Trigonometric Identities and Equations

Pure: Trigonometry · 6 questions · step-by-step answers at the end

Name: Date: Score: / 6

USEFUL EQUATIONS

$\sin^2 x + \cos^2 x = 1$ $\tan x = \sin x / \cos x$ $\sin(180° - x) = \sin x$, $\cos(360° - x) = \cos x$

$\tan(x + 180°) = \tan x$

Questions

Show your working in the space under each question.

1. EASY Solve $\cos x = 0.5$ for $0° \le x \le 360°$.

2. EASY Find the exact value of $\tan 60° \times \sin 30°$.

3. MEDIUM Solve $\sin x = -0.4$ for $0° \le x \le 360°$.

4. MEDIUM Solve $\sin x = 2 \cos x$ for $0° \le x \le 360°$.

5. HARD Simplify $(1 - \cos^2 x)/(\sin x \cos x)$.

6. HARD Solve $3 \sin^2 x = \cos^2 x$ for $0° \leq x \leq 360°$.

Step-by-step answers

Trigonometric Identities and Equations

1. Principal value 60°; the other is 360 − 60. **60° and 300°**.
2. $\sqrt{3} \times 1/2 = \mathbf{\sqrt{3}/2}$.
3. $\sin^{-1}(-0.4) = -23.6°$. Solutions: 180 + 23.6 and 360 − 23.6. **203.6° and 336.4°**.
4. Divide by cos x (it cannot be zero here): tan x = 2. **x = 63.4° or 243.4°**.
5. Top = $\sin^2$ x, so the fraction is sin x / cos x = **tan x**.
6. $\tan^2$ x = 1/3, so tan x = ±1/√3. **x = 30°, 150°, 210°, 330°**.