

Write your partial name right here: Key

AP Calculus BC: 10.2 Partial Fractions

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

$$\int \frac{-1/2}{(x+2)} + \frac{1/2}{(x-2)} dx$$

$$-\frac{1}{2} \ln|x+2| + \frac{1}{2} \ln|x-2|$$

$$\ln \left| \frac{1}{\sqrt{x+2}} \right| + \ln \left| \sqrt{x-2} \right|$$

$$\ln \left| \frac{\sqrt{x-2}}{\sqrt{x+2}} \right| + C$$

$$3. \int \frac{3x-7}{x^2+5x+4} dx = \int \frac{3x-7}{(x+4)(x+1)} dx$$

$$\int \frac{-19/3}{x+4} + \frac{-10/3}{x+1} dx$$

$$\frac{19}{3} \ln|x+4| - \frac{10}{3} \ln|x+1| + C$$

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

$$\int \frac{15}{x-2} + \frac{-13}{x-1} dx$$

$$15 \ln|x-2| - 13 \ln|x-1|$$

$$\ln \left| \frac{(x-2)^{15}}{(x-1)^{13}} \right| + C$$

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

$u = x-2$
 $du = dx$

$$4 \ln|x-1| + \int \frac{16}{u^2} du = 4 \ln|x-1| + \int 16u^{-2} du$$

$$4 \ln|x-1| - \frac{16}{u} + C = \boxed{4 \ln|x-1| - \frac{16}{x-2} + C}$$

Evaluate the area

$$5. \int_1^2 \frac{10x-11}{2x^2-x} dx = \int_1^2 \frac{10x-11}{x(2x-1)} dx = \int_1^2 \frac{11}{x} + \frac{-12}{2x-1} dx$$

$$\left[11 \ln|x| - 12 \ln|2x-1| \right]_1^2$$

$$(11 \ln|2| - 12 \ln|3|) - (11 \ln|1| - 12 \ln|1|)$$

$$11 \ln|2| - 12 \ln|3| - 11 \ln|1|$$

$$11 \ln \left| \frac{2}{1} \right| - 12 \ln|3| = 11 \ln|2| - 12 \ln|3|$$