


# Quiz 3

Key

Show *all* your work. No credit is given without reasonable supporting work. There are *two* sides to this quiz.

1. [3] TRUE/FALSE: Circle T in each of the following cases if the statement is *always* true. Otherwise, circle F.

T  F The vertex of the parabola defined by  $2(x+1)^2 - 5 = y$  is a maximum.

 has a min.

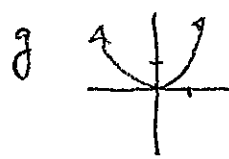
T  F The line  $\frac{2}{3}x + 1 = y$  is perpendicular to the line  $2x - 3y = 7$ .

Opens up

$2x - 3y = 7 \Rightarrow 2x - 7 = 3y \Rightarrow \frac{2}{3}x - \frac{7}{3} = y$   
 $m = \frac{2}{3}$

T F The graph of  $h(x) = (x+2)^2$  is the graph of  $g(x) = x^2$  shifted left 2 units.

$m = \frac{2}{3}$  they are parallel



scratch paper

V H.F  
U W

2. Consider the function  $f(x) = -x^2 + 3x + \frac{1}{4}$  whose graph is provided below.

(a) [1] Draw the line connecting points  $(-1, f(-1))$  and  $(\frac{3}{2}, f(\frac{3}{2}))$ .

↳ points recognized (+.5)

(b) (line wks #7) [2] Find the equation of the line you drew in part (a).

passes thru  
 $(-1, -1.75)$  or  $(\frac{3}{2}, \frac{5}{2})$   
 $(-1, -3.75)$  or  $(1.5, 2.5)$

slope =  $\frac{5/2 - (-1.75)}{3/2 - (-1)}$   
 $= \frac{25/4}{5/2} = \frac{5}{2}$

$y = mx + b$   
 thru  $(\frac{3}{2}, \frac{5}{2})$  so  
 $\frac{5}{2} = \frac{5}{2}(\frac{3}{2}) + b$   
 $\Rightarrow b = \frac{5}{2} - \frac{15}{4} = -\frac{5}{4}$   
 so  $y = \frac{5}{2}x - \frac{5}{4}$

(c) (WebHW4 #9) [1] Find the average rate of change of  $f$  between  $x = -1$  and  $x = \frac{3}{2}$ .

average rate of change = slope =  $\frac{5}{2}$

(d) (§2.5 #14) [3] Complete the square to write  $f$  in vertex/standard form.

$-x^2 + 3x + \frac{1}{4} = y$

$x^2 - 3x - \frac{1}{4} = -y$   
 $+ (\frac{3}{2})^2 + (\frac{3}{2})^2$

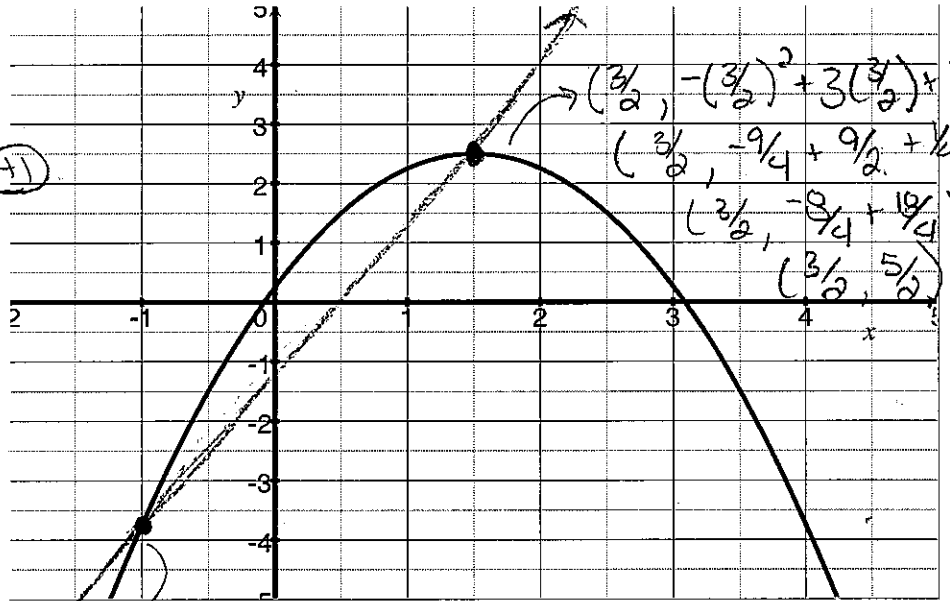
$x^2 - 3x + \frac{9}{4} - \frac{1}{4} = -y + \frac{9}{4}$   
 $(x - \frac{3}{2})^2 - \frac{1}{4} = -y + \frac{9}{4}$   
 $- \frac{9}{4}$

$(x - \frac{3}{2})^2 - \frac{10}{4} = -y$

$-[(x - \frac{3}{2})^2 - \frac{5}{2}] = y$

$-(x - \frac{3}{2})^2 + \frac{5}{2} = y$

algebra (+1)



$(\frac{3}{2}, -(\frac{3}{2})^2 + 3(\frac{3}{2}) + \frac{1}{4})$   
 $(\frac{3}{2}, -\frac{9}{4} + \frac{9}{2} + \frac{1}{4})$   
 $(\frac{3}{2}, -\frac{8}{4} + \frac{18}{4} + \frac{1}{4})$   
 $(\frac{3}{2}, \frac{11}{4})$   
 $(-1, f(-1))$   
 $(-1, -(-1)^2 + 3(-1) + \frac{1}{4})$   
 $(-1, -1 - 3 + \frac{1}{4})$   
 $(-1, -3.75)$   
 $(-1, -\frac{15}{4})$

$\frac{25}{4} \div \frac{5}{2}$   
 $\frac{25}{4} \cdot \frac{2}{5} = \frac{5}{2}$