

Complete the identity.

1)  $2 \tan x - (1 + \tan x)^2 = ?$  1) \_\_\_\_\_  
 A)  $-\sec^2 x$                       B) 1                      C)  $1 - \sin x$                       D) 0

2)  $\frac{\csc x \cot x}{\sec x} = ?$  2) \_\_\_\_\_  
 A)  $\sec^2 x$                       B)  $\csc^2 x$                       C)  $\cot^2 x$                       D) 1

3)  $\frac{\cos x - \sin x}{\cos x} + \frac{\sin x - \cos x}{\sin x} = ?$  3) \_\_\_\_\_  
 A)  $\sec x \csc x$                       B)  $2 - \sec x \csc x$                       C)  $1 - \sec x \csc x$                       D)  $2 + \sec x \csc x$

4)  $1 - \frac{\sin^2 x}{1 + \cos x} = ?$  4) \_\_\_\_\_  
 A)  $\tan x$                       B) 0                      C)  $\cot x$                       D)  $\cos x$

Verify the identity (open response).

5)  $1 + \sec^2 x \sin^2 x = \sec^2 x$  5) \_\_\_\_\_

Write the expression as the cosine of an angle, knowing that the expression is the right side of the formula for  $\cos(\alpha - \beta)$  with particular values for  $\alpha$  and  $\beta$ .

6)  $\cos(165^\circ) \cos(45^\circ) + \sin(165^\circ) \sin(45^\circ)$  6) \_\_\_\_\_  
 A)  $\cos(120^\circ)$                       B)  $\cos(190^\circ)$                       C)  $\cos(220^\circ)$                       D)  $\cos(210^\circ)$

7)  $\cos\left(\frac{5\pi}{18}\right) \cos\left(\frac{\pi}{9}\right) - \sin\left(\frac{5\pi}{18}\right) \sin\left(\frac{\pi}{9}\right)$  7) \_\_\_\_\_  
 A)  $\cos\left(\frac{\pi}{3}\right)$                       B)  $\cos\left(\frac{5\pi}{6}\right)$                       C)  $\cos\left(\frac{7\pi}{18}\right)$                       D)  $\cos\left(\frac{2\pi}{3}\right)$

Complete the identity.

8)  $\frac{\cos(\alpha - \beta)}{\sin \alpha \sin \beta} = ?$  8) \_\_\_\_\_  
 A)  $\cot \alpha \cot \beta + \tan \alpha \tan \beta$                       B)  $\cot \alpha \cot \beta + 1$   
 C)  $1 + 2 \tan \alpha$                       D)  $\cot \alpha \cot \beta + \tan \alpha$

9)  $\cos(\pi - x) = ?$  9) \_\_\_\_\_  
 A)  $-\sin x$                       B)  $-\cos x$                       C)  $\sin x$                       D)  $\cos x$

10)  $\cos\left(x - \frac{5\pi}{6}\right) = ?$  10) \_\_\_\_\_  
 A)  $\frac{\sqrt{3}}{2} (\cos x - \sin x)$                       B)  $\frac{1}{2} (-\sqrt{3} \cos x + \sin x)$   
 C)  $-\frac{\sqrt{3}}{2} (\cos x + \sin x)$                       D)  $-\frac{\sqrt{3}}{2} (\cos x - \sin x)$

Use the given information to find the exact value of the expression.

11)  $\sin \alpha = \frac{3}{5}$ ,  $\alpha$  lies in quadrant II, and  $\cos \beta = \frac{2}{5}$ ,  $\beta$  lies in quadrant I Find  $\cos(\alpha - \beta)$ . 11) \_\_\_\_\_

A)  $\frac{-8 + 3\sqrt{21}}{25}$       B)  $\frac{6 + 4\sqrt{21}}{25}$       C)  $\frac{8 - 3\sqrt{21}}{25}$       D)  $\frac{6 - 4\sqrt{21}}{25}$

Find the exact value by using a sum or difference identity. Hint: rewrite 285 as 135 + 150.

12)  $\cos 285^\circ$  12) \_\_\_\_\_

A)  $-\sqrt{2}(\sqrt{3} - 1)$       B)  $-\frac{\sqrt{2}(\sqrt{3} - 1)}{4}$       C)  $\frac{\sqrt{2}(\sqrt{3} - 1)}{4}$       D)  $-\sqrt{2}(\sqrt{3} + 1)$

Complete the identity.

13)  $\cos(\alpha + \beta) + \cos(\alpha - \beta) = ?$  13) \_\_\_\_\_

A)  $\cos \alpha \cos \beta$       B)  $2\sin \alpha \cos \beta$       C)  $2\cos \alpha \cos \beta$       D)  $\sin \beta \cos \alpha$

14)  $\sin(\alpha + \beta) + \sin(\alpha - \beta) = ?$  14) \_\_\_\_\_

A)  $\sin \alpha \cos \beta$       B)  $2\sin \alpha \cos \beta$       C)  $\cos \beta \cos \alpha$       D)  $2\cos \alpha \cos \beta$

Use the given information to find the exact value of the expression.

15)  $\sin \alpha = \frac{7}{25}$ ,  $\alpha$  lies in quadrant I, and  $\cos \beta = \frac{8}{17}$ ,  $\beta$  lies in quadrant I Find  $\cos(\alpha + \beta)$ . 15) \_\_\_\_\_

A)  $\frac{87}{425}$       B)  $-\frac{304}{425}$       C)  $\frac{416}{425}$       D)  $\frac{297}{425}$

16)  $\sin \alpha = \frac{20}{29}$ ,  $\alpha$  lies in quadrant II, and  $\cos \beta = \frac{12}{13}$ ,  $\beta$  lies in quadrant I Find  $\sin(\alpha - \beta)$ . 16) \_\_\_\_\_

A)  $\frac{352}{377}$       B)  $\frac{135}{377}$       C)  $\frac{152}{377}$       D)  $\frac{345}{377}$

17)  $\cos \alpha = -\frac{4}{5}$ ,  $\alpha$  lies in quadrant III, and  $\sin \beta = \frac{\sqrt{21}}{5}$ ,  $\beta$  lies in quadrant II Find  $\cos(\alpha + \beta)$ . 17) \_\_\_\_\_

A)  $\frac{8 + 3\sqrt{21}}{25}$       B)  $\frac{6 - 4\sqrt{21}}{25}$       C)  $\frac{-6 + 4\sqrt{21}}{25}$       D)  $\frac{-8 - 3\sqrt{21}}{25}$

Use trigonometric identities to find the exact value.

18)  $\frac{\tan 175^\circ - \tan 55^\circ}{1 + \tan 175^\circ \tan 55^\circ}$  18) \_\_\_\_\_

A)  $-\frac{\sqrt{3}}{3}$       B)  $-2$       C)  $-\frac{1}{2}$       D)  $-\sqrt{3}$

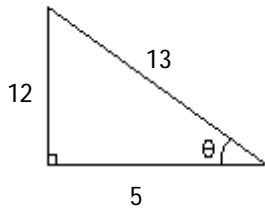
Verify the identity (open response)

19)  $\tan\left(x - \frac{\pi}{4}\right) = \frac{\tan x - 1}{1 + \tan x}$  19) \_\_\_\_\_

Use the figure to find the exact value of the trigonometric function.

20) Find  $\cos 2\theta$ .

20) \_\_\_\_\_



A)  $\frac{119}{169}$

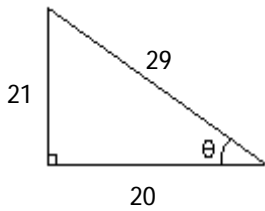
B)  $-\frac{9}{13}$

C)  $-\frac{119}{169}$

D)  $\frac{120}{169}$

21) Find  $\tan 2\theta$ .

21) \_\_\_\_\_



A)  $\frac{39}{41}$

B)  $\frac{840}{841}$

C)  $-\frac{41}{841}$

D)  $-\frac{840}{41}$

Use the given information to find the exact value of the expression.

22)  $\cos \theta = \frac{4}{5}$ ,  $\theta$  lies in quadrant IV Find  $\sin 2\theta$ .

22) \_\_\_\_\_

A)  $\frac{24}{25}$

B)  $-\frac{7}{25}$

C)  $-\frac{24}{25}$

D)  $\frac{7}{25}$

23)  $\sin \theta = \frac{4}{5}$ ,  $\theta$  lies in quadrant II Find  $\tan 2\theta$ .

23) \_\_\_\_\_

A)  $\frac{24}{7}$

B)  $-\frac{5}{7}$

C)  $\frac{24}{25}$

D)  $-\frac{24}{7}$

Write the expression as the sine, cosine, or tangent of a double angle. Then find the exact value of the expression.

24)  $2 \sin 75^\circ \cos 75^\circ$

24) \_\_\_\_\_

A)  $\sin(150^\circ)$

B)  $\cos(150^\circ)$

C)  $2\sin(75^\circ)$

D)  $\cos(75^\circ)$

Answer Key

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- 1) A
- 2) C
- 3) B
- 4) D

$$5) 1 + \sec^2 x \sin^2 x = 1 + \frac{\sin^2 x}{\cos^2 x} = 1 + \tan^2 x = \sec^2 x.$$

- 6) A
- 7) C
- 8) B
- 9) B
- 10) B
- 11) A
- 12) C
- 13) C
- 14) B
- 15) A
- 16) D
- 17) A
- 18) D

$$19) \tan\left(x - \frac{\pi}{4}\right) = \frac{\tan x - \tan \pi/4}{1 + (\tan x)(\tan \pi/4)} = \frac{\tan x - 1}{1 + \tan x}.$$

- 20) C
- 21) D
- 22) C
- 23) A
- 24) A