MTH 142 - Spring 2004 - Section 7.0, or
What You are Supposed to Know from MTH 141 to Understand Chapter 7

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This handout is to help you be prepared for the material about to be learned in Section 7. Here are some problems that your instructor is expecting you to know how to solve from day 1:

1. Compute the following *indefinite integrals*:
   (a) $\int 2x^3 - 3\sqrt{x} + \frac{4}{x^2}\ dx$

   (b) $\int -5e^t + 3\cos(t) + 2\sin(t) + \frac{1}{t}\ dt$

2. Compute the following *definite integral*:
   (a) $\int_{-1}^{2} x - \frac{3}{2}x^3\ dx$,

   (b) $\int_{1}^{4} 5\sqrt{t}\ dt$

3. In Figure (1), $\int_1^5 f(t)dt$ equals (choose one):

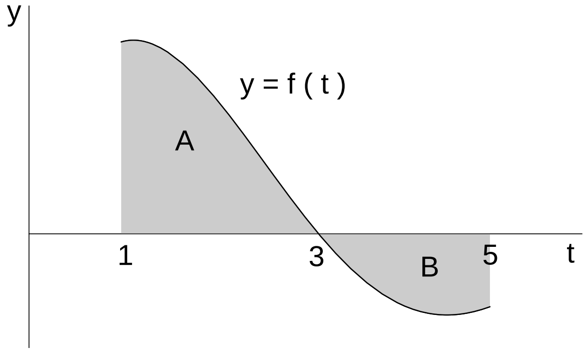
   (a) Area(A)+Area(B) (b) Area(A)-Area(B)

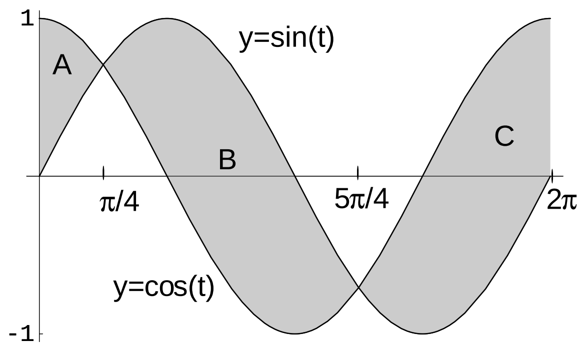
   (c) Area(A) $\cdot$ Area(B) (d) Area(A)/Area(B)

3. Refer to Figure (2) to express in terms of one or more integrals:
   (i) Area(A) $=$

   (ii) Area(B) $=$

   (iii) Area(C) $=$



Useful Formulas from MTH 141

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|---|---|
| [**1**.] $\int 1\,dt = t + C$ | [**5**.] $\int \sin t\,dt = -\cos t + C$ |
| [**2**.] $\int t\,dt = \frac{1}{2}t^2 + C$ | [**6**.] $\int \cos t\,dt = \sin t + C$ |
| [**3**.] $\int t^n\,dt = \frac{1}{n+1}t^{n+1} + C$ (for $n \neq -1$) | [**7**.] $\int e^t\,dt = e^t + C$ |
| [**4**.] $\int \frac{1}{t}\,dt = \ln\lvert t\rvert + C$ | [**8**.] $\int a^t\,dt = \frac{1}{\ln a}a^t + C$ |

| |
|---|
| [**9**.] $\int f(t) \pm g(t)\,dt = \int f(t)\,dt \pm \int g(t)\,dt$ |
| [**10**.] $\int k\,f(t)\,dt = k \int f(t)\,dt$ |

## The Fundamental Theorem of Calculus:

If $F(t)$ is an antiderivative of $f(t)$ on $a \leq t \leq b$, then

$$\int_a^b f(t)dt = F(t)\big|_a^b = F(b) - F(a)$$

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## Need to practice? Try this:

Read section 6.2, and work out some or all problems 42-78 in p. 272 of the text.