Calc AB   Lesson 51

       lessons 51
          Integration by Guessing

1) Guess an antiderivative

2) Check by differentiating

Ex. $\int 5(x+2)^4 dx = \boxed{(x+2)^5 + C}$

     Guess: $(x+2)^5$ Check: $\frac{d}{dx}(x+2)^5 = 5(x+2)^4$ ✓

Ex. $\int 6\cos^5 t \sin t \, dt = \boxed{-\cos^6 t + C}$

     Guess: $-\cos^6 t$ Check: $\frac{d}{dt}(-\cos^6 t) = +6\cos^5 t \cdot \sin t$ ✓
     Fix

$\boxed{\text{Ex. 51.5}}$ $\int 8x(e^{4x^2}) dx = \boxed{e^{4x^2} + C}$

     Guess: e^{4x^2} Check: $\frac{d}{dx}(e^{4x^2}) = e^{4x^2} \cdot (8x)$ ✓

Ex. $\int 24x(2x^2+7)^5 dx = \boxed{(2x^2+7)^6 + C}$

     Guess: $(2x^2+7)^6$ Check: $\frac{d}{dx}(2x^2+7)^6 = 6(2x^2+7)^5 \cdot (4x)$ ✓

$\boxed{\text{Ex. 51.4}}$ $\int \frac{3x^2}{2\sqrt{x^3+4}} dx = \boxed{(x^3+4)^{1/2} + C}$

     Guess: $(x^3+4)^{1/2}$ check: $\frac{1}{2}(x^3+4)^{-1/2} \cdot (3x^2)$ ✓