Regents Exam Questions A2.A.67: Simplifying Trigonometric Expressions Name: _____
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A2.A.67: Simplifying Trigonometric Expressions: Justify the Pythagorean identities

1 Which expression always equals 1?
1) $\cos^2 x - \sin^2 x$
2) $\cos^2 x + \sin^2 x$
3) $\cos x - \sin x$
4) $\cos x + \sin x$

2 The expression $\sin^2 x + \cos^2 x - b^2$ is equivalent to
1) 1
2) b^2
3) $(1+b)(1-b)$
4) $\sin x \cos x - b$

3 The expression $\frac{1-\cos^2 x}{\sin^2 x}$ is equivalent to
1) 1
2) -1
3) $\sin x$
4) $\cos x$

4 The expression $\cos^2 4\theta + \sin^2 4\theta$ is equivalent to
1) 1
2) 2
3) $\cos\theta$
4) $\cos 8\theta$

5 If $\sin A = k$, then the value of the expression $(\sin A)(\cos A)(\tan A)$ is equivalent to
1) 1
2) $\frac{1}{k}$
3) k
4) k^2

6 The expression $\frac{\sin^2 A}{\tan A}$ is equivalent to
1) $\frac{\sin A}{\cos A}$
2) $\sin A \cos A$
3) $\frac{1}{\sin A \cos A}$
4) $\frac{\cos A}{\sin A}$

7 The expression $\frac{\sin x \cdot \cos x}{\tan x}$ is equivalent to
1) 1
2) $\sin^2 x$
3) $\cos x$
4) $\cos^2 x$

8 Express in simplest terms: $\frac{2-2\sin^2 x}{\cos x}$

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Answer Section

1 ANS: 2 REF: 011208a2
2 ANS: 3 REF: 060121siii
3 ANS: 1

$$\frac{1-\cos^2 x}{\sin^2 x} = \frac{\sin^2 x}{\sin^2 x} = 1$$

REF: 060610b
4 ANS: 1

$\cos^2(4\theta) + \sin^2(4\theta) = 1$

REF: 060812b
5 ANS: 4 REF: 019026siii
6 ANS: 2 REF: 089023siii
7 ANS: 4 REF: 080032siii
8 ANS:

$$2\cos x.\ \frac{2-2\sin^2 x}{\cos x} = \frac{2(1-\sin^2 x)}{\cos x} = \frac{2\cos^2 x}{\cos x} = 2\cos x.$$

REF: 080526b