

Trigonometric Identities and Equations: math test, Grade 12 – download the PDF

Suggested time: 45 minutes. Out of 20 points. Calculator allowed only when the problem says so.

1 Pythagorean identities

/ 4 pts

Angle θ is in Quadrant III and $\tan \theta = \frac{8}{15}$.

- Find $\sec \theta$ and then $\cos \theta$.
- Find $\sin \theta$.
- Find $\sin 2\theta$.
- Find $\cos 2\theta$.

2 Exact values

/ 4 pts

- Find the exact value of $\sin 75^\circ$ using a sum formula.
- Find the exact value of $\cos 22.5^\circ$ using a half-angle formula.

3 Verifying identities

/ 4 pts

Verify each identity.

a. $\frac{\cos x}{1 - \sin x} = \frac{1 + \sin x}{\cos x}$

b. $\frac{\cos 2x}{\cos x + \sin x} = \cos x - \sin x$

4 A trigonometric equation

/ 4 pts

Solve $2 \sin^2 x + 3 \cos x = 0$ on $[0, 2\pi)$.

5 Products and sums

/ 4 pts

a. Write $\sin 3x \cos x$ as a sum.

b. Solve $\sin 5x - \sin x = 0$ on $[0, \pi]$ using a sum-to-product formula.



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