

PRACTICE CHOOSING A STRATEGY FOR INTEGRATION

0. $\int \frac{1}{(x-3)^2} dx$

1. $\int x^2 \ln x dx$

2. $\int \frac{\ln \sqrt{x}}{\sqrt{x}} dx$

3. $\int e^{2x} \cos x dx$

4. $\int \frac{x^3}{\sqrt{4+x^2}} dx$

5. $\int \frac{x}{\sqrt{4+x^2}} dx$

6. $\int \frac{x+1}{x^2+6x+5} dx$

7. $\int \frac{2x+6}{x^2+6x+5} dx$

8. $\int \frac{2x+6}{x^2+4} dx$

9. $\int \sin^4 x dx$

10. $\int \sin^5 x dx$

11. $\int \frac{x^2-1}{(x-1)} dx$

12. $\int \frac{x^3+3x+5}{(x+4)^2(x^2+9)} dx$

0. $u = x-3, \int (x-3)^{-2} dx = -(x-3)^{-1} + C$

1. INTEGRATION BY PARTS,
 $u = \ln x, dv = x^2 dx$

2. SUBSTITUTION, $u = \sqrt{x}, du = \frac{1}{2\sqrt{x}} dx$

3. INTEGRATION BY PARTS
TWICE (BOOMERANG)

4. TRIG SUBSTITUTION,
 $x = 2 \tan \theta$

5. u/du SUBSTITUTION, $u = 4+x^2$

6. PARTIAL FRACTIONS,

$$\frac{x}{x^2+6x+5} = \frac{A}{x+5} + \frac{B}{x+1}$$

7. u/du SUBSTITUTION, $u = x^2+6x+5$

8. BREAK IT UP:

$$\int \frac{2x}{x^2+4} dx \text{ with } u = x^2+4$$

$$\int \frac{6}{x^2+4} dx = \frac{6}{2} \arctan \frac{x}{2} + C$$

9. POWER-REDUCTION FORMULA,

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

10. $u = \cos x, du = -\sin x dx$

$$\sin^2 x = 1 - \cos^2 x$$

$$\int \sin^5 x dx = \int \sin^4 x \sin x dx$$

$$= \int (1-u^2)^2 du$$

11 Simplify and cancel

12. PARTIAL FRACTIONS

$$\frac{x^3+3x+5}{(x+4)^2(x^2+9)} = \frac{A}{x+4} + \frac{B}{(x+4)^2} + \frac{Cx+D}{x^2+9}$$

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