Math 16A (Summer 2008)
Kouba
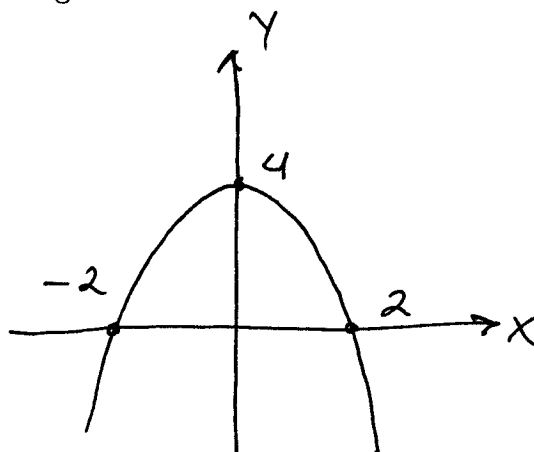Quiz 1

PRINT Name : _____ KEY _____

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1.) (10 pts.) Determine the x- and y-intercepts for $y = 4 - x^2$. Then sketch the graph of this equation using appropriate labeling of your diagram.

$X = 0: \quad y = 4$

$y = 0: \quad 0 = 4 - x^2$

$\rightarrow 0 = (2-x)(2+x)$

$\rightarrow X = 2, \ X = -2$

2.) (10 pts.) Determine the center and radius of the circle given by : $x^2 - 4x + y^2 + 10y = 7$

$(x^2 - 4x + 4) + (y^2 + 10y + 25) = 7 + 4 + 25 \rightarrow$

$(x - 2)^2 + (y + 5)^2 = 36 = 6^2 \rightarrow$

$\text{center} : (2, -5)$

$\text{radius} : \quad r = 6$

3.) (10 pts.) Find an equation of the line in slope/intercept form ($y = mx + b$) passing through the point $(-1, 3)$ and which is perpendicular to the line $y = (1/2)x + 4$.

$y = \frac{1}{2}x + 4$ has slope $\frac{1}{2}$ so new line $(\perp)$

has slope $m = -2$ and pt. $(-1, 3)$ so

$y = mx + b \rightarrow 3 = (-2)(-1) + b \rightarrow b = 1 \rightarrow$

$y = -2x + 1$

4.) (10 pts.) Let $f(x) = \dfrac{x}{x+3}$ and $g(x) = \dfrac{1}{x-2}$. Find and simplify the functional composition $f(g(x))$.

$$f(g(x)) = f\left(\frac{1}{x-2}\right) = \frac{\dfrac{1}{x-2}}{\dfrac{1}{x-2}+3} \cdot \frac{x-2}{x-2}$$

$$= \frac{1}{1+3(x-2)} = \frac{1}{1+3x-6} = \frac{1}{3x-5}$$

5.) (5 pts. each) Consider the function $f(x) = \sqrt{x^2 - 3x}$.

a.) Use a sign chart to determine the domain of f.

$$x^2 - 3x = x(x-3) \geq 0$$

$$\underline{Domain}:$$
$$x \geq 3, \; x \leq 0$$

$x(x-3)$

sign chart: $+$ at -1, 0 at $x=0$, $-$ at 1, 0 at $x=3$, $+$ at 4

b.) Determine the range of f.

$$y = \sqrt{x(x-3)} \quad ; \quad \text{if } x = 3, \; y = 0 \text{ and}$$

$$\text{as } x \to \infty, \quad y \to \infty \quad \text{so}$$

$$\underline{Range}: \qquad y \geq 0$$