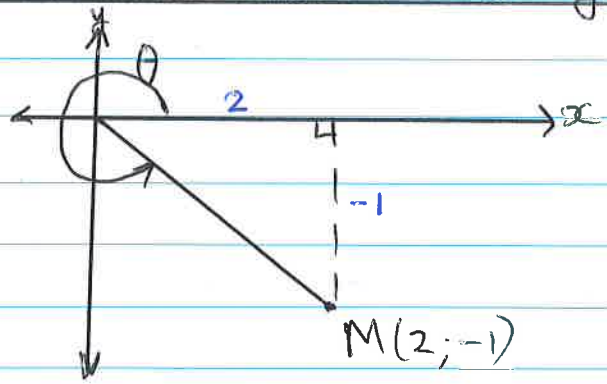
Revision Exercise (Trig. Ratios)

1)



$r^2 = x^2 + y^2$ Pyth

$= (2)^2 + (-1)^2$

$= 4 + 1$

$= 5$

$r = \pm\sqrt{5}$

$\therefore r = \sqrt{5}$

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

b) $1 - \sin^2\theta = 1 - \left(\frac{y}{r}\right)^2$

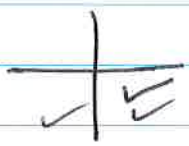
$= 1 - \left(\frac{-1}{\sqrt{5}}\right)^2$

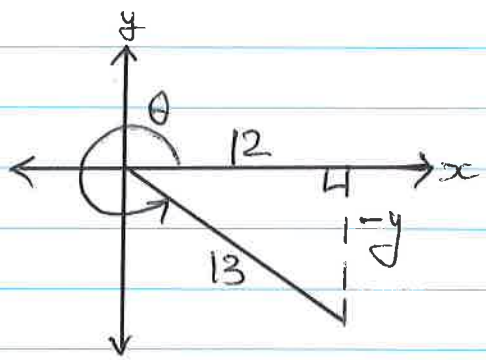
$= 1 - \frac{1}{5}$

$= \frac{4}{5}$

2) $13\cos\theta = 12$ $\quad 180° < \theta < 360°$

$\cos\theta = \frac{12}{13}$ $\quad \frac{x}{r}$





$y^2 = r^2 - x^2$ Pyth.

$= (13)^2 - (12)^2$

$= 169 - 144$

$= 25$

$y = \pm\sqrt{25}$

$\therefore y = -5$

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

b) $(\sin\theta + \cos\theta)^2$

$= (\sin\theta + \cos\theta)(\sin\theta + \cos\theta)$

$= \sin^2\theta + 2\sin\theta\cos\theta + \cos^2\theta$

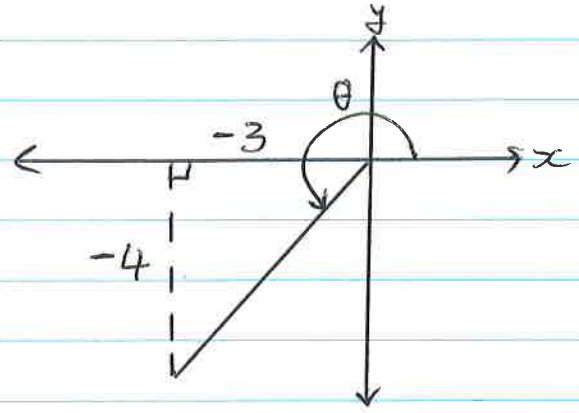
$= \left(\frac{y}{r}\right)^2 + 2\left(\frac{y}{r}\right)\left(\frac{x}{r}\right) + \left(\frac{x}{r}\right)^2$

$= \left(\frac{-5}{13}\right)^2 + 2\left(\frac{-5}{13}\right)\left(\frac{12}{13}\right) + \left(\frac{12}{13}\right)^2$

$= \frac{49}{169}$

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

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



$r^2 = x^2 + y^2$ Pyth.

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

$= 9 + 16$

$= 25$

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

$\therefore r = 5$

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

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

$= \frac{4}{3}$

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

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

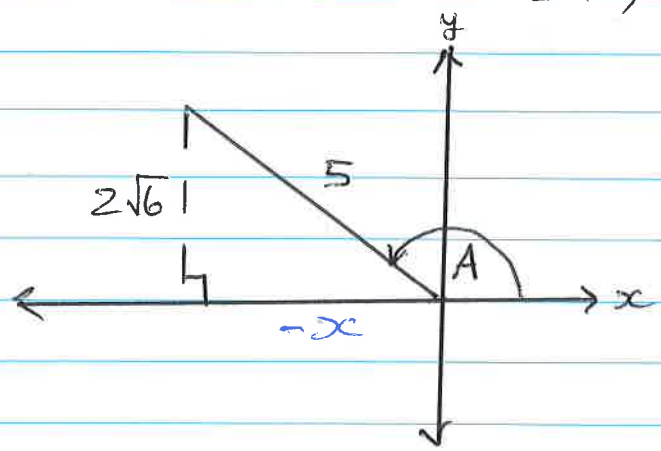
$= 10\left(\frac{-4}{5}\right) - 25\left(\frac{-3}{5}\right)^2$

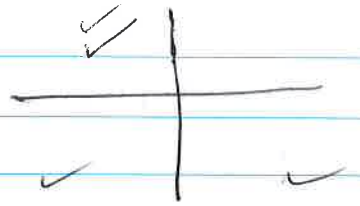
$= -8 - 25\left(\frac{9}{25}\right)$

$= -8 - 9$

$= -17$

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

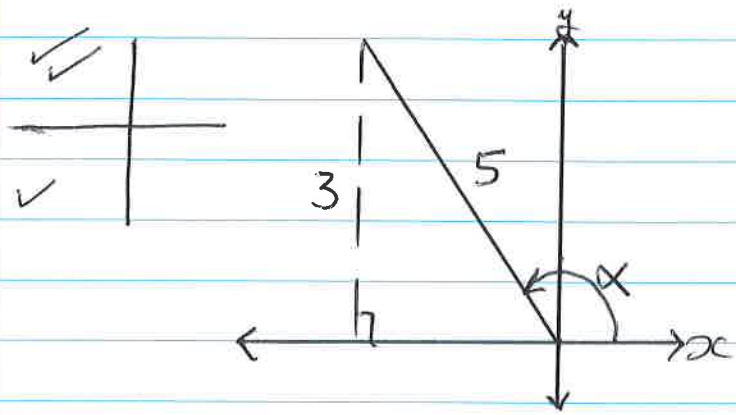




$x^2 = r^2 - y^2$ Pyth.
$= (5)^2 - (2\sqrt{6})^2$
$= 25 - 24$
$= 1$
$x = \pm\sqrt{1} = -1$

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

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



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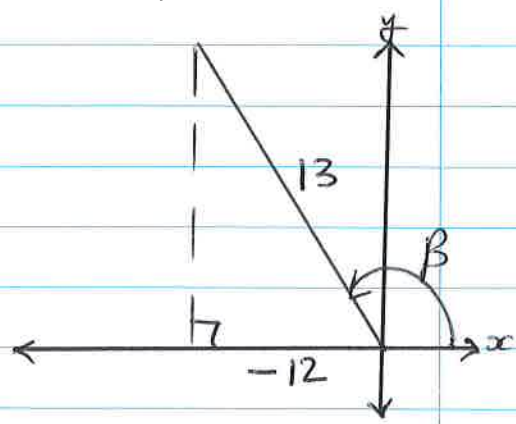

$x^2 = r^2 - y^2$ Pyth. &
$= (5)^2 - (3)^2$
$= 25 - 9$
$= 16$
$x = \pm\sqrt{16} = \pm 4$
$\therefore x = -4$

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

→

$\cos\alpha + \tan\beta$

$\left(\frac{x}{r}\right)$ for α + $\left(\frac{y}{x}\right)$ for β

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

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