

Activity 4.6 - Answer Key

Problem 1

Find the exact value of $y = \cos^{-1}(0)$

$$\cos y = 0$$

$$y = \frac{\pi}{2}$$

Problem 2

Find the exact value of $y = \cos^{-1}\left(-\frac{\sqrt{3}}{2}\right)$

$$\cos y = -\frac{\sqrt{3}}{2}$$

$$y = \frac{5\pi}{6}$$

Problem 3

Find the exact value of $y = \arcsin\left(\frac{1}{2}\right)$

$$\sin y = \frac{1}{2}$$

$$y = \frac{\pi}{6}$$

Problem 4

Find the exact value of $y = \arcsin(\pi)$

$$\sin y = \pi$$

$$y = \text{undefined}$$

Problem 5

Find the exact value of $y = \tan^{-1}(-1)$

$$\tan y = -1$$

$$y = -\frac{\pi}{4}$$

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Problem 6

Find the inverse function of $y = 2 \sin(x) + 1$, with domain $-\frac{\pi}{2} \leq x \leq \frac{\pi}{2}$

$$y = 2 \sin(x) + 1$$

Switch x and y and now solve for y .

$$x = 2 \sin(y) + 1$$

$$x - 1 = 2 \sin(y)$$

$$\frac{x - 1}{2} = \sin(y)$$

$$\sin^{-1}\left(\frac{x - 1}{2}\right) = y$$

$$f^{-1}(x) = \sin^{-1}\left(\frac{x - 1}{2}\right)$$

Problem 7

Evaluate $y = \cos \left[\sin^{-1} \left(\frac{2}{3} \right) \right]$

$$y = \cos \left(\sin^{-1} \left(\frac{2}{3} \right) \right)$$

$$\sin \theta = \frac{2}{3} = \frac{y}{r}$$

$$x^2 + y^2 = r^2$$

$$x = \sqrt{r^2 - y^2}$$

$$x = \sqrt{3^2 - 2^2}$$

$$x = \sqrt{9 - 4}$$

$$x = \sqrt{5}$$

Since inverse sin is positive, then θ must be in Q1, so x must be positive.

Now use the x value to solve for \cos .

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$$\cos \left[\sin^{-1} \left(\frac{2}{3} \right) \right] = \cos \theta = \frac{x}{r} = \frac{\sqrt{5}}{3}$$
$$\cos \theta = \frac{\sqrt{5}}{3}$$

Problem 8

Evaluate $y = \tan \left[\sin^{-1} \left(-\frac{1}{5} \right) \right]$

$$y = \tan \left[\sin^{-1} \left(-\frac{1}{5} \right) \right]$$
$$\sin \theta = -\frac{1}{5} = \frac{y}{r}$$
$$x = \sqrt{r^2 - y^2}$$
$$x = \sqrt{(5)^2 - (-1)^2}$$
$$x = \sqrt{24}$$

Since inverse sin is negative, then θ must be in Q4, so x must be positive.

Now use the x value to solve for tan.

$$\tan \left[\sin^{-1} \left(-\frac{1}{5} \right) \right] = \tan \theta = \frac{y}{x}$$
$$\frac{-1}{\sqrt{24}} = -\frac{\sqrt{24}}{24} = -\frac{2\sqrt{6}}{24} = -\frac{\sqrt{6}}{12}$$
$$\tan \theta = -\frac{\sqrt{6}}{12}$$

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Problem 9

Given $f(x) = \cos(x - \pi) - 5$, what must the domain of the function be in order to find the inverse?

Recall the domain of the function must be equal to the range of the inverse function.

$$0 \leq x - \pi \leq \pi$$

$$\pi \leq x \leq 2\pi$$

Problem 10

Given $f(x) = \tan(x - \pi) + 3$, what must the domain of the function be in order to find the inverse?

Recall the domain of the function must be equal to the range of the inverse function.

$$-\frac{\pi}{2} < x - \pi < \frac{\pi}{2}$$

$$\frac{\pi}{2} < x < \frac{3\pi}{2}$$

Problem 11

What is the range of inverse sin?

$$-\frac{\pi}{2} \leq x \leq \frac{\pi}{2}$$

Problem 12

What is the range of inverse cos?

$$0 \leq x \leq \pi$$

Problem 12

What is the range of inverse tan?

$$-\frac{\pi}{2} < x < \frac{\pi}{2}$$

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Secret Phrase

What was the secret phrase you found?

RAMBLIN' WRECK