Warmup 1 Week of Aug 27th

1. If $f(t)$ represents the acceleration of a particle, then $\int_a^b f(t)dt$ represents?

1. The distance traveled in the time interval $a \leq t \leq b$
2. The average velocity over the interval $a \leq t \leq b$
3. The difference of the accelerations at $t = b$ and $t = a$
4. The average position over the interval $a \leq t \leq b$
5. The difference of the velocities at $t = b$ and $t = a$

2. The substitution rule (Theorem 6) is said to be "the chain rule backwards". Since the chain rule tells you how to differentiate $f(g(x))$, does the substitution rule tell you how to integrate $f(g(x))$?

1. Yes, $\int f(g(x))dx = F(g(x))$ if F is an antiderivative of f
2. Yes, you just have to divide by $g'(x)$: $\int f(g(x))dx = \frac{1}{g'(x)} \int f(u)du$
3. No, since $\frac{d}{dx} f(g(x)) = f'(g(x))g'(x)$ you can't get rid of $g'(x)$
4. Only if $g(x)$ is a power
5. Only if $g(x)$ is a sine or cosine

3.Is there an interpretation of $\int_a^b f(x)dx$ in terms of areas between curves?

1. It is the area between the graph of $f(x)$ and the x-axis between $x = a$ and $x = b$
2. It is the area between the graph of $f(x)$ and the y-axis between $y = f(a)$ and $y = f(b)$
3. It is the area between the graph of $|f(x)|$ and the x-axis between $x = a$ and $x = b$
4. Only if you have a formula for the integral of f
5. It is the difference of the area between the graph of $f^+(x)$ and the x-axis between $x = a$ and $x = b$ and the area between the graph of $f^-(x)$ and the x-axis between $x = a$ and $x = b$ (here $f^+(x)$ is the function equal to $f(x)$ when $f(x) \geq 0$ and 0 otherwise, and similarly $f^-(x) = f(x)$ when $f(x) \leq 0$ and 0 otherwise)

4. $\frac{d}{dx}(Arccscx) =$

1. $-\frac{1}{x^2\sqrt{1-1/x^2}}$
2. $\frac{1}{x^2\sqrt{1-1/x^2}}$