Your Name: Key + Rubric

Calculus I, Math 151-06, Quiz #9

1. **[10 points]** A ball is thrown straight upwards from a height of 20 meters at an unknown velocity. 2 seconds later, the ball reaches a maximum height. Assuming acceleration due to gravity is $-10\ m/s$, find that maximum height that the ball reaches.

2 pts: $a(t) = -10$

3 pts: $v(t) = -10t + c$ $\quad v(2) = 0$ $\quad -10(2) + c = 0$ $\quad -20 + c = 0$ $\quad c = 20$

$v(t) = -10t + 20$

3 pts: $h(t) = -5t^2 + 20t + d$ $\quad h(0) = 20$ $\quad -5(0)^2 + 20(0) + d = 20$ $\quad d = 20$

$h(t) = -5t^2 + 20t + 20$

max height $= h(2) = -5(2)^2 + 20(2) + 20 =$ **40 meters**

1 pt $\quad$ 1 pt

2. **[7 points]** Let $f(x) = 2x^2 - 10x + 10$. Using Newton's Method to approximate a root of f with an initial guess of $x_1 = 3$, find x_2 and x_3. You do not need to simplify x_3.

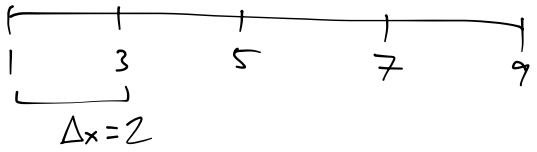
1 pt: $f'(x) = 4x - 10$

2 pts: $x_2 = x_1 - \frac{f(x_1)}{f'(x_1)} = 3 - \frac{f(3)}{f'(3)} = 3 - \frac{-2}{2} = 4$ 1 pt

2 pts: $x_3 = x_2 - \frac{f(x_2)}{f'(x_2)} = 4 - \frac{f(4)}{f'(4)} = 4 - \frac{2}{6} = \frac{11}{3}$

1 pt

3. **[8 points]** Find the approximation L_4 for the area under the curve $g(x) = \sqrt{2x+3}$ between $x = 1$ and $x = 9$. Simplify your answer.



$$L_4 = \underbrace{2}_{2\text{ pts}}\underbrace{(g(1)+g(3)+g(5)+g(7))}_{4\text{ pts}} = 2(\sqrt{5}+3+\sqrt{13}+\sqrt{17})$$

$$= \boxed{6+2\sqrt{5}+2\sqrt{13}+2\sqrt{17}}$$

2 pts