

**Week-In-Review #12**

1. Integrate the following:

(a)  $\int(2x^3 - 4x + 3) dx$

(b)  $\int(\frac{1}{\sqrt{t}} - \sqrt[3]{t^4}) dt$

(c)  $\int(y^{1.4} - 5y^{3/2}) dy$

(d)  $\int(e^x + \frac{1}{x^2} - e^2) dx$

(e)  $\int(3\sqrt[5]{x} - ex + x^7) dx$

$$(f) \int [6t(t + 2)] dt$$

$$(g) \int \left( \frac{5z^4 + 6z - 2}{z^3} \right) dz$$

$$(h) \int (3x^2 \sqrt{x^3 + 6}) dx$$

$$(i) \int (8ye^{-2y^2+3}) dy$$

$$(j) \int \left( \frac{x-2}{2x^2-8x+6} \right) dx$$

$$(k) \int [t(t-8)^{100}] dt$$

$$(l) \int \left( \frac{1}{x \ln x} \right) dx$$

$$(m) \int \left( \frac{e^{2y}}{(e^{2y} + 3)^4} \right) dy$$

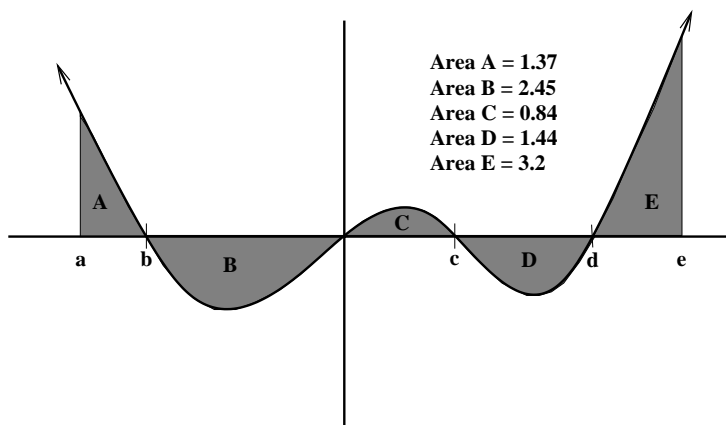
2. Find  $f(x)$  if  $f'(x) = \frac{2 - x^2}{x^4}$  and  $f(1) = 2$ .

3. Find  $y$  if  $\frac{dy}{dx} = 500 - 0.5e^x$  and  $y(0) = 2$ .

4. The monthly marginal revenue function for KNB Co. is given by  $MR(x) = 10 - 0.01x + \frac{150}{x+2}$  where  $x$  is the number of thousands of items produced and sold and  $MR(x)$  is measured in thousands of dollars per thousands of items. Find the revenue function for KNB Co.
5. A certain weed grows at the rate of  $0.5e^{0.1t}$  cm/day. If the weed is 6 cm tall after 2 days, how tall is the weed after  $t$  days?
6. The rate of change of sales of a brand new soup (in thousands per month) is given by  $R(t) = \sqrt{t} + 2$ , where  $t$  is the time in months that the new product has been on the market. Find the total sales after 9 months.

7. Approximate the area under the curve  $y = x^2 + 2$  and above the  $x$ -axis from  $x = 2$  to  $x = 4$ , with 4 rectangles, using
- (a) left hand sums.
  - (b) right hand sums.

8. Using the given graph of  $f(x)$ , calculate the following:



- (a)  $\int_a^b f(x) dx$   
 (b)  $\int_b^0 f(x) dx$   
 (c)  $\int_a^0 f(x) dx$   
 (d)  $\int_0^e f(x) dx$

9. Given  $\int_0^4 x dx = 8$ ,  $\int_0^4 x^2 dx = 64/3$  and  $\int_4^6 x^2 dx = 152/3$ , calculate the following:

(a)  $\int_0^4 2x^2 dx$

(b)  $\int_0^6 (-4x^2) dx$

(c)  $\int_0^4 (x^2 - 7x) dx$