

(5.1) --- Practice with Basic Trig Identities**&****(5.2) --- Proving Basic Trig Identities**

- 1) The expression $\cot\theta \cdot \sec\theta$ is equivalent to

A. $\frac{\cos\theta}{\sin^2\theta}$ B. $\csc\theta$ C. $\frac{\sin\theta}{\cos^2\theta}$ D. $\sin\theta$ E. None of these

- 2) The expression $\frac{\sec\theta}{\csc\theta}$ is equivalent to

A. $\frac{\cos\theta}{\sin\theta}$ B. $\cos\theta$ C. $\frac{\sin\theta}{\cos\theta}$ D. $\sin\theta$ E. None of these

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

A. 1 B. $\sin x$ C. -1 D. $\cos x$ E. None of these

- 4) The expression $((1 + \cos x)(1 - \cos x))$ is equivalent to:

A. $1 + \cos^2 x$ B. $\sin^2 x$ C. $\sec^2 x$ D. $\csc^2 x$ E. None of these

- 5) The expression $\cos^2(4\theta) + \sin^2(4\theta)$ is equivalent to

A. 1 B. -4 C. 2 D. 4 E. None of these

- 6) The expression $\sin A + \cot^2 A \sin A$ is equivalent to

A. 1 B. $\sec A$ C. $\sin A$ D. $\csc A$ E. None of these

- 7) If θ is a positive acute angle and $\sin \theta = a$ which expression represents $\cos \theta$ in terms of a ?

A. \sqrt{a} B. $\frac{1}{\sqrt{a}}$ C. $\sqrt{1-a^2}$ D. $\frac{1}{\sqrt{1-a^2}}$ E. None of these

Simplify each of the following:

8) $\frac{\sin^2 \beta \cot \beta}{\cos \beta}$

9) $\sin x - \sin x \cos^2 x$

10) $\sin^2 x + \cos\left(\frac{\pi}{2} - x\right) - 1 + \cos^2 x$

Solve each of the following on the interval from $[0, 2\pi]$

11) $2\cos^2 x - 5\cos x + 3 = 0$

12) $\cos^2 x + 4\sin x + 4 = 0$

13) $4\cos^2 x - 3 = 0$

14) $2 \tan x \sin x + \tan x = 0$

Verify that each of the following is an identity

15) $\frac{\cos^2 \theta}{\sin^2 \theta} + \csc \theta \sin \theta = \csc^2 \theta$

16) $\frac{1}{1 - \sin x} + \frac{1}{1 + \sin x} = 2 \sec^2 x$

17) $\frac{1 + \cos(2\alpha)}{\sin(2\alpha)} = \cot \alpha$

18) $\frac{1 + \cos(2\alpha)}{\sin(2\alpha)} = \cot \alpha$

(5.3) --- Practice with Sum & Difference Identities

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- 1) If $\sin x = \frac{4}{5}$, where $0^\circ \leq x \leq 90^\circ$, find the value of $\cos(x + 180^\circ)$.

A. $\frac{4}{5}$

B. $-\frac{4}{5}$

C. $\frac{3}{5}$

D. $-\frac{3}{5}$

E. None of these

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- 2) If $\sin A = \frac{4}{5}$, $\tan B = \frac{5}{12}$, and angles A and B are in Quadrant 1, what is the value of $\sin(A + B)$?

A. $\frac{63}{65}$

B. $\frac{33}{65}$

C. $-\frac{63}{65}$

D. $-\frac{33}{65}$

E. None of these

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- 3) The expression $\cos(40^\circ)\cos(10^\circ) + \sin(40^\circ)\sin(10^\circ)$ is equivalent to:

A. $\cos 30^\circ$

B. $\sin 30^\circ$

C. $\cos 50^\circ$

D. $\sin 50^\circ$

E. None of these

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- 4) If A and B are positive acute angles, $\sin A = \frac{5}{13}$, and $\cos B = \frac{4}{5}$, what is the value of $\sin(A + B)$?

A. $\frac{56}{65}$

B. $\frac{33}{65}$

C. $\frac{63}{65}$

D. $-\frac{16}{65}$

E. None of these

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- 5) If $\sin x = \frac{12}{13}$, $\cos y = \frac{3}{5}$, and x and y are acute angles, the value of $\cos(x - y)$ is

A. $\frac{21}{65}$

B. $-\frac{14}{65}$

C. $\frac{63}{65}$

D. $-\frac{33}{65}$

E. None of these

Use the sum or difference identities to find the exact value of each function

6) $\sin 105^\circ$

7) $\tan(-15^\circ)$

8) $\sin 10^\circ \cos 20^\circ + \cos 10^\circ \sin 20^\circ$

Use the sum or difference identities to verify that each of the following is an identity

9) $\cos^2 x \cos\left(\frac{3\pi}{2} - x\right) + \sin^2 x \cos\left(\frac{3\pi}{2} - x\right) = \sin x$

10) $\sin\left(\frac{3\pi}{2} - x\right) = -\cos x$

(5.4) --- Practice with Double & Half Angle Identities

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- 1) If $0 \leq \theta \leq 90^\circ$ and $\sin \theta = \frac{\sqrt{5}}{3}$, then $\cos(2\theta) = \underline{\hspace{2cm}}$
(a) $\frac{1}{9}$ (b) $\frac{1}{3}$ (c) $-\frac{1}{9}$ (d) $-\frac{1}{3}$
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- 2) If $0 \leq x \leq 90^\circ$ and $\sin x = \frac{12}{13}$, then $\cos(2x) = \underline{\hspace{2cm}}$
(a) $\frac{25}{169}$ (b) $-\frac{25}{169}$ (c) $\frac{119}{169}$ (d) $-\frac{119}{169}$
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- 3) If $0 \leq x \leq 90^\circ$ and $\cos x = \frac{4}{5}$, then $\cos(2x) = \underline{\hspace{2cm}}$
(a) $\frac{6}{25}$ (b) $\frac{2}{25}$ (c) $-\frac{1}{25}$ (d) $\frac{7}{25}$
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- 4) If $0 \leq \theta \leq 90^\circ$ such that $\sin \theta = \frac{5}{13}$, then $\sin(2\theta) = \underline{\hspace{2cm}}$
(a) $\frac{12}{13}$ (b) $\frac{60}{169}$ (c) $\frac{10}{26}$ (d) $\frac{120}{169}$
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- 5) If $0 \leq x \leq 90^\circ$ and $\sin x = \frac{1}{2}$, then $\sin(2x) = \underline{\hspace{2cm}}$
(a) $-\frac{1}{2}$ (b) $-\frac{\sqrt{3}}{2}$ (c) $\frac{1}{2}$ (d) $\frac{\sqrt{3}}{2}$
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- 6) If $0 \leq \theta \leq 90^\circ$ and $\sin 2\theta = \frac{\sqrt{3}}{2}$, then $(\cos \theta + \sin \theta)^2$ equals
(a) 1 (b) 30° (c) $1 + \frac{\sqrt{3}}{2}$ (d) 60°
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- 7) The expression $\frac{\sin 2A}{2 \cos A}$ is equivalent to
(a) $\cos A$ (b) $\sin A$ (c) $\tan A$ (d) $\frac{1}{2} \sin A$
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- 8) The expression $\frac{\sin 2\theta}{\sin^2 \theta}$ is equivalent to
(a) $\frac{2}{\sin \theta}$ (b) $2 \cot \theta$ (c) $2 \cos \theta$ (d) $2 \tan \theta$
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- 9) The expression $\frac{2 \cos \theta}{\sin 2\theta}$ is equivalent to
(a) $\csc \theta$ (b) $\cot \theta$ (c) $\sec \theta$ (d) $\sin \theta$
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- 10) If θ is an obtuse angle and $\sin \theta = b$, then it can be concluded that
(a) $\tan \theta > -b$ (b) $\cos 2\theta > b$ (c) $\cos \theta > -b$ (d) $\sin 2\theta < -b$
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11) If $\sin \theta = 3/5$ and θ is in the 2nd quadrant find each of the following:

a) $\sin(2\theta)$ b) $\cos(2\theta)$ b) $\tan(2\theta)$

Use double angle identities to write each of the following as the function of one angle and THEN evaluate.

12) $1 - 2\sin^2\left(\frac{\pi}{8}\right)$ 13) $\frac{2 \tan 75^\circ}{1 - \tan^2 75^\circ}$

(5.5) --- Law of Sines &
(5.6) --- Law of Cosines

Find the area of each triangle to the nearest tenth

1) $a = 5, b = 12, c = 13$

2) $c = 3.58, b = 6.8, A = 39^\circ$

Solve each triangle (round to the nearest tenth)

3) $b = 40, c = 45, A = 51^\circ$

4) $c = 125, b = 150, C = 25^\circ$