

Good job, Stephen!

MAC1140 SEC29 HW 08-27-2007 3.1

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Due: 08-29-2007

due 8/29/07

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Sec#: 29

Extra Credit Attempted? Yes

1.

[3.1.1bPT] The graph of the quadratic function $f(x) = -x^2 + 2x + 8$ has

- 1 x-intercept
- None of these
- 2 x-intercepts
- 0 x-intercepts

Two ways:
 Not recommended $0 = -x^2 + 2x + 8$
 $= -(x^2 - 2x - 8)$
 $= -(x-4)(x+2)$
 x-intercepts: 4, -2

$b^2 - 4ac = 4 - 4(-1)(8) = 36 > 0$
 2 x-intercepts.
 Vertex: (1, 9), $a < 0$

2.

[3.1.1cPT] Find the quadratic equation whose graph has vertex at (-2, 1) and an x-intercept of 1

Vertex:

(-2, 1)

$y = \frac{1}{9}(x+2)^2 - 1$

(-2, 1)

$y = -\frac{1}{9}(x+2)^2 + 1$

(2, 1)

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

(1, -2)

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

(2, -1)

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

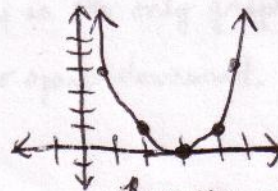
$y = -\frac{1}{9}(x+2)^2 + 1$
 $(h, k) \rightarrow (-2, 1)$

Because when you plug 0 in for y you find the x-intercept, if the x-intercept is 1, then $0 = -\frac{1}{9}(1+2)^2 + 1$ should hold true
 $0 = -1 + 1$
 $0 = 0$ Good check.

3.

[3.1.2bPT] The quadratic function $f(x) = x^2 - 6x + 9$ has

- a minimum value of 0
- a maximum value of -3
- a minimum value of 3
- a maximum value of 36



$h = \frac{-b}{2a} = \frac{6}{2(1)} = 3$

$k = f(3) = 9 - 18 + 9 = 0$

$(h, k) \rightarrow (3, 0)$

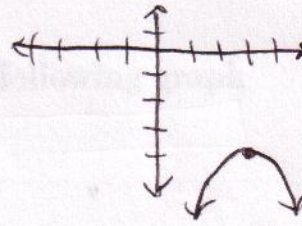
Because $a > 0$, the vertex of the parabola is the minimum point on the graph of the function

4.

[3.1.2cPT] $f(x) = a(x-3)^2 - 4$, $a < 0$, has

- a maximum value of 4
- a maximum value of 3

$$(h, k) \rightarrow (3, -4)$$



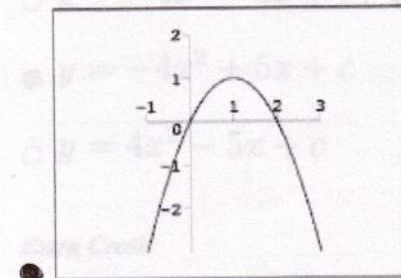
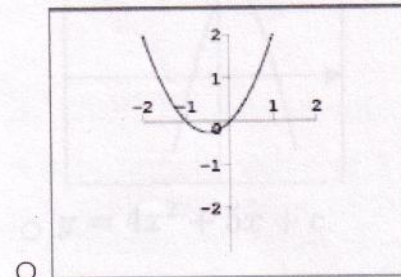
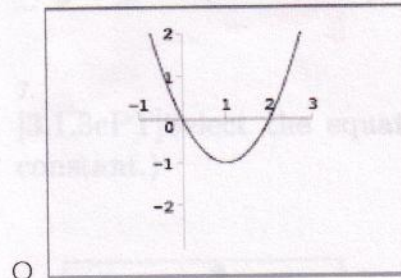
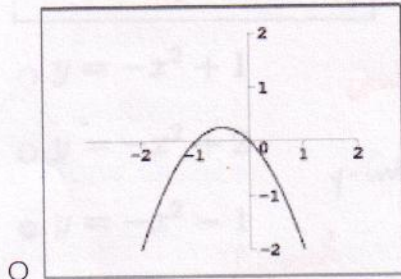
- a minimum value of -4
- a minimum value of 3
- a maximum value of -4

5.

[3.1.3aPT] Select the graph of $y = -x^2 + 2x$.

$$h = \frac{-b}{2a} = \frac{-2}{-2} = 1$$

$$f(1) = k = 1$$



This is the only graph with vertex $(1, 1)$, and it also opens downward.

As you can find in the notes that the discriminant, $\Delta = b^2 - 4ac$, is one way to find out the

number of x-intercepts. Explain how and why the conclusion drawn in the notes is correct

by examining the Quadratic Formula: $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

The conclusion drawn in class can be verified by considering the fact that the quadratic formula requires taking the square root of the discriminant, and that this is possible if and only if the discriminant is non-negative. If the discriminant is greater than zero, then two real roots will be added and subtracted from $-b$, resulting in 2 real roots. If the discriminant is zero, then one real root, because $(b \pm 0) / (2a)$ is equal to $-b / (2a)$. If $\Delta < 0$, no real square root exists for the discriminant, and thus for the function.

