Activity B ∫ Name: Date: / /

Almost There AP Calculus 4.1 Antiderivatives

Grade 12

Find an antiderivative for each function. Choose the correct answer

Part 1

1. $\int (4x^5 - 6x^3 + 3x^2)\,dx =$

A) $\frac{2}{3}x^6 - \frac{3}{2}x^4 + x^3 + C$

B) $\frac{2}{3}x^6 - \frac{3}{2}x^4 + \frac{1}{3}x^3 + C$

C) $\frac{4}{6}x^6 - \frac{6}{4}x^4 + x^3 + C$

D) $\frac{2}{3}x^6 - 3x^4 + x^3 + C$

2. $\int (7x^4 + 5x^2 - 2x + 1)\,dx =$

A) $\frac{7}{5}x^5 + \frac{5}{3}x^3 - x^2 + x + C$

B) $\frac{7}{5}x^5 + \frac{5}{2}x^3 - x^2 + x + C$

C) $\frac{7}{5}x^5 + \frac{5}{3}x^3 - 2x^2 + x + C$

D) $\frac{7}{4}x^5 + \frac{5}{3}x^3 - x^2 + x + C$

Part 2

3. $\int e^{4x}\,dx =$

A) $\frac{1}{4}e^{4x} + C$

B) $4e^{4x} + C$

C) $e^{4x} + C$

D) $\ln(e^{4x}) + C$

4. $\int e^{5x+2}\,dx =$

A) $\frac{1}{5}e^{5x+2} + C$

B) $5e^{5x+2} + C$

C) $e^{5x+2} + C$

D) $\ln(e^{5x+2}) + C$

5. $\int \frac{6}{e^{4x}}\,dx =$

A) $-\frac{3}{2}e^{-4x} + C$

B) $\frac{6}{4}e^{-4x} + C$

C) $-6e^{-4x} + C$

D) $\frac{3}{2}e^{-4x} + C$

Part 3

6. $\int \cos(7x)\,dx =$

A) $\frac{1}{7}\sin(7x) + C$

B) $7\sin(7x) + C$

C) $-\frac{1}{7}\sin(7x) + C$

D) $\cos(7x) + C$

7. $\int (5\sin(4x) + 2\cos(6x))\,dx =$

A) $-\frac{5}{4}\cos(4x) + \frac{1}{3}\sin(6x) + C$

B) $\frac{5}{4}\cos(4x) + \frac{1}{3}\sin(6x) + C$

C) $-5\cos(4x) + 2\sin(6x) + C$

D) $-\frac{5}{4}\cos(4x) - \frac{1}{3}\sin(6x) + C$

Part 4

8. $\int \frac{4x}{x^2+9}\,dx =$

A) $2\ln|x^2+9| + C$

B) $4\ln|x^2+9| + C$

C) $\ln|x^2+9| + C$

D) $\frac{4}{x^2+9} + C$

9. $\int \frac{6x}{x^2-3}\,dx =$

A) $3\ln|x^2-3| + C$

B) $6\ln|x^2-3| + C$

C) $\ln|x^2-3| + C$

D) $\frac{6}{x^2-3} + C$

10. $\int \frac{2x}{x^2+10}\,dx =$

A) $\ln|x^2+10| + C$

B) $2\ln|x^2+10| + C$

C) $\frac{1}{2}\ln|x^2+10| + C$

D) $\frac{2}{x^2+10} + C$

Part 5

11. $\int \frac{6}{1+9x^2}\,dx =$

A) $2\tan^{-1}(3x) + C$

B) $6\tan^{-1}(x) + C$

C) $\tan^{-1}(3x) + C$

D) $\frac{1}{3}\tan^{-1}(3x) + C$

12. $\int \frac{4}{\sqrt{4-x^2}}\,dx =$

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

B) $4\sin^{-1}(x) + C$

C) $\sin^{-1}(2x) + C$

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

13. $\int \frac{5}{1+25x^2}\,dx =$

A) $\tan^{-1}(5x) + C$

B) $5\tan^{-1}(x) + C$

C) $\frac{1}{5}\tan^{-1}(5x) + C$

D) $\tan^{-1}(25x) + C$

Part 6

15. $\int (6x^{-4} + 2x^{1/3})\,dx =$

A) $-2x^{-3} + \frac{3}{2}x^{4/3} + C$

B) $-\frac{3}{2}x^{-3} + \frac{3}{4}x^{4/3} + C$

C) $-2x^{-3} + \frac{3}{4}x^{4/3} + C$

D) $-6x^{-3} + \frac{3}{4}x^{4/3} + C$

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

A) $\ln|x| + \frac{3}{5}x^5 + 2x^{-1} + C$

B) $\ln|x| + \frac{3}{5}x^5 - 2x^{-1} + C$

C) $\frac{1}{x} + \frac{3}{5}x^5 - 2x^{-1} + C$

D) $\ln|x| + 3x^5 - 2x^{-1} + C$

Prepared by : Murad Jawaada

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