

+10

Name Key

### Quiz #3: Take-Home

**Directions:** Please show all work since partial credit is given. Answers without the necessary work will receive no credit. The quiz is due no later than **Monday, February 8, at 12:01 pm.** Remember, have fun!

1. Let  $f(x) = -x^2 + 6x - 8$ .

+3 a) Rewrite  $f(x)$  in standard form ( $f(x) = a(x-h)^2 + k$  form).

$f(x) = -(x-3)^2 + 1$

$$f(x) = -x^2 + 6x - 8$$

$$= -(x^2 - 6x + 9) - 8 + 9$$

$$f(x) = -(x-3)^2 + 1$$

$$x_v = \frac{-b}{2a}$$

$$= \frac{-6}{2(-1)}$$

$$= 3$$

$$f(3) = -(3)^2 + 6(3) - 8$$

$$= -9 + 18 - 8$$

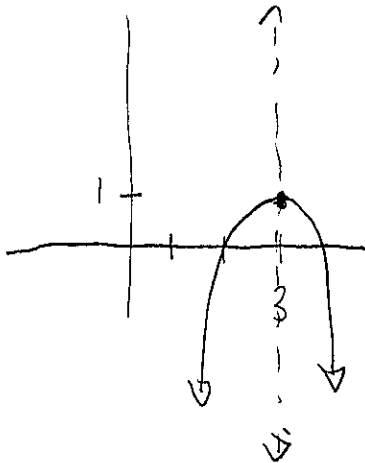
$$= 1$$

$$\text{Vertex} = (3, 1), \quad a = -1$$

b) Identify the vertex and axis of symmetry for  $f(x)$ .

+1 Vertex:  $(3, 1)$

+1 Axis:  $x = 3$



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2. Let  $P(x) = 2x^3 + 4x^2 - 13x + 12$ , and suppose  $P(-4) = 0$ .

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a) Factor  $P(x)$  completely.

$$P(x) = (2x^2 - 4x + 3)(x + 4)$$

$$\begin{array}{r|rrrr} -4 & 2 & 4 & -13 & 12 \\ & & -8 & +16 & -12 \\ \hline & 2 & -4 & 3 & 0 \end{array}$$

$$(2x^2 - 4x + 3) \cdot (x + 4)$$

Does not factor  
any more.

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b) Find all solutions of the equation  $P(x) = 0$ .

$$x = -4, \frac{2 \pm \sqrt{2}i}{2} = 1 \pm \frac{\sqrt{2}}{2}i$$

$$(2x^2 - 4x + 3) \cdot (x + 4) = 0$$



$$x = -4$$

$$x = \frac{-(-4) \pm \sqrt{(-4)^2 - 4 \cdot 2 \cdot 3}}{2 \cdot 2}$$

$$= \frac{4 \pm \sqrt{16 - 24}}{4} = \frac{4 \pm \sqrt{-8}}{4} = \frac{4 \pm 2i\sqrt{2}}{4} = \frac{2 \pm \sqrt{2}i}{2}$$

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c) Describe the end behavior (Global behavior) of  $P(x)$ . Make sure to use the appropriate notation.

$$\text{As } x \rightarrow -\infty, P(x) \rightarrow -\infty$$

$$\text{As } x \rightarrow +\infty, P(x) \rightarrow +\infty$$

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