King Fahd University of Petroleum and Minerals
Prep-Year Math Program
Math 001 - Term 131
Recitation (3.1)

Question 1: If the equation of a parabola is $y - 2 = -2(x + 3)^2$, then which one of the following is TRUE:

a)   The vertex is $(3, -2)$ and the parabola opens downward

b)   The vertex is $(-3, 2)$ and the parabola is symmetric about $x = 2$

c)   The vertex is $(3, -2)$ and the parabola is symmetric about $x = -3$

d)   The parabola opens upward and symmetric about $x = -3$

e)   The vertex is $(-3, 2)$ and the parabola opens downward

Answer: (e): is **TRUE**

Question 2: If a rock is thrown upward from the ground with an initial velocity of 48 feet per second, the distance S in feet of the rock from the ground after t seconds is $S = 48t - 16t^2$. Then find maximum height the rock can reach. **Answer:** 36 meters.

Question 3: If the point $\left(-\dfrac{1}{4}, t\right)$ is the vertex of the parabola $y = x^2 + mx + 2$ for

some real number m, then find the value of t.   **Answer:** $\boxed{t = \dfrac{31}{16}}$

Question 5: If the vertex of the parabola $y = -x^2 + 8x + 2c$ is a point on the x-axis, then the value of c is a point on the x-ax

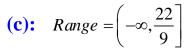(a): 32   **(b): −8**   **(c):** −64   (d): −32   (e): 64

Question 5: Given $f(x) = 2 + \dfrac{4}{3}x - x^2$

a)   Write $f(x)$ in standard form.

b)   Find the vertex and the equation of the axis of symmetry.

c)   Find the range of $f(x)$.

d)   Sketch the graph of $f(x)$.

e)   From the graph determine the intervals over which $f(x)$ is increasing and the intervals over which $f(x)$ is decreasing**.**

Solution: **(a):** The standard form of the quadratic function $f(x)$ is:

$$f(x) = -x^2 + \dfrac{4}{3}x + 2 \qquad f(x) = -\left(x - \dfrac{2}{3}\right)^2 + \dfrac{22}{9}$$

(b): $Vertex = (h, k) = \left(\dfrac{2}{3}, \dfrac{22}{9}\right)$, Equation of symmetry axis is $x = \dfrac{2}{3}$

(c): $Range = \left(-\infty, \dfrac{22}{9}\right]$

(d):

(e): The function f *increases on* $\left(-\infty, \dfrac{2}{3}\right]$ and *decreases on* $\left[\dfrac{2}{3}, \infty\right)$