Week 2
MATH 34B
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8. Sketch a diagram showing the area the following integral represents on scratch paper, then use the formula for the area of a trapezoid to calculate the value.

$\int_0^a (4x + 5)dx$

14. What is the area under the graph of the function $f(t) = t^9 + t$ between $t = 0$ and $t = 1$?

16. Integrate:

    (a) $\int_0^1 (2x^4 + 3x^3 + 3x^2 + 2x + 3)dx$

    (b) $\int_1^2 (x+3)^2 dx$

    (c) $\int_0^1 (ax^2 + b)dx$

19. Consider the functions $f(x) = x^2$ and $g(x) = x^4$. Find the area of the region between f(x) and g(x) bounded on the left by the vertical line x=1 and on the right by x=4. (Hint: draw a diagram and subtract one area from another.)

27. Find a non-zero exponential function h(t) so that $h(t) = 8h(t)$. (Hint: Look back at the section on differentiating exponential functions.)

29. The temperature T of a cup of coffee is a function T(t) where t is the time in minutes. The room temperature is 15° Celsius. The rate at which the coffee cools down is proportional to the difference between the temperature of the coffee and the room temperature. Use this information to write a differential equation describing the derivative of the coffee temperature in terms of T and t. Use C as your proportionality constant. C should be a positive number. Write T instead of T(t).

39. The number of megawatts supplied by a power station at time t is $p(t) = 120 + t^2$ where t is measured in hours. During a 24 hour time interval $0 \leq t \leq 24$ what was the average wattage supplied?