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Name:

"A recall is worth a thousand repetitions"
-Dr. Wayne Iba

Collaborators:

Section Day/Time:

Exam 1 Practice Worksheet

1. Find an equation of the line that passes through the points on the graph $f(x) = x^2$ when $x = 3$ and $x = 5$. Write the equation in point-slope form.

$$m = \frac{f(3)-f(5)}{3-5} = \frac{9-25}{-2} = \frac{-16}{-2} = 8$$

$$\Rightarrow y - 3^2 = 8(x-3)$$

$$\boxed{\Rightarrow y - 9 = 8(x-3)}$$

OR

$$y - 5^2 = 8(x-5)$$

$$\boxed{= y - 25 = 8(x-5)}$$

2. The point $(5, 1)$ is on the graph of $f(x) = \sqrt{x-4}$.

a) Compute the slope of the secant line through $(5, 1)$ and the point that is on the graph of $f(x)$ at $x = 5.01$.

$$m = \frac{f(5.01) - f(5)}{5.01 - 5} = \frac{\sqrt{5.01-4} - 1}{0.01} = \boxed{0.4987}$$

b) Use this answer to guess the slope of the tangent line to $f(x)$ at the point $(5, 1)$.

Guess: $\boxed{m = 0.5}$

Check: How might you check this guess?

3. Evaluate the limit $\lim_{h\to 0} \frac{\sqrt{1+h}-1}{h}$.

$$\lim_{h\to 0} \frac{\sqrt{1+h}-1}{h} = \lim_{h\to 0} \frac{\sqrt{1+h}-1}{h} \cdot \frac{\sqrt{1+h}+1}{\sqrt{1+h}+1}$$

$$= \lim_{h\to 0} \frac{(1+h)-1^2}{h(\sqrt{1+h}+1)} = \lim_{h\to 0} \frac{h}{h(\sqrt{1+h}+1)}$$

$$= \lim_{h\to 0} \frac{1}{\sqrt{1+h}+1} = \frac{1}{\sqrt{1}+1} = \boxed{\frac{1}{2}}$$