

# Solutions

Name \_\_\_\_\_

ID \_\_\_\_\_

## UWO Calculus 1000 Quiz 1. Sept 16, 2016.

(1) Find all values of  $x$  in the interval  $[0, 2\pi]$  that satisfy the equation

$$2 \cos x - 1 = 0$$

$$2 \cos x - 1 = 0 \Rightarrow 2 \cos x = 1 \Rightarrow \\ \Rightarrow \cos x = \frac{1}{2}$$

Answers:

(A)  $\frac{\pi}{6}, \frac{5\pi}{6}$

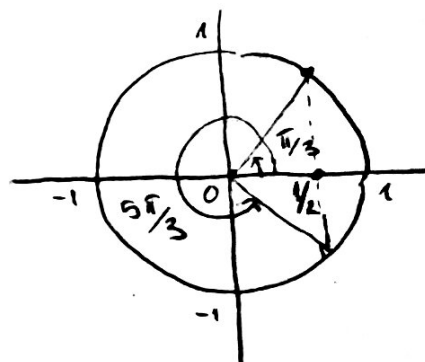
(B)  $\frac{\pi}{4}$  only

(C)  $\frac{\pi}{3}, \frac{5\pi}{3}$

(D)  $\frac{\pi}{3}, \frac{2\pi}{3}$

(E) None of these

Hence,  
 $x = \frac{\pi}{3}, \frac{5\pi}{3}$



(2) Find the formula for the inverse of the function

$$f(x) = 1 + \sqrt{2 + 3x}$$

write  $y = 1 + \sqrt{2 + 3x}$  and solve for  $x$ :

$$\sqrt{2 + 3x} = y - 1 \Rightarrow 2 + 3x = (y - 1)^2 \Rightarrow$$

$$\Rightarrow 3x = (y - 1)^2 - 2 \Rightarrow x = \frac{1}{3}(y - 1)^2 - \frac{2}{3}$$

Changing the notation of the free variable  $y$ , to  $x$ , we obtain,

$$f^{-1}(x) = \frac{1}{3}(x - 1)^2 - \frac{2}{3}$$

Answers:

(A)  $\frac{1}{3}(x - 1)^2 - \frac{2}{3}$

(B)  $\frac{1}{3}(x - 1)^2 + \frac{2}{3}$

(C)  $\frac{2}{3}(x - 1)^2 + \frac{1}{3}$

(D)  $\frac{1}{3}(x + 1)^2 - \frac{2}{3}$

(E) None of these

(3) Determine the function whose graph is represented on the figure

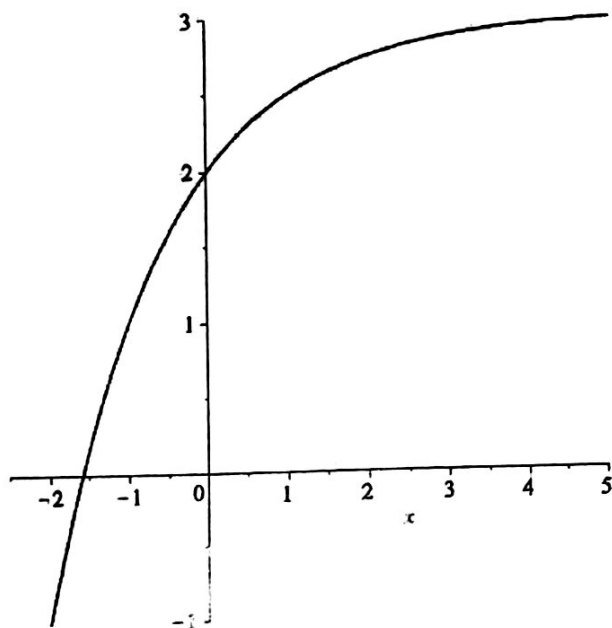


FIGURE 1  $f(x) = ???$

Answers:

(A)  $f(x) = 3 - 2^x$

(B)  $f(x) = 3 - 2^{-x}$

(C)  $f(x) = 2 - 3^{-x}$

(D)  $f(x) = 2 + 3^{-x}$

(E) None of these

It follows from the graph of  $f$  that  $f(0) = 2$ ; this excludes options (C):  $f(0) = 2 - 3^0 = 2 - 1 = 1$  and (D):  $f(0) = 2 + 3^0 = 2 + 1 = 3$ .

So, it is either (A), or (B). Again, from the graph, we see that our function  $f$  is increasing, which excludes option (A), hence the answer is

(B):  $f(x) = 3 - 2^{-x}$ .