Reset Form

Topic: @EASE Demo DB 2 May 11, 2006
Subtopic: Various Question Types D. P. Story

Description: This is a test document for the **AcroTEX Test Bundle**. The document contains a variety of problems types that can be selected.

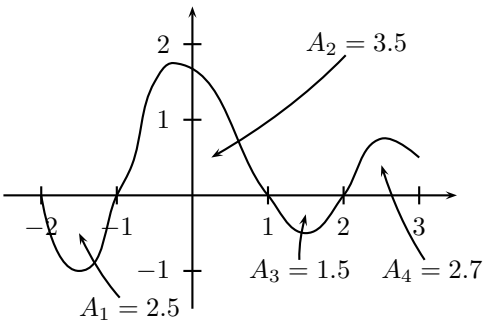
The next question has a figure drawn by pstricks. Immediately following the \ID is the \uses command where the packages that this question uses are listed in a comma-delimited list. The JavaScript of @EASE will search each problem for the \uses command, then read the list of packages needed. This packages will then be inserted into an array, when @EASE builds the exam, it will include the packages listed in the array (after removing duplicate packages).

☐ **1.** Consider the graph of the function f sketched to the right. Based on the given information on the areas of the various regions, calculate...

$$\int_{-2}^{3} f(x)\,dx = \boxed{}$$

and

$$\int_{-2}^{3} |f(x)|\,dx = \boxed{}$$



☐ **2.** Define a function by $h(x) = \int_{x^2}^{5} \sqrt{t^2+4}\,dt$. Calculate $h'(x)$.

$h'(x) =$ $\boxed{}$

☐ **3.** Determine the truth (T) or falsity (F) of each of the following statements. Enter a "T" or a "F" on the blank line to indicate your answer.

(a) _____ $\int cf(x)\,dx = c\int f(x)\,dx$, here c is a constant.

(b) _____ $\int xf(x)\,dx = x\int f(x)\,dx$

(c) _____ $\int \dfrac{x}{\cos(x)}\,dx = \dfrac{x^2}{2\sin(x)} + \mathbb{C}$

(d) _____ $\int_b^a f(x)\,dx = -\int_a^b f(x)\,dx$

☐ **4.** Solve each of the following elementary integrals.

(a) $\int_{-3}^{1} 3x^2 - 2x\,dx$

(b) $\int 6\sec(s)\tan(s)\,ds$

(c) $\int (3x^2+2)^2\,dx$

(d) $\int \dfrac{4x^2+1}{\sqrt{x}}\,dx$

☐ **5.** Let $f(x)$ be defined by $f(x) = \begin{cases} 2-2x & -2 \le x \le 0 \\ 4x^2 & 0 \le x \le 1 \end{cases}$. Calculate the following integral: $\int_{-2}^{1} f(x)\,dx$

☐ **6.** Solve each of the following integrals (possibly using the *Substitution Rule*).

(a) $\int_0^2 \sqrt{6x+4}\,dx$

(b) $\int \sec^2(\frac{6}{7}x)\,dx$

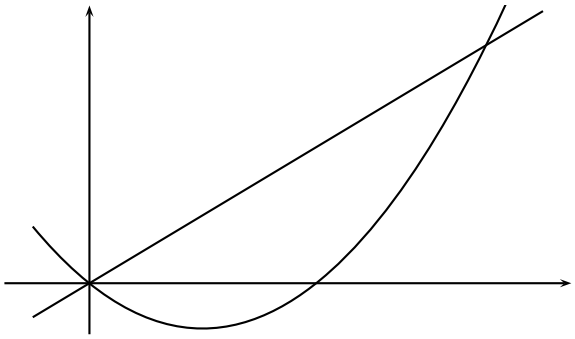
(c) $\int x^4(2-3x^5)^{1/3}\,dx$

(d) $\int \sin(x)\cos^5(x)\,dx$

7. Consider the region bounded by the curves $x = y^{3/2}$, $y = 4$, and the y-axis. The region is rotated about the y–axis, calculate the volume of this solid of revolution.

Here is another question that uses PSTricks. The `\uses` command is used to specify the packages required.

8. Consider the region bounded by the curves $y = x^2 - 4x$ and $y = 3x$. *Set up* the area integral for this region.



9. The base of a solid S is bounded by the x-axis, the line $y = 2x$ and the line $x = 2$. Each cross-section perpendicular to the x-axis is a *rectangle*. The base of each rectangle lies on the base of the solid and the height of the rectangle is twice that of the base. Find the volume of this solid S. (*Hint*: Read the description of the solid carefully, draw a picture of the base of the solid S, draw a typical cross-section, and compute the lengths of the sides of the rectangle as a function of x.)

This next DB element is enclosed in the `eqComments` environment **and** is itself enclosed between `\ID` and `\endID`. When content is enclosed in this way, the `eqComments` environment and its contents are selectable. This construct is suitable for inserting tables, charts, figures and pictures into an exam not associated with a particular problem. These are used as reference materials on the test. One could develop a DB document containing charts, (statistical) tables, etc., that are commonly used in your exams.

Recall: Use the following facts freely throughout the exam.

$$\frac{1}{1-x} = \sum_{n=0}^{\infty} x^n, \quad R = 1, \qquad \sin(x) = \sum_{n=0}^{\infty} \frac{(-1)^n}{(2n+1)\,!}\, x^{2n+1}, \quad R = \infty,$$

$$e^x = \sum_{n=0}^{\infty} \frac{1}{n\,!}\, x^n, \quad R = \infty, \qquad \cos(x) = \sum_{n=0}^{\infty} \frac{(-1)^n}{(2n)\,!}\, x^{2n}, \quad R = \infty$$