

Calculus I Quiz 3

Name:

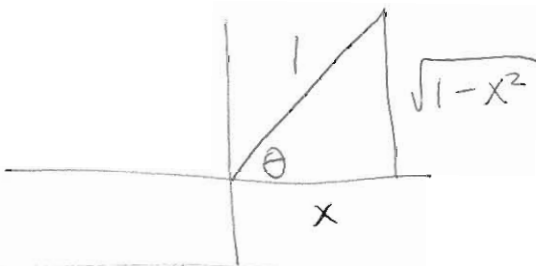
KEY

Pledge:

SHOW ALL WORK. Any answers without work will not receive full credit.

1. Simplify by referring to the appropriate triangle or trigonometric identity: $\tan(\cos^{-1} x) =$

$$\cos^{-1} x = \theta \iff \cos \theta = x$$



$$\tan \theta = \frac{\sqrt{1-x^2}}{x}$$

2. Solve for the unknown variable: $2^{x^2-2x} = 8$

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

$$x = 3, -1$$

$$x^2 - 2x = 3$$

$$x^2 - 2x - 3 = 0$$

$$(x-3)(x+1) = 0$$

3. Find a domain on which f is one-to-one and formula for the inverse of f restricted to this domain:
 $f(x) = \sqrt{x^3 + 9}$ (you don't have to graph them)

$$x^3 + 9 \geq 0$$

$$x^3 \geq -9$$

$$x \geq (-9)^{1/3}$$

$$\sqrt{x^3 + 9} \text{ is 1-1 on } [-9^{1/3}, \infty)$$

$$y = \sqrt{x^3 + 9}$$

$$y^2 = x^3 + 9$$

$$y^2 - 9 = x^3$$

$$(y^2 - 9)^{1/3} = x$$

$$f^{-1}(x) = (x^2 - 9)^{1/3}$$

4. Calculate directly: $\log_4 48 - \log_4 12$

$$\log_4 \left(\frac{48}{12} \right) = \log_4 (4) = \boxed{1}$$