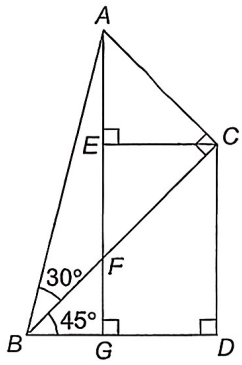
Grade 9 Mathematics Term 1 Consolidated Assignment 4

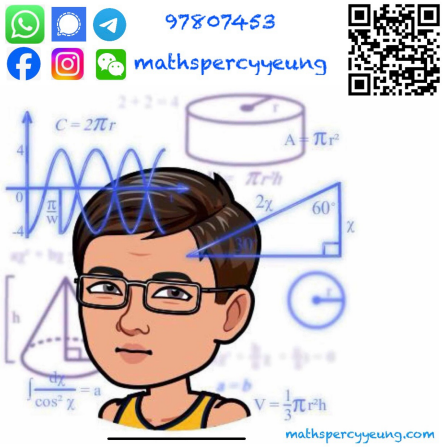
Name: _____(_____) Date: _____

Class: _____ Grade: _____

Content: Ch.9 Trigonometric Relations

1. In the figure, $AEFG$, BFC and BGD are straight lines. $\angle ABC = 30°$, $\angle CBD = 45°$ and $\angle ACB = \angle AEC = \angle AGD = \angle BDC = 90°$. Let $CD = a$.





(a) Express the lengths of AC and BC in terms of a.

(b) Hence, find the value of $\sin 75°$.

2. Without using a calculator, find the values of the following expressions.

(a) $\cos^2 3° + \cos^2 6° + \cos^2 9° + \ldots + \cos^2 45° + \ldots + \cos^2 81° + \cos^2 84° + \cos^2 87°$

(b) $\dfrac{\tan 1° \tan 3° \tan 5° \ldots \tan 85° \tan 87° \tan 89°}{\sin^2 1° + \sin^2 2° + \sin^2 3° + \ldots + \sin^2 87° + \sin^2 88° + \sin^2 89°}$

(Challenging_3B09_e Q.10)

3. It is given that $\sin\theta\cos\theta = \frac{12}{25}$, where θ is an acute angle and $\sin\theta > \cos\theta$.

(a) By using the identity $a^2 + b^2 \equiv (a+b)^2 - 2ab$, find the value of $\sin^4\theta + \cos^4\theta$ without evaluating θ.

(b) (i) By expressing $(\sin\theta + \cos\theta)^2$ in terms of $\sin\theta\cos\theta$, find the value of $\sin\theta + \cos\theta$ without evaluating θ.

(ii) By expressing $(\sin\theta - \cos\theta)^2$ in terms of $\sin\theta\cos\theta$, find the value of $\sin\theta - \cos\theta$ without evaluating θ.

(c) Hence, find the value of $\frac{\sin^4\theta + \cos^4\theta}{\sin^4\theta - \cos^4\theta}$ without evaluating θ.

(Challenging_3B09_e Q.11)

END OF ASSIGNMENT