

MS 100 College Algebra Spring 2006 Test Six

1. Calculate (expand):  $\left(x - \frac{1}{2} - 4i\right)\left(x - \frac{1}{2} + 4i\right)$

$$= x^2 - x - 16.25i^2$$

$$= x^2 - x + 16.25$$

2. For  $f(x) = x^2 - x - 15.75$   $g(x) = x + 15.75$

Find the composition:  $(g \circ f)(x)$

$$= [x^2 - x - 15.75] + 15.75$$

$$= x^2 - x$$

3. All about  $f(x) = x^2 - x - 15.75$ ...

2 a. What is the degree of the function  $f(x) = x^2 - x - 15.75$ ?

even b. Is  $f(x) = x^2 - x - 15.75$  an even or odd function?

up c. Does  $f(x) = x^2 - x - 15.75$  open up or open down?

2 d. What is the maximum number of zeros for  $f(x) = x^2 - x - 15.75$ ?

parabola e. What is the name of the shape produced by  $f(x) = x^2 - x - 15.75$ ?

-15.75 f. What is the y-intercept for  $y = x^2 - x - 15.75$ ?

g. Solve  $x^2 - x - 15.75 = 0$  by completing the square. Show your work.

$$x^2 - x = 15.75$$

$$x^2 - x + 0.25 = 15.75 + 0.25$$

$$(x - 0.5)^2 = 16$$

$$\sqrt{(x - 0.5)^2} = \pm\sqrt{16}$$

$$x - 0.5 = \pm 4$$

$$x = 0.5 \pm 4$$

$$x = -3.5, x = 4$$

h. Find the x-intercepts for  $f(x) = x^2 - x - 15.75$

$$x = -3.5, x = 4$$

i. Use the formula  $(h, k) = \left(\frac{-b}{2a}, \frac{-b^2 + 4ac}{4a}\right)$  to find the vertex (h, k) for

$$y = x^2 - x - 15.75$$

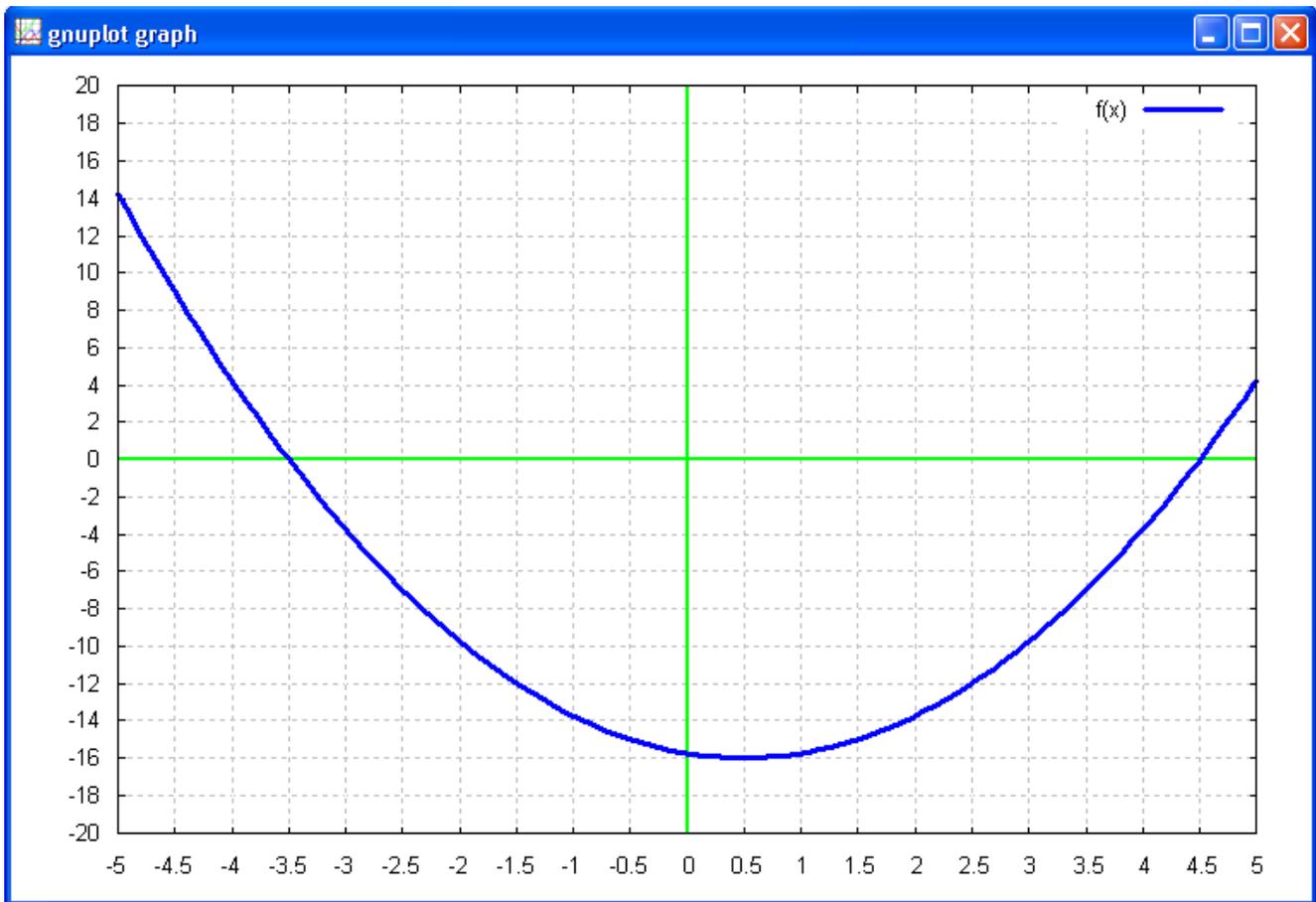
$$(h, k) = (0.5, -16)$$

j. Use the formula (h, k+p) where  $p = \frac{1}{4a}$  to find the focus for

$$f(x) = x^2 - x - 15.75$$

$$(0.5, -15.75)$$

k. Sketch a graph of  $f(x) = x^2 - x - 15.75$ :



4. Solve by completing the square  $x^2 - x + 16.25 = 0$ . Show your work.

$$x^2 - x = -16.25$$

$$x^2 - x + 0.25 = -16.25 + 0.25$$

$$(x - 0.5)^2 = -16$$

$$\sqrt{(x-0.5)^2} = \pm \sqrt{-16}$$

$$\sqrt{(x-0.5)^2} = \pm \sqrt{16} * \sqrt{-1}$$

$$x - 0.5 = \pm 4i$$

$$x = 0.5 \pm 4i$$

$$x = 0.5 + 4i, x = 0.5 - 4i$$

Factors (not required, only done to show connection to problem one):

$(x - 0.5 - 4i)(x - 0.5 + 4i)$  or

$$\left(x - \frac{1}{2} - 4i\right)\left(x - \frac{1}{2} + 4i\right)$$