

STUDENT NAME:

Calculus 1550, section 6. Tuesday, 27 January, 2004. First quiz.

Let

$$g(x) = 2\sqrt{x} - 2, \quad h(x) = 4 - x, \quad \text{and} \quad F(x) = g \circ h(x).$$

1. [1 point] Write down $F(x)$ directly (not as a composition).

$$F(x) = g(h(x)) = g(4-x) = 2\sqrt{4-x} - 2$$

2. [1.5 points] What is the domain of $F(x)$?

for $\sqrt{4-x}$ to make sense, we need $4-x \geq 0 \Rightarrow 4 \geq x \Rightarrow x \in (-\infty, 4]$

so domain of $F(x)$ is $(-\infty, 4]$

3. [1.5 points] What is the range of $F(x)$?

$\sqrt{4-x}$ has range $[0, \infty)$ ie $\sqrt{4-x} \geq 0 \Rightarrow 2\sqrt{4-x} \geq 0$
 $\Rightarrow 2\sqrt{4-x} - 2 \geq -2$

so $2\sqrt{4-x} - 2$ can be any number ≥ -2 , ie, Range of $F(x) = \underline{\underline{[-2, \infty)}}$

4. [1.5 points] What is the y -intercept of $F(x)$? Plot this point on the graph below.

$$\text{if } x=0, F(0) = 2\sqrt{4-0} - 2 = 2\sqrt{4} - 2 = 2 \times 2 - 2 = 2$$

so y intercept is $(0, 2)$

5. [1.5 points] What is the x -intercept of $F(x)$? Plot this point on the graph below.

$$\text{if } y=0, 2\sqrt{4-x} - 2 = 0 \Rightarrow 2\sqrt{4-x} = 2 \Rightarrow \sqrt{4-x} = 1 \Rightarrow 4-x = 1$$

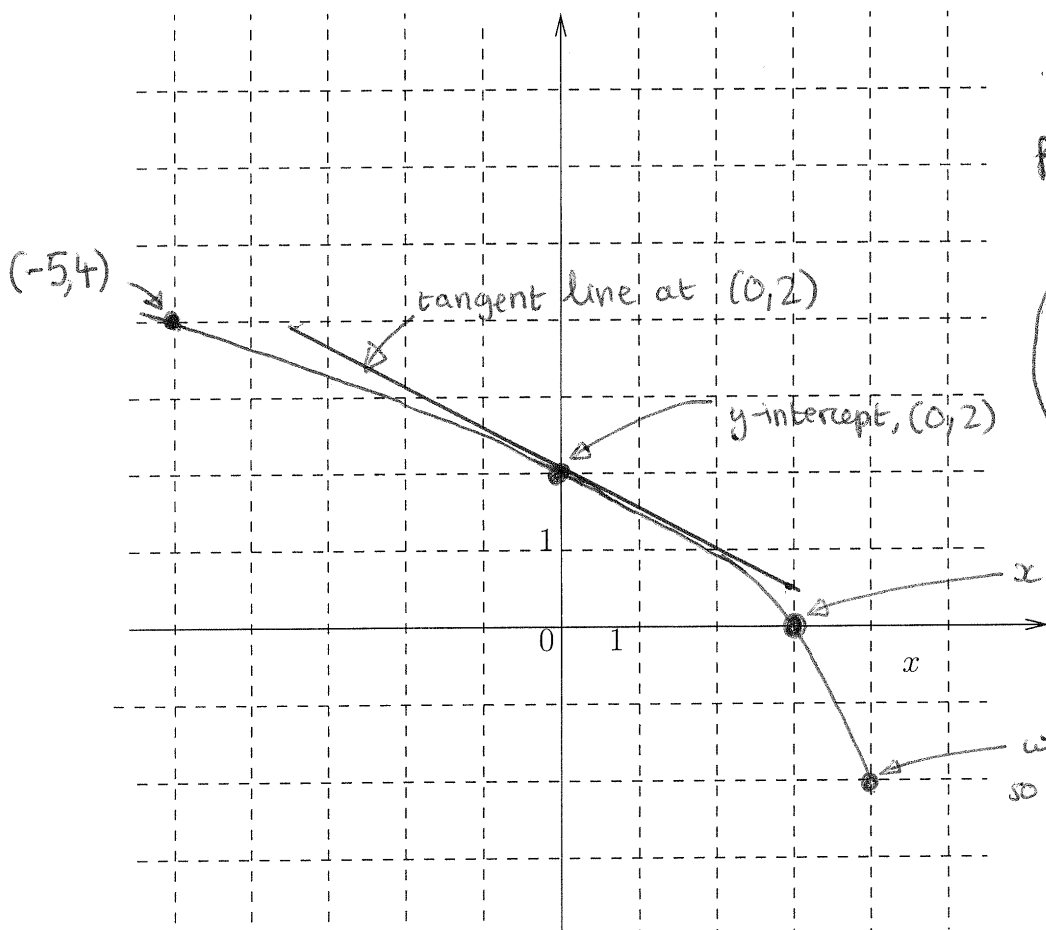
so x -intercept is $(3, 0)$

$$\Rightarrow 4 = 1+x \Rightarrow 3 = x$$

6. [2 points] Sketch the graph of $y = F(x)$ below. - plotted 4 "easy" points, and drawn graph through them.

7. [1 point] Draw the tangent to the curve at the point $(0, F(0))$.

$F(x)$



$$\text{if } x = -5, \\ F(-5) = 2\sqrt{9} - 2 = 2 \times 3 - 2 = 4$$

(Note graph looks like $\frac{1}{2}$ a parabola, reflected & translated)

x -intercept, $(3, 0)$

when $x = 4, F(4) = 2\sqrt{0} - 2 = -2$
so have a point at $(4, -2)$