Calc AB   Lesson 56   10/21/15

Agenda: 10/21/15
 HW leader: Period 3   Period 4
 Lesson 56
  More Integration by Guessing
 A Quiz 6 on Friday (lessons 46-56)

Ex. $\int \cos(3t)\,dt = \boxed{\frac{1}{3}\sin(3t) + C}$

Guess: $\sin(3t)$

Check: $\frac{d}{dt}(\sin(3t)) = \cos(3t) \cdot 3$

Guess: $\frac{1}{3}\sin(3t)$

Check: $\frac{d}{dt}\left(\frac{1}{3}\sin(3t)\right) = \frac{1}{3}\frac{d}{dt}(\sin(3t))$
$= \cos(3t)$

Ex. $\int x^3(4x^4 + 5)^2\,dx = \boxed{\frac{1}{48}(4x^4+5)^3 + C}$

Guess: $(4x^4+5)^3$

Check: $\frac{d}{dx}(4x^4+5)^3 = 3(4x^4+5)^2 \cdot 16x^3$

Guess: $\frac{1}{48}(4x^4+5)^3$

Check: $\frac{d}{dx}\left(\frac{1}{48}(4x^4+5)^3\right) = \frac{3}{48}(4x^4+5)^2 \cdot 16x^3$

x 56.3 $\int \frac{x^2\,dx}{\sqrt{x^3+1}} = \boxed{\frac{2}{3}\left(\sqrt{x^3+1}\right) + C}$

Guess: $\sqrt{x^3+1}$

Check: $\frac{d}{dx}\left(\sqrt{x^3+1}\right) = \frac{1}{2}(x^3+1)^{-1/2} \cdot 3x^2$

x. 56.6 $\int \frac{e^{\sqrt{x}}\,dx}{\sqrt{x}} = \boxed{2e^{\sqrt{x}} + C}$

Guess: $e^{\sqrt{x}}$ Check: $\frac{d}{dx}\left(e^{\sqrt{x}}\right) = e^{\sqrt{x}} \cdot \frac{1}{2}x^{-1/2}$

56.8 $\int \frac{\cos(ax)\,dx}{\sqrt{b+\sin(ax)}} = \boxed{\frac{2}{a}\sqrt{b+\sin(ax)} + C}$ Guess: $\sqrt{b+\sin(ax)}$

Check: $\frac{d}{dx}\left(\sqrt{b+\sin(ax)}\right) = \frac{1}{2}(b+\sin(ax))^{-1/2} \cdot \cos(ax) \cdot a$