

## Answer on Question #55739 - Math – Calculus

**Task 3:** If  $y = \cos^{-1}(x)$ , then  $\frac{d}{dx}(y)$  is

### Solution

Using the following formulas:

$$(\cos x)' = -\sin x$$

and

$$(a^n)' = n \cdot a^{n-1}$$

we get:

$$\frac{d}{dx}(y) = (-1) \cdot \cos^{-1-1}(x) \cdot (\cos x)' = -\cos^{-2}(x) \cdot (-\sin x) = \frac{\sin x}{\cos^2 x}$$

**Answer:**  $\frac{\sin x}{\cos^2 x}$

**Task 4:** If  $y = \arctan x$ , then  $x$  is

**Answer:**  $x = \tan y$ ,  $y \in (-\frac{\pi}{2}; \frac{\pi}{2})$

**Task 5:** If  $y = \arcsin x$ , then  $x^2$  is

**Answer:**  $x^2 = \sin^2 y$ ,  $y \in [-\frac{\pi}{2}; \frac{\pi}{2}]$ ,  $x \in [-1; 1]$

**Task 6:** If  $y = \arcsin x$ , then  $\frac{dx}{dy}$  is

**Solution.**

Find  $x(y)$ :

$$x(y) = \sin y, \quad x \in [-1; 1], \quad y \in [-\frac{\pi}{2}; \frac{\pi}{2}]$$

then using the following formula:

$$(\sin x)' = \cos x$$

we get:

$$\frac{dx}{dy} = (\sin y)' = \cos y$$

**Answer:**  $\cos y$