

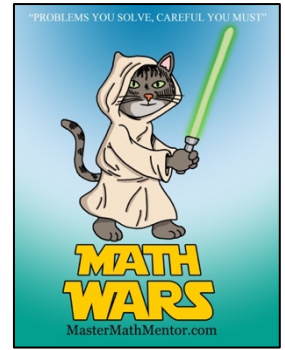
Math Wars – AB Calculus

Topic 110 – Linear Approximation



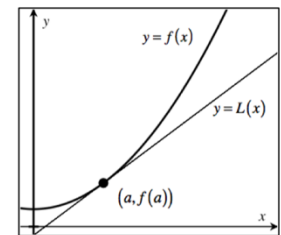
Maximum Time: 7.5 Minutes

Directions: To start, you need to download the Math Wars application on your cell phone: Use the QR code or the url: <https://mastermathmentor.com/mmm/mathwars.ashx?key=110>



When ready, start the timer and then solve the problems below, entering your choice, A, B, C, D and pressing **Submit** for each problem when you are sure of your answer. When complete, stop the timer. You will see problems you got correct in green and incorrect in red. You will receive a score based on how many problems you got right and your time. A perfect score is all problems correct using half the maximum time or less. You can text or email your friends with your results.

1. (1 pt) Suppose the line $y = L(x)$ is tangent to the curve $y = f(x)$ at $x = a$ as shown in the figure to the right. The equation for $L(x)$ is



- A. $L(x) = f(a) + f'(a)x$ B. $L(x) = f(a) + f'(a)(x - a)$
 C. $L(x) = f'(a)(x - a) - f(a)$ D. $L(x) = f'(a)x - f(a)$

2. (3 pts) If $f(-4) = 8$ and $f'(-4) = -8$, approximate the value of $f(-3.5)$

- A. 4 B. 12 C. 68 D. -52

3. (5 pts) If $f(x) = \frac{2x+6}{x-4}$, use the tangent line to f at $x = 3$ to approximate $f(\pi)$ with $\pi \approx \frac{22}{7}$

- A. $\frac{86}{7}$ B. -10 C. 8 D. -14

□

4. (7 pts) Use the linear approximation for $f(x) = \frac{1}{\sqrt{x}}$ to best approximate $\frac{1}{\sqrt{4.5}}$.

- A. $\frac{3}{8}$ B. $\frac{5}{8}$ C. $\frac{15}{32}$ D. $\frac{17}{32}$

5. (9 pts) For the tangent line to $f(x) = x^2 + 4x - 3$ at $x = 0$ to have an error of at most 0.1 in approximating $f(h)$, find the range of h .

- A. $|h| \leq 0.1$ B. $|h| \leq 0.01$ C. $|h| \leq 2$ D. $|h| \leq 0.316$