(1) If $\sin(\theta+\alpha)=2\sin\theta$, show clearly that

$$\tan\theta=\frac{\sin\alpha}{a-\cos\alpha}.$$

State a

(2) By expanding $\tan(\theta+45°)$ with a suitable value for θ, show clearly that $\tan 75 = a+\sqrt{b}$

a and b are integers. State a and b

(3) By expanding $\sin(45°-x)$ with a suitable value for x, show clearly that $\operatorname{cosec} 15 = \sqrt{a}+\sqrt{b}$

a and b are integers. State a and b

(4) $$\sin A=\frac{12}{13} \text{ and } \cos B=\frac{4}{5}.$$

If A is obtuse and B is acute, show clearly that

$$\sin(A+B)=\frac{a}{b}.$$

a and b are integers. State a and b

(5) The constants a and b are such so that

$$\tan a=\frac{1}{3} \text{ and } \tan b=\frac{1}{7}.$$

Determine the exact value of $\cot(a-b)$, showing all the steps in the workings.

(6) $$\sin x=\frac{12}{13} \text{ and } \cos y=\frac{15}{17}.$$

If x is obtuse and y is acute, show clearly that

$$\sin(x-y)=\frac{a}{b}.$$

a and b are integers. State a and b

(7) $$\cos\theta=-\frac{3}{5} \text{ and } \tan\varphi=\frac{24}{7}.$$

If θ is reflex, and φ is also reflex, show clearly that $\sin(\theta-\varphi)=\frac{a}{b}$

a and b are integers. State a and b