

AP CALCULUS I

F=Fun at home **I**=Incunabula **V**=Variety **E**=Endeavors **S**=Specimens

Friday, October 13

F #31 Evaluate the antiderivatives using the “Box Method”

$$\begin{array}{lll} 1. \int 28(7x-2)^{-5} dx & 2. \int x^3(x^4-1)^2 dx & 3. \int \frac{9r^2 dr}{\sqrt{1-r^3}} \\ 4. \int \sqrt{3-2s} ds & 5. \int 12(y^4+4y^2+1)^2(y^3+2y) dy & 6. \int (2x+1)^3 dx \\ 7. \int 3y\sqrt{7-3y^2} dy & 8. \int \frac{(1+\sqrt{x})^3}{\sqrt{x}} dx & \end{array}$$

I SAT sponges 49, 50

V p. 338 # 24

E 1. Learn the easy \square method for evaluating integrals (antiderivatives).
2. Learn a rule that makes doing some limit problems easier.

S 1. $\int (3x^2+4) dx$ 2. $\int \frac{x}{3x^2+4} dx$ 3. $\int \frac{x}{\sqrt{1-9x^2}} dx$ 4. $\int \frac{3x}{\sqrt{1+9x^2}} dx$
5. $\int xe^{x^2} dx$ 6. $\int \frac{x}{1+x^2} dx$ 7. $\int \frac{x}{1+x^2} dx$

Monday, October 16

F #32 p. 338 # 21, 22 31,35, 38, 41, 42, AND the following 3 problems:

$$1. \int \frac{dx}{\sqrt{1-4x^2}} \quad 2. \int \frac{dy}{y\sqrt{4y^2-1}} \quad 3. \int \frac{dx}{\sqrt{9-x^2}}$$

I SAT sponges 53, 54

V p. 338 # 40

E 1. Continue working on antidifferentiation. 2. Integrals that yield inverse trig functions.

S 1. $\int \frac{dx}{1+4x^2}$ 2. $\int e^{(\tan x)} \sec^2 x dx$ 3. $\int \frac{5 dx}{\sqrt{1-9x^2}}$ 4. $\int \frac{dx}{\sqrt{16-x^2}}$ 5. $\int \frac{dx}{7+x^2}$

Tuesday, October 17

F #33 p. 291 # 19,27-30 p. 338 # 53-59 odd, 58

I SAT sponges 55, 56

V p.338 #60 Show all work without a calculator.

E 1. Work with definite integrals.
2. Learn the Fundamental Theorem of Calculus – Part 2

S 1. $\int_1^2 (3x^4) dx$ 2. $\int_{\pi/2}^{3\pi/2} \cos x dx$ 3. $\int_2^1 \frac{dx}{x}$ 4. $\int_{-1}^0 \frac{3}{3x-2} dx$

Wednesday, October 18

F #34 Integrate the following nine problems:

$$\begin{array}{lll}
 1. \int \frac{x}{x+1} dx & 2. \int_{\sqrt{2}}^3 \frac{2x^3}{x^2-1} dx & 3. \int_0^{\frac{\pi}{4}} \frac{1+\sin x}{\cos^2 x} dx \\
 4. \int \frac{2\theta^3 - 7\theta^2 + 7\theta}{2\theta - 5} d\theta & 5. \int 3x\sqrt{2x+1} dx & 6. \int \frac{x^2 - 2x + 3}{x^2} dx \\
 7. \int \frac{2x^2 + 1}{x-1} dx & 8. \int \frac{dv}{v \ln v} & 9. \int \tan(2x-7) dx
 \end{array}$$

I SAT sponges 57,58

V $\int \cos^3 x \, dx$

E 1. Work with integrals where you have to divide before you integrate.

S 1. $\int \frac{3x-5}{x} dx$ 2. $\int \frac{x^2}{x-3} dx$ 3. $\int \frac{x}{x-3} dx$ 4. $\int \frac{4x^2-7}{2x+3} dx$ 5. $\int \frac{3x^2-7x}{3x+2} dx$
 6. $\int \frac{3x+2}{\sqrt{1-x^2}} dx$

Thursday, October 19

F #35 p. 327 #7,11,13,20,23 ALSO, FOR THE FOLLOWING, FIND THE FUNCTION, F(X) or y, THAT SATISFIES THE GIVEN CONDITION:

$$\begin{array}{ll}
 1. f'(x) = \sin x - \cos x \text{ and } f(0) = 3 & 2. \frac{dy}{dx} = \left(\frac{x^2 - 3x + 2}{x - 2} \right) \text{ and } y(-2) = 0 \\
 3. f'(x) = \left(\frac{x^2 - 3x + 1}{x} \right) \text{ and } f(e) = 1 & 4. \frac{dy}{dx} = \frac{-y \ln y}{1 + x^2} \text{ and } y(0) = e^2
 \end{array}$$

I SAT sponges 59, 60

V Does any function satisfy the following. The second derivative is 0 for all x, $\frac{dy}{dx} = 1$ when $x = 0$, and $x = 0$ when $y = 0$? Explain your answer.

E 1. Finding the constant, C, when more information is given. 2. Solving simple differential equations using the method of variables separable. 3. Solving initial-value problems.

S 1. If $f'(x) = 3x^2 + 2$ and $f(0) = 5$, then find $f(x)$. 2. Solve: $\frac{dy}{dx} = x^2y$

3. Find y: $\frac{dy}{dx} = 4y$ and $y = 4$ when $x=0$.

Friday, October 20

- F** #36 1. $\int \sin^2 2t dt$ 2. $\int \cos^2 3q dq$ 3. $\int_0^{\pi} \sin^2 x dx$
4. $\int \frac{\sec^2 2x dx}{1 + \tan 2x}$ 5. $\int \tan 3x dx$ 6. $\int \tan^2 4x dx$
7. $\int \cos^3 2x dx$ 8. $\int \sin^3 x dx$ 9. $\int (\cos^3 x)(\sin^2 x) dx$
10. $\int \frac{x^2 + x - 1}{x^2 - x} dx$ 11. $\int \frac{1}{x \ln x} dx$
12. If $f'(x) = 3x^2 - 2$ and if $f(2) = 14$, then $f(1) = ?$

- I** 1. Find the inverse function $f^{-1}(x)$ if $f(x) = \sqrt[5]{x} + 1$
2. Find $\lim_{h \rightarrow 0} \frac{(2+h)^3 - 8}{h}$

V $\int \cot^3 x dx =$

- E** 1. Integrate odd powers and 2nd powers of sines and cosines that don't have the correct children.

For odd powers: PEEL one of the sines or cosines, then substitute using:
 $\sin^2 x = 1 - \cos^2 x$ and $\cos^2 x = 1 - \sin^2 x$.

For even powers: Use the substitutions: $\sin^2 \square = \frac{1}{2}(1 - \cos 2\square)$ and $\cos^2 \square = \frac{1}{2}(1 + \cos 2\square)$

- S** 1. $\int \sin^3 x dx$ 2. $\int \sin^3 x \cos^2 x dx$ 3. $\int \cos^5 x dx$ 4. $\int \sin^2 x dx$

Monday, October 23

F #37 Worksheet #13 1-12

- I** 1. $r + 3 > 5$ Column A: $r + 2$ Column B: 4 What's bigger: A, B, equal, can't tell?
2. $6x - 2y < 0$ Column A: x Column B: 0 What's bigger: A, B, equal, can't tell

V p.297 #46

- E** 1. Review integration for upcoming test.

S Notes problems.

Tuesday, October 24

F #38 Worksheet #14 1–15

I 1. $\lim_{x \rightarrow 2} \frac{x^2 - 2}{4 - x^2}$ 2. $\lim_{x \rightarrow 0} \frac{e^x - 1}{x}$

V If $f(x)$ is a function whose derivative is constant, and if it contains the origin and thepoint $(4,20)$, then find $\int_0^3 f'(x) \, dx$.**E** 1. Review integration for upcoming easy test.**S** 1. What do the symbols $\forall, \exists, \ni, \varepsilon, \alpha, \beta, \delta, \phi, \theta, \rho, \Sigma$ mean? 2. Notes problems.**Wednesday, October 25**

F #39 Worksheet #15 1–13**I** SAT sponges 63, 64**V** Let $x > 0$. Suppose $\frac{d}{dx} f(x) = g(x)$ and $\frac{d}{dx} g(x) = f(\sqrt{x})$; then $\frac{d^2}{dx^2} f(x^2) =$ A) $f(x^4)$ B) $f(x^2)$ C) $2xg(x^2)$ D) $\frac{1}{2x} f(x)$ E) $2g(x^2) + 4x^2f(x)$ **E** 1. Review integration, variables separable, l'hôpital's rule, and other stuff for tomorrow's easy test.**S** Several problems for review.**Thursday, October 26**

F #40 Read p.474–477, especially Example 5. Do p.481 (11,47,49)**I** SAT sponges 65, 66**V** p. 330 # 68 (c)**E** **1. Take an easy multiple-choice test on integrals.**

2. Find the integral where the exponent has a variable ("special technique").

S 1. SUCCESS comes from your intense, dedicated preparation!!