CALCULUS
The Integral Mean Value Theorem
NEW

0640-1. Find $\displaystyle\int_2^4 (8x^3 - 4x)\, dx$.

NEW

0640-2. Find $\displaystyle\fint_2^4 (8x^3 - 4x)\, dx$.

NEW

0640-3. Find the average value of $8x^3 - 4x$ on $2 \le x \le 4$.

NEW

0640-4. Find the average value of $5(8x^3 - 4x)$ on $2 \le x \le 4$.

NEW

0640-5. Find the average value of $5(8x^3 - 4x) + 9$ on $2 \le x \le 4$.

NEW

0640-6. Find the average value of
$$3e^{2x} - 4e^{x-1} \text{ on } 0 \le x \le 2.$$

0640-7. Find $\displaystyle\fint_{2}^{2+\pi} \sin^2 x \, dx$.

Hint: $\sin^2 x = \dfrac{1 - \cos(2x)}{2}$.

0640-8. Find $\displaystyle\fint_{3}^{3+(3\pi/7)} \sin^2(7x - 1) \, dx$.

0640-9. A metal cable is 7 feet long. We measure and find that, for any $x \in [0, 7]$, its density x feet from the left endpoint of the cable is $3x^5 + 2$ lbs/foot. Find the average density of the cable.

0640-10.
NEW
Suppose f is continuous and
$$\int_2^8 f(x)\,dx = -1.$$
What value *MUST* any such function f
attain on the interval $[2, 8]$?

0640-11.
NEW
A particle is traveling on a straight
line in a coordinate plane, with constant
velocity, and its position at time t is
$$(\quad 4t + 1 \quad, \quad 3t - 4 \quad)\qquad.$$

a. Find its distance to $(9, 2)$ at time $t = 1$.

b. Find its distance to $(9, 2)$
at an aribtrary time t.

c. Find its AVERAGE distance to $(9, 2)$
between time $t = 0$ and time $t = 7$.