# Math 1010 - Quiz 10 <br> University of Utah 

Fall 2009

Name: Solutions

1. Find the solutions to the quadratic equations:
(a) (4 points)

$$
\begin{gathered}
4 x^{2}+6 x+1=0 . \\
x=\frac{-6 \pm \sqrt{6^{2}-4(4)(1)}}{2(4)}=\frac{-6 \pm \sqrt{20}}{8}=\frac{-6 \pm 2 \sqrt{5}}{8}=\frac{-3 \pm \sqrt{5}}{4} .
\end{gathered}
$$

(b) (4 points)

$$
x^{2}-8 x+19=0
$$

$$
x=\frac{-(-8) \pm \sqrt{(-8)^{2}-4(1)(19)}}{2(1)}=\frac{8 \pm \sqrt{-12}}{2}=4 \pm \sqrt{-3}=4 \pm i \sqrt{3}
$$

2. Find the vertex of the parabola: (2 points)

$$
y=x^{2}-4 x+8
$$

Hint $-x=-b /(2 a)$.

$$
\begin{gathered}
x=\frac{-(-4)}{2(1)}=2 \\
y=2^{2}-4(2)+8=4 .
\end{gathered}
$$

So,

The vertex is at $(2,4)$.
3. Solve the quadratic inequality: (That is, find all values of $x$ for which the inequality is true.) (5 points)

$$
x^{2}-6 x+10 \leq 2 .
$$

First, we move everything to one side to get:

$$
x^{2}-6 x+8 \leq 0
$$

Then, we find the roots of our polynomial on the left to figure out our points of interest:

$$
\begin{gathered}
x^{2}-6 x+8=(x-2)(x-4)=0 \\
\text { So, } \\
x=2 \text { and } x=4 \text { are our points of interest. }
\end{gathered}
$$

Then, we check to determine whether our function is positive or negative within these intervals. Say, at the points 0,3 , and 5 .

$$
\begin{gathered}
f(x)=x^{2}-6 x+8 \\
f(0)=8 \\
f(3)=9-18+8=-1 \\
f(5)=25-30+8=3
\end{gathered}
$$

So, our function is less than or equal to zero between 2 and 4 .

$$
x \leq 2 \leq 4
$$

