SOLUTIONS

Math 71 Spring 2006 QUIZ #9 @ 15 points Name:

Write in a neat and organized fashion. You should use a pencil. For an exercise to be complete there needs to be a detailed solution to the problem. Do not just write down an answer. No proof, no credit given.

1. Let $y = -3(x+3)^2 - 5$. parabola opens downward $(a = -3 < 0)$

a) What is the vertex of this parabola? Is it a maximum or a minimum point?

The above equation is in vertex form $\Rightarrow$ $\boxed{V(-3,-5)}$ maximum point

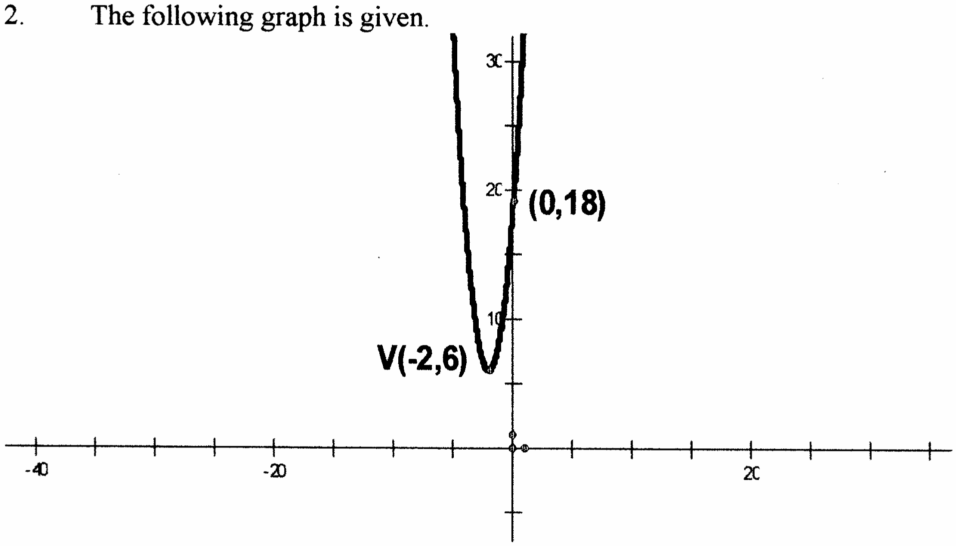
b) What is the domain of the function?

$\boxed{x \in \mathbb{R}}$

c) What is the range of the function?

$\boxed{y \in (-\infty, -5]}$

2. The following graph is given.



a) Write an equation for the graph.

$y = a(x - x_v)^2 + y_v$, where $V(x_v, y_v)$

$y = a(x+2)^2 + 6$

$(0,18) \in$ graph $\Rightarrow$ when $x=0$, $y=18$

$18 = a(2)^2 + 6$

$18 = 4a + 6$

$12 = 4a \Rightarrow a = 3$

$\boxed{y = 3(x+2)^2 + 6}$

b) What is the domain and the range of the function?

$\boxed{x \in \mathbb{R}, \quad y \in [6, \infty)}$

c) Using the graph, solve the following: $f(x) > 0$. $\boxed{x \in \mathbb{R}}$

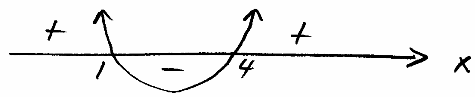
3. Solve the following inequality: $x^2 - 5x > -4$

$x^2 - 5x + 4 > 0$ - parabola opens upward

x-int: $x^2 - 5x + 4 = 0$

$(x-1)(x-4) = 0$

$x = 1$ or $x = 4$



Therefore, $x^2 - 5x + 4 > 0$ if $\boxed{x \in (-\infty, 1) \cup (4, \infty)}$.

4. Solve the following inequality: $\dfrac{x}{x-1} > 2$

$\dfrac{x}{x-1} - 2 > 0$

$\dfrac{x - 2(x-1)}{x-1} > 0$

$\dfrac{x - 2x + 2}{x-1} > 0$

$\dfrac{2-x}{x-1} > 0$

x	$-\infty$		1		2		∞
$2-x$	+ +	+ +	+	+	0	− −	−
$x-1$	−	− −	0	+ +	+	+	+
$\dfrac{2-x}{x-1}$		−	|	+	0	−	

therefore, $\dfrac{2-x}{x-1} > 0$ if $\boxed{x \in (1, 2)}$.