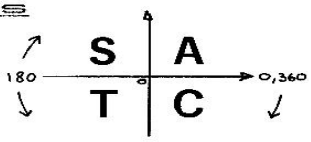
Mathematics Revision Exercises

Trigonometric Equations and Identities



1. Solve the following equations for $x°$ $(0 \leq x° \leq 360)$,-

   a) $\cos x° = 0.643$ b) $\tan x° = -0.5$ c) $\sin x° = 0.707$

   d) $2\cos x° = 1.414$ e) $3\sin x° = 2.598$ f) $4\tan x° = -2.31$

   g) $\sin 2x° = 0.5$ h) $\cos 3x° = 0.5$ i) $\tan 2x° = -1$

   j) $2\cos x° = \sqrt{3}$ k) $\sqrt{3}\tan x° = 1$ l) $2\sin x° = -\sqrt{3}$

2. Solve the following equations where $0 \leq x° \leq 360$,-

   a) $2\cos x° + 2 = 0$ b) $3\cos x° + 1 = 0$ c) $3\sin x° = 6$

3. Solve the following equations where $0 \leq x° \leq 720$,-

   a) $2\sin x° + 1 = 0$ b) $4\cos x° + 5 = 5$

4. Verify that $\sin^2 x° + \cos^2 x° = 1$ and $\frac{\sin x°}{\cos x°} = \tan x°$ for;-

   a) $x = 30°$ b) $x = 45°$ c) $x = 60°$ [use exact values if you can]

5. Prove that the following identities are TRUE;-

   a) $4\cos^2 A + 4\sin^2 A = 4$ b) $2\cos^2 A = 2 - 2\sin^2 A$

   c) $1 - 2\sin^2 A = 2\cos^2 A - 1$ d) $3\cos^2 A - 2 = 1 - 3\sin^2 A$

   e) $(\cos A + \sin A)^2 = 1 + 2\sin A\cos A$ f) $(\cos A - \sin A)^2 + 2\cos A\sin A = 1$

   g) $(\cos A + \sin A)(\cos A - \sin A) = 2\cos^2 A - 1$ h) $\cos A \tan A = \sin A$

   i) $(\cos A - \sin A)(\cos A + \sin A) = 1 - 2\sin^2 A$ j) $(\sin A - \cos A)^2 = 1 - 2\sin A\cos A$

   k) $\frac{1 - \cos^2 x}{\cos^2 x} = \tan^2 x$ l) $\frac{\sin A}{\cos A} + \frac{\cos A}{\sin A} = \frac{1}{\cos A \sin A}$

ANSWERS (given to 1 decimal place)

1.a) 50°,310° b) 133.4°,333.4° c) 45°,135° d) 45°,315° e) 60°,120° f) 150°,330° g) 15°,75°,195°,255°
h) 20°,100°,140°,220°,260°,340° i) 67.5°,157.5°,247.5°,337.5° j) 30°, 330° k) 30°210° l) 240°,300°

2.a) 180° b) 109.5°,250.5° c) No solution possible.

3.a) 210°,330°,570°,690° b) 90°,270°,450°,630°

Questions 4 and 5 are to be proved.