4/20/2015 6.1

Page 418 Practice

Verify that F is an antiderivative of f.

Brady Bunch (group 1 to board)

1. $F(x) = \frac{1}{3}x^3 + 2x^2 - x + 2$; $f(x) = x^2 + 4x - 1$

$F'(x) =$

$F'(x) = x^2 + 4x - 1 = f(x)$

2. $f(x) = xe^x$

$f'(x)$

Warm up

$f'(x) = xe^x + e^x(1) = e^x(x+1)$

$f(x) = \pi$

$f'(x) =$

$f'(x) = 0$

Textbook

$F(x) = \pi e^x + \pi$; $f(x) = e^x(1+x)$

$F'(x) =$

$F'(x) = e^x + e^x(1) + 0 = e^x(x+1) = f(x)$

 4/20/2015 MON. Page 2

FIND THE INDEFINITE INTEGRAL

3. $\int 2\,dx =$

Rule 1 $2x + C$

4. $\int \sqrt{3}\,dx$

Rule 1 $\sqrt{3}\,x + C$

5. $\int (x^2 + x + x^{-3})\,dx =$

Rules 2 & 4

$= \left(\frac{1}{3}\right)x^3 + \left(\frac{1}{2}\right)x^2 + \left(\frac{1}{-2}\right)x^{-2} + C$

$= \left(\frac{1}{3}\right)x^3 + \left(\frac{1}{2}\right)x^2 - \frac{1}{2}x^{-2} + C$

6. warm up

simplify $\frac{2}{3} + 1$

$= \frac{2}{3} + \frac{3}{3} = \frac{5}{3}$

6. cont.

warm up Simplify $\frac{1}{\left(\frac{2}{3}+1\right)} =$

$= \frac{1}{\left(\frac{5}{3}\right)} = \frac{3}{5}$

problem $\int x^{(2/3)}\,dx =$

$= \frac{1}{\left(\frac{2}{3}+1\right)} x^{\left(\frac{2}{3}+1\right)} + C = \frac{3}{5}x^{5/3} + C$

7. $\int x^{-5/4}\,dx =$

$= \frac{1}{\left(-\frac{5}{4}+\frac{4}{4}\right)} x^{\left(-\frac{5}{4}+\frac{4}{4}\right)} = \frac{1}{\left(-\frac{1}{4}\right)} x^{-\frac{1}{4}} + C = -4x^{-\frac{1}{4}} + C$

$-4/x^{\frac{1}{4}} + C$

group 2 to board

8. $\int 3t^{-7}\,dt$

$$= 3\int t^{-7}\,dt = 3\left(\frac{1}{(-7+1)}\right)t^{-6} + C = -\frac{3}{6}t^{-6} + C$$

$$= \boxed{-\frac{1}{2}t^{-6} + C}$$

9. $\int 2u^{3/4}\,du$

$$= 2\int u^{3/4}\,du = 2\left(\frac{1}{(\frac{3}{4}+1)}\right)u^{7/4} + C$$

$$= 2\left(\frac{4}{7}\right)u^{7/4} + C$$

$$= \boxed{\frac{8}{7}u^{7/4} + C}$$

10. $\int (1 + x + e^x)\,dx$

$= \int 1\,dx + \int x\,dx + \int e^x\,dx$

$= x + \left(\frac{1}{2}\right)x^2 + e^x + C$

11. $\int \left(4x^3 + \frac{2}{x^2} - 1\right)dx$

$= \int 4x^3\,dx + \int 2x^{-2}\,dx - \int 1\,dx$

$= 4\left(\frac{1}{4}\right)x^4 + 2\left(\frac{1}{(-2+1)}x^{-1}\right) - x + C$

$= x^4 - 2\ln|x| - x + C$

last group to board

12. $\int 2x^5 dx$

$= 2\int x^5 dx = 2\left(\frac{1}{5+1}\right)x^6 + C$

$= 2\left(\frac{1}{6}\right)x^6 + C$

$= \left(\frac{1}{3}\right)x^6 + C$

13. $\int 3x^{-2/3} dx$

$= 3\int x^{-2/3} dx = 3\left(\frac{1}{\left(-\frac{2}{3}+1\right)}\right)x^{\left(-\frac{2}{3}+1\right)} + C$

$= 3\left(\frac{1}{\frac{1}{3}}\right)x^{1/3} + C$

$= 9x^{1/3} + C$

14. $\int (2 + x + 2x^2 + e^x)\,dx$

$= \int 2\,dx + \int x\,dx + 2\int x^2\,dx + \int e^x\,dx$

$= 2x + \left(\frac{1}{2}\right)x^2 + 2\left(\frac{1}{2+1}\right)x^{(2+1)} + e^x + C$

$= \boxed{2x + \frac{1}{2}x^2 + \frac{2}{3}x^3 + e^x + C}$

THE END