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Calculus 1:

Quiz 1: (Chapter 1)

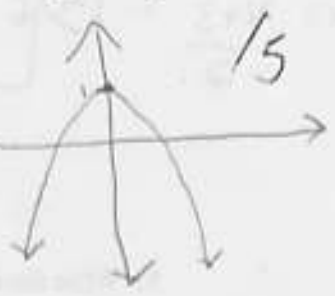
1) Sketch the graph of the equation. Identify any intercepts and test for symmetry.

$y(x) = 1 - x^2$

Symmetry around  $x=y$  axis  
 $y(x) = 1 - x^2$   
replace  $y = -y$  NO  
 $-y = 1 - x^2$   
 $y = x^2 + 1$

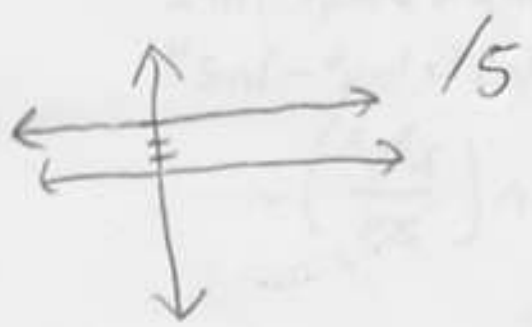
Symmetry:  $y = -y$   
replace  $x$  with  $-x$   
 $y = 1 - (-x)^2$   
 $y = 1 - x^2 \Rightarrow$  YES

Symmetry: Origin  
 $-y = 1 - (-x)^2$   
 $-y = 1 - x^2$   
 $y = -1 + x^2 \Rightarrow$  NO



2) Find an equation of the line that passes through the points  $p_1$  and  $p_2$ , and sketch the line.  $P_1=(1,3)$   $P_2=(4,3)$

equation of line  $y - y_1 = m(x - x_1)$   
 $m = \frac{3-3}{4-1} = \frac{0}{3} = 0 \Rightarrow y - y_1 = 0(x - x_1)$   
 $y = y_1$   
 $y = 3$



3) Find the domain of these functions:

a)  $h(x) = \sqrt{x-1}$

Find domain - solve inequality

$x - 1 \geq 0$   
 $x \geq 1$

Domain =  $\{x | x \geq 1\}$  /5  
or  $[1, \infty)$

b)  $g(x) = \frac{2}{1 - \cos(x)}$  (use inverse trig function)

Domain:

Restriction when  $1 - \cos(x) = 0$

$\Rightarrow -\cos(x) = -1$

$\cos(x) = 1$

$x = \cos^{-1}(1)$

$x = 0$

Domain  $\{x | x \neq (0 + 2n\pi)\}$

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Dom

4) Find the inverse of the function  $f(x) = 2x - 3$ .

$$\begin{aligned} \textcircled{1} \quad y &= 2x - 3 \\ \textcircled{2} \quad 2x &= y + 3 \\ \textcircled{3} \quad x &= \frac{y + 3}{2} \\ \textcircled{4} \quad f^{-1}(x) &= \frac{x + 3}{2} \end{aligned}$$

5) Write the expression as the logarithm of a single function:  $3 \ln x + 2 \ln y - 4 \ln z$

$$\begin{aligned} 3 \ln x + 2 \ln y - 4 \ln z &= \ln x^3 + \ln y^2 - \ln z^4 \\ &= \ln \left( \frac{x^3 y^2}{z^4} \right) \end{aligned}$$

6) Solve for x:

a)  $\ln(x) = 2$

$$\begin{aligned} e^{\ln(x)} &= e^2 \\ x &= e^2 \end{aligned}$$

b)  $e^x = 4$

$$\begin{aligned} \ln e^x &= \ln 4 \\ x &= \ln 4 \end{aligned}$$

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