Name: _____ **Course:** _____ **Date:** _____ **ID: A**

Double Angle Identities Problem Set

Multiple Choice

Identify the choice that best completes the statement or answers the question.BE SURE TO SHOW ALL WORK FOR EACH QUESTION!

1. The expression $\cos^2\theta - \cos 2\theta$ is equivalent to
   a. $\sin^2\theta$
   b. $-\sin^2\theta$
   c. $\cos^2\theta + 1$
   d. $-\cos^2\theta - 1$

2. If $\sin A = \frac{2}{3}$ where $0° < A < 90°$, what is the value of $\sin 2A$?
   a. $\frac{2\sqrt{5}}{3}$
   b. $\frac{2\sqrt{5}}{9}$
   c. $\frac{4\sqrt{5}}{9}$
   d. $-\frac{4\sqrt{5}}{9}$

3. If $\sin A = \frac{1}{3}$, what is the value of $\cos 2A$?
   a. $-\frac{2}{3}$
   b. $\frac{2}{3}$
   c. $-\frac{7}{9}$
   d. $\frac{7}{9}$

4. If x is an acute angle, and $\cos x = \frac{4}{5}$, then $\cos 2x$ is equal to
   a. $\frac{6}{25}$
   b. $\frac{-1}{25}$
   c. $\frac{2}{25}$
   d. $\frac{7}{25}$

5. The expression $\frac{2\cos\theta}{\sin 2\theta}$ is equivalent to
   a. $\csc\theta$
   b. $\sec\theta$
   c. $\cot\theta$
   d. $\sin\theta$

6. The expression $2\sin^2 A + \cos 2A$ is equivalent to
   a. 1
   b. 2
   c. $\sin^2 A$
   d. $-\sin^2 A$

7. The expression $1 - 2\sin^2 30°$ has the same value as
   a. $\sin 60°$
   b. $\cos 60°$
   c. $\cos 15°$
   d. $\sin 15°$

8. The expression $2\sin 30° \cos 30°$ has the same value as
   a. $\sin 15°$
   b. $\cos 60°$
   c. $\sin 60°$
   d. $\cos 15°$

9. The expression $\csc A \sin 2A$ is equivalent to
   a. $2\sin A$
   b. 2
   c. $2\cos A$
   d. $2\cot A$

Short Answer

10. If $\sin A = \frac{2}{3}$, find $\cos 2A$.

11. If $\sin A = \frac{3}{5}$, find $\cos 2A$.

12. If θ is in Quadrant II and $\cos\theta = -\frac{3}{4}$, find an exact value for $\sin 2\theta$.

13. Express $\frac{\cos 2A + \sin^2 A}{\cos A}$ as a single trigonometric function for all values of A for which the fraction is defined.

Double Angle Identities Problem Set
Answer Section

MULTIPLE CHOICE

1. ANS: A
$\cos^2\theta - \cos 2\theta = \cos^2\theta - (\cos^2\theta - \sin^2\theta) = \sin^2\theta$

PTS: 2 REF: 061024a2 STA: A2.A.77 TOP: Double Angle Identities
KEY: simplifying

2. ANS: C
$\left(\frac{2}{3}\right)^2 + \cos^2 A = 1$ $\sin 2A = 2\sin A\cos A$

$\cos^2 A = \frac{5}{9}$ $= 2\left(\frac{2}{3}\right)\left(\frac{\sqrt{5}}{3}\right)$

$\cos A = +\frac{\sqrt{5}}{3}$, sin A is acute. $= \frac{4\sqrt{5}}{9}$

PTS: 2 REF: 011107a2 STA: A2.A.77 TOP: Double Angle Identities
KEY: evaluating

3. ANS: D
$\cos 2A = 1 - 2\sin^2 A = 1 - 2\left(\frac{1}{3}\right)^2 = 1 - \frac{2}{9} = \frac{7}{9}$

PTS: 2 REF: 011311a2 STA: A2.A.77 TOP: Double Angle Identities
KEY: evaluating

4. ANS: D
$\cos 2x = 2\cos^2 x - 1 = 2(\frac{4}{5})^2 - 1 = 2(\frac{16}{25}) - 1 = \frac{32}{25} - \frac{25}{25} = \frac{7}{25}$

PTS: 2 REF: fall9905b STA: A2.A.77 TOP: Double Angle Identities
KEY: evaluating

5. ANS: A
$\frac{2\cos\theta}{\sin 2\theta} = \frac{2\cos\theta}{2\cos\theta\sin\theta} = \frac{1}{\sin\theta} = \csc\theta$

PTS: 2 REF: 080315b STA: A2.A.77 TOP: Double Angle Identities
KEY: simplifying

6. ANS: A PTS: 2 REF: 018429siii STA: A2.A.77
TOP: Double Angle Identities KEY: simplifying

7. ANS: B PTS: 2 REF: 068523siii STA: A2.A.77
TOP: Double Angle Identities KEY: evaluating

8. ANS: C PTS: 2 REF: 069727siii STA: A2.A.77
TOP: Double Angle Identities KEY: evaluating
9. ANS: C PTS: 2 REF: 060229siii STA: A2.A.77
TOP: Double Angle Identities KEY: simplifying

SHORT ANSWER

10. ANS:
$\frac{1}{9}$

PTS: 2 REF: 088713siii STA: A2.A.77 TOP: Double Angle Identities
KEY: evaluating
11. ANS:
$\frac{7}{25}$

PTS: 2 REF: 068817siii STA: A2.A.77 TOP: Double Angle Identities
KEY: evaluating
12. ANS:
$\frac{-3\sqrt{7}}{8}$

PTS: 3 REF: 089940siii STA: A2.A.77 TOP: Double Angle Identities
KEY: evaluating
13. ANS:
$\cos A$

PTS: 2 REF: 010014siii STA: A2.A.77 TOP: Double Angle Identities
KEY: simplifying