

Calculus I

Homework

Trigonometry review

1. Convert from degrees to radians.

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|------------------|-------------------|---------------------|
| (a) 15° . | (h) 120° . | (o) 360° . |
| (b) 30° . | (i) 135° . | (p) 405° . |
| (c) 36° . | (j) 150° . | (q) 1200° . |
| (d) 45° . | (k) 180° . | (r) -900° . |
| (e) 60° . | (l) 225° . | (s) -2014° . |
| (f) 75° . | (m) 270° . | |
| (g) 90° . | (n) 305° . | |

2. Convert from radians to degrees. The answer key has not been proofread, use with caution.

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| (a) 4π . | (d) $\frac{4}{3}\pi$. | (g) 5. |
| (b) $-\frac{7}{6}\pi$. | (e) $-\frac{3}{8}\pi$. | |
| (c) $\frac{7}{12}\pi$. | (f) 2014π . | (h) -2014 . |

3. Prove the trigonometry identities.

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| (a) $\sin \theta \cot \theta = \cos \theta$. | (j) $\tan(\alpha + \beta) = \frac{\tan \alpha + \tan \beta}{1 - \tan \alpha \tan \beta}$. |
| (b) $(\sin \theta + \cos \theta)^2 = 1 + \sin(2\theta)$. | (k) $\sin(3\theta) + \sin \theta = 2 \sin(2\theta) \cos \theta$. |
| (c) $\sec \theta - \cos \theta = \tan \theta \sin \theta$. | (l) $\cos(3\theta) = 4 \cos^3 \theta - 3 \cos \theta$. |
| (d) $\tan^2 \theta - \sin^2 \theta = \tan^2 \theta \sin^2 \theta$. | (m) $1 + \tan^2 \theta = \sec^2 \theta$. |
| (e) $\cot^2 \theta + \sec^2 \theta = \tan^2 \theta + \csc^2 \theta$. | (n) $1 + \csc^2 \theta = \cot^2 \theta$. |
| (f) $2 \csc(2\theta) = \sec \theta \csc \theta$. | (o) $2 \cos^2(2x) = 2 \sin^4 \theta + 2 \cos^4 \theta - \sin^2(2\theta)$. |
| (g) $\tan(2\theta) = \frac{2 \tan \theta}{1 - \tan^2 \theta}$. | (p) $\frac{1 + \tan(\frac{\theta}{2})}{1 - \tan(\frac{\theta}{2})} = \tan \theta + \sec \theta$. |
| (h) $\frac{1}{1 - \sin \theta} + \frac{1}{1 + \sin \theta} = 2 \sec^2 \theta$. | |
| (i) $\tan \alpha + \tan \beta = \frac{\sin(\alpha + \beta)}{\cos \alpha \cos \beta}$. | |

4. Find all values of x in the interval $[0, 2\pi]$ that satisfy the equation.

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| (a) $2 \cos x - 1 = 0$. | (g) $2 \cos^2 x - (1 + \sqrt{2}) \cos x + \frac{\sqrt{2}}{2} = 0$. |
| (b) $\sin(2x) = \cos x$. | (h) $ \tan x = 1$. |
| (c) $\sqrt{3} \sin x = \sin(2x)$. | (i) $3 \cot^2 x = 1$. |
| (d) $2 \sin^2 x = 1$. | (j) $\sin x = \tan x$. |
| (e) $2 + \cos(2x) = 3 \cos x$. | |
| (f) $2 \cos x + \sin(2x) = 0$. | |