

TRIGONOMETRY SUMMARY

Question type	Summary of procedure	Example question
1. Calculate the value of a trig expression without using a calculator.	Establish whether you need a rough sketch or special triangles, ASTC rules or compound angles.	<p>1.1 If $13\cos\alpha = 5$ and $\tan\beta = -\frac{3}{4}$, $\alpha \in [0^\circ; 270^\circ]$ and $\beta \in [0^\circ; 180^\circ]$.</p> <p>It is given that $\sin(\alpha + \beta) = \sin\alpha \cdot \cos\beta + \sin\beta \cdot \cos\alpha$ Determine, without using a calculator, a) $\sin\alpha$ b) $\sin(\alpha + \beta)$.</p> <p>1.2 Calculate: a) $\frac{\cos(-210^\circ) \cdot \sin^2 405^\circ \cdot \cos 14^\circ}{\tan 120^\circ \cdot \sin 104^\circ}$</p> <p style="padding-left: 40px;">b) $\sin 70^\circ \cos 40^\circ - \cos 70^\circ \sin 40^\circ$</p>
2. If a trig ratio is given as a variable express another trig ratio in terms of the same variable.	Draw a rough sketch with given angle and label 2 of the sides. The 3 rd side can then be determined using Pythagoras. Express each of the angles in question in terms of the angle in the rough sketch.	<p>2. If $\sin 27^\circ = q$, express each of the following in terms of q.</p> <p>a) $\sin 117^\circ$ b) $\cos(-27^\circ)$</p>
3. Simplify a trigonometric expression.	Use the ASTC rule to simplify the given expression if possible. See if any of the identities can be used to simplify it, if not see if it can be factorized. Check again if any identity can be used. This includes using the compound and double angle identities.	<p>3. Simplify:</p> <p>a) $\frac{\cos(720^\circ - x) \cdot \sin(360^\circ + x) \cdot \tan(x - 180^\circ)}{\sin(-x) \cdot \cos(90^\circ - x)}$</p> <p>b) $\frac{\sin(90^\circ + x) \cdot \tan(360^\circ + x)}{\sin(180^\circ + x) \cdot \cos(90^\circ - x) + \cos(540^\circ + x) \cdot \cos(-x)}$</p> <p>c) $\frac{\sin^2 x \cos x + \cos^3 x}{\cos x}$</p> <p>d) $\frac{\sin^2 x \cos x}{1 - \cos^2 x}$</p>
4. Prove a given identity.	Simplify the one side of the equation using reduction formulae and identities until .	<p>Prove that</p> <p>a) $\frac{\tan x \cdot \cos^3 x}{1 - \sin^2 x + \cos^2 x} = \frac{1}{2} \sin x$</p> <p>b) $\cos^2(180^\circ - x) + 2 \cos x \cos(90^\circ + x) \tan(360^\circ - x) = \sin^2 x + 1$</p>
5. Solve a trig equation.	Find the reference angle by ignoring the “-“sign and finding $\sin^{-1}(0,435)$ Write down the two solutions in the interval $x \in [0^\circ; 360^\circ]$. Then write down the general solution of this eq. From the general solution you can determine the solution for the specified interval by using various values of k .	<p>Solve for $x \in [-180^\circ; 360^\circ]$</p> <p>a) $\sin x = -0,435$ b) $\cos 2x = 0,435$ c) $\tan \frac{1}{2} x - 1 = 0,435$</p>