CALCULUS
The Integral Mean Value Theorem
OLD2

0640-1. Find $\int_1^4 (6x^2 - 2x)\,dx$.
OLD2

0640-2. Find $\int_1^4 (6x^2 - 2x)\,dx$.
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0640-3. Find the average value of $6x^2 - 2x$ on $1 \leq x \leq 4$.
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0640-4. Find the average value of $3(6x^2 - 2x)$ on $1 \leq x \leq 4$.
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0640-5. Find the average value of $3(6x^2 - 2x) - 7$ on $1 \leq x \leq 4$.
OLD2

0640-6. Find the average value of $e^x + 2$ on $0 \le x \le 5$.
OLD2

0640-7. Find $\int_0^{2\pi} \cos^2 x \, dx$.
OLD2

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

0640-8. Find $\int_0^{2\pi/7} \cos^2(7x - 1) \, dx$.
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0640-9. A metal cable is 4 feet long. We measure and find that, for any $x \in [0, 4]$, its density x feet from the left endpoint of the cable is $4x^3 + 1$ lbs/foot. Find the average density of the cable.
OLD2

0640-10. Suppose f is continuous and
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$$\int_2^8 f(x)\,dx = 12.$$

What value *MUST* any such function f attain on the interval $[2, 8]$?

0640-11. A particle is traveling on a straight
OLD2 line in a coordinate plane, with constant velocity, and its position at time t is

$$(\quad 3t-1 \quad , \quad 4t-3 \quad) \qquad .$$

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

b. Find its distance to $(2, 1)$ at an aribtrary time t.

c. Find its AVERAGE distance to $(2, 1)$ between time $t = 0$ and time $t = 8$.