# TRIGONOMETRY

**Question 1**

1.1 Determine**, without the use of the calculator,** the value of the following trigonometric expression:

$$\frac{\sin 2x.\cos(-x)+\cos 2x.\sin(360°-x)}{\sin(180°+x)}$$

1.2 Prove that $\cos(90°-2x).\tan(180°+x)+\sin^2(360°-x)=3\sin^2 x$

1.3 **Without the use of a calculator**, prove that:

a) $$\frac{\tan 480°.\sin 300°.\cos 14°.\sin(-135°)}{\sin 104°.\cos 225°}=\frac{3}{2}.$$

b) $$\cos 75° = \frac{\sqrt{2}(\sqrt{3}-1)}{4}$$

1.4 **Without using a calculator**, determine the value of: $$\frac{\sin^2 35°-\cos^2 35°}{4\sin 10°\cos 10°}$$

1.5 Simplify $\sin(180°-x).\cos(-x)+\cos(90°+x).\cos(x-180°)$ to a single trigonometric ratio.

**Question 2**

2.1 If $\sin 24° = p$, express the following in terms of $p$, **without the use of a calculator**:

2.1.1 $\cos 24°$

2.1.2 $\sin 12°\cos 12° - \sin(-66°)\tan 204°$

2.2 Given: $\sin 36° = \sqrt{1-p^2}$

**Without using a calculator,** determine EACH of the following in terms of $p$:

2.2.1 $tan36°$

2.2.2 $cos108°$

2.3 Given: $\cos 26° = m$

**Without using a calculator**, determine $2\sin^2 77°$ in terms of $m$.

**Question 3**

3.1 It is known that $13\sin\alpha - 5 = 0$ and $\tan\beta = -\frac{3}{4}$ where $\alpha \in [90°; 270°]$ and $\beta \in [90°; 270°]$. Determine, without using a calculator, the values of the following:

3.1.1 $cos\alpha$

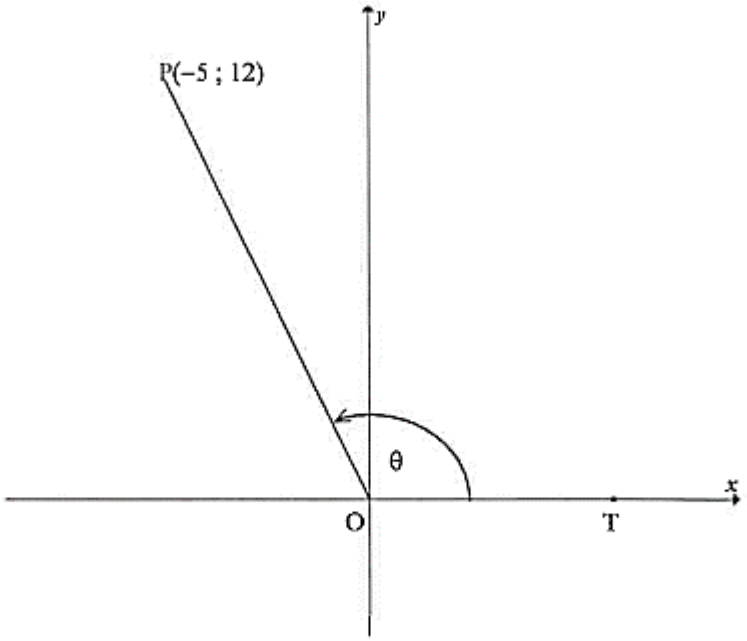
3.1.2 $\cos(\alpha + \beta)$

3.2 If $\cos 2\theta = -\frac{5}{6}$, where $2\theta \in [180°;270°]$, calculate, **without using a calculator**, the values in simplest form of:

3.2.1 $sin2\theta$

3.2.2 $\sin^2\theta$

3.3 In the diagram, P(–5 ; 12) and T lies on the positive $x$-axis. $P\hat{O}T = \theta$




Answer the following **without using a calculator**:

3.3.1 Write down the value of $tan\theta$.

3.3.2 Calculate the value of $cos\theta$.

3.3.3 S($a$ ; $b$) is a point in the third quadrant such that $T\hat{O}S = \theta + 90°$ and OS = 6,5 units. Calculate the value of $b$.