

Return exams... questions?
 Unit 2 MMM
 Check Progress Book
 Retakes by next Friday. Let me know which one by tomorrow

17 MC 27 FR

$$\frac{10}{17}(50\%) + \frac{18}{27}(50\%) = \text{O}$$

- A 5
- B 4
- C 3 60%
- D 2
- F 1

find $f'(x)$ for each:

① $f(x) = x^2$

② $f(x) = x^2 + 3$

③ $f(x) = x^2 + e$

④ $f(x) = x^2 - \sqrt{7}$

$f'(x) = 2x$

Integration/Antidifferentiation

"inverse" of differentiation

Ex. $\int 2x dx = x^2 + C$
 ↑ constant of integration

Ex. $\int 3x^2 dx = x^3 + C$
 $\frac{3x^{2+1}}{3} \quad 3x^{3-2}$

Ex. $\int x^5 dx = \frac{x^{5+1}}{6} + C$
 $= \frac{1}{6}x^6 + C$

Examples - find the integral of each of the following:

1) $\int 7dx = 7x + C$

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

3) $\int x^{12} dx = \frac{x^{13}}{13} + C$

4) $\int (x^4 - x^2) dx$

5) $\int (t^3 + t + 1) dt$

6) $\int 3x^3 dx$

7) $\int (2x^2 - 7x - 8) dx$

8) $\int \left(\frac{3}{4}x^5 + \frac{5}{3}x^2 - \frac{x}{2} \right) dx$

9) $\int \left(\pi x + \frac{1}{\pi} \right) dx$

10) $\int \frac{1}{x^2} dx$

11) $\int \left(\frac{4}{x^3} - \frac{5}{x^4} \right) dx$

12) $\int \sqrt{x} dx$

13) $\int (2\sqrt[3]{y} - 4\sqrt[4]{y}) dy$

14) $\int \left(\frac{1}{\sqrt{x}} - x^{2/5} \right) dx$

15) $\int (x^5 + \sqrt{\pi}) dx$

④ $\int (x^4 - x^2) dx$

$= \frac{x^5}{5} - \frac{x^3}{3} + C$

⑤ $\int (t^3 + t + 1) dt$

$= \frac{t^4}{4} + \frac{t^2}{2} + t + C$

⑥ $\int 3x^3 dx = \frac{3x^4}{4} + C$

⑦ $\int (2x^2 - 7x - 8) dx$

$= \frac{2x^3}{3} - \frac{7x^2}{2} - 8x + C$

⑫ $\int x^{1/2} dx = \frac{x^{3/2}}{3/2} + C$

$= \frac{2x^{3/2}}{3} + C$

⑬ $\int (2y^{1/3} - 4y^{1/4}) dy$

$= \frac{2y^{4/3}}{4/3} - \frac{4y^{5/4}}{5/4} + C$

$= \frac{6y^{4/3}}{4} - \frac{16y^{5/4}}{5} + C$

$= \frac{3}{2}y^{4/3} - \frac{16}{5}y^{5/4} + C$

$$8) \int \left(\frac{3}{4}x^5 + \frac{5}{3}x^2 - \frac{1}{2}x \right) dx$$

$$= \frac{3}{4} \cdot \frac{x^6}{6} + \frac{5}{3} \cdot \frac{x^3}{3} - \frac{1}{2} \cdot \frac{x^2}{2} + C$$

$$= \frac{x^6}{8} + \frac{5x^3}{9} - \frac{x^2}{4} + C$$

$$9) \int \left(\pi x + \frac{1}{\pi} \right) dx$$

$$= \frac{\pi x^2}{2} + \frac{1}{\pi} \cdot x + C$$

$$= \frac{\pi}{2}x^2 + \frac{x}{\pi} + C$$

$$10) \int \frac{1}{x^2} dx = \int x^{-2} dx$$

$$= \frac{x^{-1}}{-1} + C$$

$$= -\frac{1}{x} + C$$

Check answer by taking derivative!

$$f(x) = -\frac{1}{x} + C$$

$$f'(x) = 1 \cdot x^{-2} + 0$$

$$= \frac{1}{x^2} \checkmark$$

$$\int (4x^{-3} - 5x^{-4}) dx$$

$$= \frac{4x^{-2}}{-2} - \frac{5x^{-3}}{-3} + C$$

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

$$1. \int -9 \, dx$$

$$2. \int -5x \, dx$$

$$3. \int (6+2x) \, dx$$

$$4. \int x^7 \, dx$$

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

$$6. \int (3x^3 - 4x^2) \, dx$$

$$7. \int \left(\frac{2}{3}x^5 - \frac{5}{2}x + \frac{1}{2} \right) dx$$

$$8. \int \left(\frac{3}{x^4} \right) dx$$

$$9. \int \left(2 - \frac{1}{x^5} + \frac{7}{x^3} \right) dx$$

$$10. \int 5\sqrt{x} \, dx$$

$$11. \int 5(\sqrt[5]{x}) \, dx$$

$$12. \int \left(x^{3/4} - \frac{1}{x^{3/4}} \right) dx$$