Math 103 Professor Katiraie (Sections 7.5, 7.6, 8.1, and 8.2) Quiz 8 Form A (20 Pts)
Name Solution

1) Solve the following equations symbolically (i.e. algebraically) (2 points each)
Check your results.

a) $\sqrt[4]{t+1}=2$

$t+1=2^4$

$t+1=16$

$\boxed{t=15}$

b) $\sqrt{x+6}=x$

$(\sqrt{x+6})^2=x^2$

$x+6=x^2$

$x^2-x-6=0$

$(x-3)(x+2)=0$

$\boxed{x=3}$ $x=-2$

c) $\sqrt[3]{2z-4}=-2$

$2z-4=(-2)^3$

$2z-4=-8$

$+4 \quad +4$

$2z=-4$

$\boxed{z=-2}$

d) $\sqrt{b^2-4}=b-2$

$b^2-4=(b-2)^2$

$b^2-4=b^2-4b+4$

$-8=-4b$

$\boxed{2=b}$

2) Use imaginary unit to write the expression. (2 points)

a) $\sqrt{-12}=\sqrt{4}\sqrt{3}\,i=2\sqrt{3}\,i$

b) $\sqrt{-18}=\sqrt{9}\sqrt{2}\,i=3\sqrt{2}\,i$

c) $\sqrt{-144}=12i$

d) $\sqrt{-100}=10i$

3. Suppose that a baseball is thrown upward with an initial velocity of 66 feet per second and it is released 6 feet above the ground. Its height h after t seconds is given by

$$h(t) = -16t^2 + 66t + 6.$$

a) After how many seconds does the baseball reach a maximum height? (2 points)

$$x = \frac{-b}{2a} = \frac{-66}{2(-16)} = \frac{-66}{-32} = \frac{+33}{16} = 2.0625 \text{ sec}$$

b) What is the maximum height? (2 points)

$y = 74.0625$ feet

4. Write the vertex form of a parabola that satisfies the following condition.

Vertex $(5,-2)$ and $a = -\frac{1}{2}$ (2 points)

$$y = -\frac{1}{2}(x-5)^2 - 2$$

b) Write the above equation in the form of $y = ax^2 + bx + c$ (2 points)

$$y = -\frac{1}{2}(x^2 - 10x + 25) - 2$$

$$= -\frac{1}{2}x^2 + 5x - \frac{25}{2} - 2 = -\frac{1}{2}x^2 + 5x - \frac{29}{2}$$

5. Write the vertex form of the parabola shown in the following graph.

Assume $a = \pm 1$ (2 points)

$$y = a(x-h)^2 + k$$

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

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