

1. -/3 points

SPreCalc6 7.2.025.

Prove the identity.

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

Use the Subtraction Formula for Sine, and then simplify.

$$\begin{aligned}\sin\left(x - \frac{\pi}{2}\right) &= \left(\sin x\right)\left(\cos \frac{\pi}{2}\right) - \left(\cos x\right)\left(\sin \frac{\pi}{2}\right) \\ &= \left(\sin x\right)(0) - \left(\cos x\right)(1) \\ &= \end{aligned}$$

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2. -/3 points

SPreCalc6 7.2.027.

Prove the identity.

$$\sin(x - \pi) = -\sin x$$

Use the Subtraction Formula for Sine, and then simplify.

$$\begin{aligned}\sin(x - \pi) &= \left(\sin x\right)\left(\cos \pi\right) - \left(\cos x\right)\left(\sin \pi\right) \\ &= \left(\sin x\right)(-1) - \left(\cos x\right)(0) \\ &= \end{aligned}$$

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3. -/3 points

SPreCalc6 7.2.029.

Prove the identity.

$$\tan(x - \pi) = \tan x$$

Use the Subtraction Formula for Tangent, and then simplify.

$$\begin{aligned}\tan(x - \pi) &= \frac{\tan x - \tan \pi}{1 + (\tan x)(\tan \pi)} \\ &= \frac{\tan x - 0}{1 + (\tan x)(0)} \\ &= \end{aligned}$$

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4. -/3 points

SPreCalc6 7.2.031.

Prove the identity.

$$\cos\left(x + \frac{\pi}{3}\right) + \sin\left(x - \frac{\pi}{6}\right) = 0$$

Use the Addition and Subtraction Formulas, and simplify.

$$\begin{aligned}\cos\left(x + \frac{\pi}{3}\right) + \sin\left(x - \frac{\pi}{6}\right) &= \left(\cos x\right)\left(\cos \frac{\pi}{3}\right) - \left(\sin x\right)\left(\sin \frac{\pi}{3}\right) + \left(\sin x\right)\left(\cos \frac{\pi}{6}\right) - \left(\cos x\right)\left(\sin \frac{\pi}{6}\right) \\ &= \left(\cos x\right)\left(\frac{1}{2}\right) - \left(\sin x\right)\left(\frac{\sqrt{3}}{2}\right) + \left(\sin x\right)\left(\frac{\sqrt{3}}{2}\right) - \left(\cos x\right)\left(\frac{1}{2}\right) \\ &= \end{aligned}$$

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5. -/2 points

SPreCalc6 7.2.033.

Prove the identity.

$$\sin(x + y) - \sin(x - y) = 2 \cos x \sin y$$

Use the Sum and Difference Identities for Sine, and then simplify.

$$\begin{aligned}\sin(x + y) - \sin(x - y) &= \sin x \cos y + \cos x \sin y - \left(\sin x \cos y - \cos x \sin y\right) \\ &= \end{aligned}$$

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6. -/5 points

SPreCalc6 7.2.035.

Prove the identity.

$$\cot(x - y) = \frac{\cot x \cot y + 1}{\cot y - \cot x}$$

Use a Reciprocal Identity, and then use a Subtraction Formula.

$$\begin{aligned}\cot(x - y) &= \frac{1}{\tan(\quad)} \\ &= \frac{\quad + \tan x \tan y}{\tan x - \tan y}\end{aligned}$$

Use a Reciprocal Identity, and then simplify the compound fraction.

$$\begin{aligned}&= \frac{\quad + \left(\frac{1}{\cot x}\right)\left(\frac{1}{\cot y}\right)}{\frac{1}{\cot x} - \frac{1}{\cot y}} \\ &= \frac{\left(\frac{\quad}{\cot x \cot y}\right)}{\left(\frac{\cot y - \cot x}{\cot x \cot y}\right)} \\ &= \end{aligned}$$

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7. -/3 points

SPreCalc6 7.2.037.

Prove the identity.

$$4 \tan x - 4 \tan y = \frac{4 \sin(x - y)}{\cos y \cos x}$$

Use a Reciprocal Identity, and then rewrite as a single rational expression.

$$\begin{aligned}4 \tan x - 4 \tan y &= \frac{\quad}{\cos x} - \frac{4 \sin y}{\cos y} \\ &= \frac{\quad}{\cos y \cos x}\end{aligned}$$

Use an Addition or Subtraction Formula to simplify.

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8. -/4 points

SPreCalc6 7.2.041.

Prove the identity.

$$\sin(x + y - z) = \sin x \cos y \cos z + \cos x \sin y \cos z - \cos x \cos y \sin z + \sin x \sin y \sin z$$

Regroup, and apply the Addition and Subtraction Formulas as needed.

$$\begin{aligned} \sin(x + y - z) &= \sin((x + y) - z) \\ &= \left(\right) \cos z - \left(\right) \sin z \\ &= \left(\sin x \cos y + \cos x \sin y \right) \cos z - \left(\right) \sin z \\ &= \end{aligned}$$

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9. -/1 points

SPreCalc6 7.2.043.

Write the given expression in terms of x and y only.

$$\cos(\sin^{-1} x - \tan^{-1} y)$$

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