King Fahd University of Petroleum and Minerals

Prep-Year Math Program

Math 001 - Term 141

Recitation (3.1)

Answered by S. Omar

Question 1: Given $f(x)=1+\frac{4}{3}x-2x^2$

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 $f(x)$.

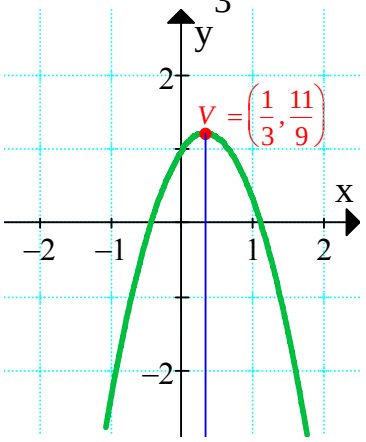
e) From the graph determine the intervals over which $f(x)$ is increasing and the intervals over which $f(x)$ is decreasing.

Answer: (a): $f(x)=-2\left(x-\frac{1}{3}\right)^2+\frac{11}{9}$

(b): $Vertex=\left(\frac{1}{3},\frac{11}{9}\right)$ Equation of symmetry axis is $x=\frac{1}{3}$

(c): $Range=\left(-\infty,\frac{11}{9}\right]$

(d):



$x=\frac{1}{3}$ is the symmetry axis

(e): The function f *increases on* $\left(-\infty,\frac{1}{3}\right]$ and *decreases on* $\left[\frac{1}{3},\infty\right)$

Question 2: If the point $\left(-\frac{1}{4},t\right)$ is the vertex of the parabola $y=x^2+mx+2$ for some real number *m*, then find the value of t.

Answer: $\boxed{t=\frac{31}{16}}$

Question 3: 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.

(a) 36 feet
(b) 24 feet
(c) 48 feet
(d) 16 feet
(e) 52 feet

Question 4: 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**