

PRINT Your Name: _____

Quiz 9 — September 16, 2015

Remove everything from your desk except this page and a pencil or pen.

The solution will be posted soon after the quiz is given.

Circle your answer. **Show your work.** Your work must be correct and coherent. Check your answer.

Find $\int \frac{x-9}{(x+5)(x-2)} dx$.

Answer: We use the technique of partial fractions. We look for numbers A and B with

$$\frac{x-9}{(x+5)(x-2)} = \frac{A}{x+5} + \frac{B}{x-2}.$$

Multiply both sides by $(x+5)(x-2)$ to obtain

$$x-9 = A(x-2) + B(x+5)$$

Plug in $x = 2$ to see that $-7 = B7$. (In other words, $B = -1$.) Plug in $x = -5$ to see that $-14 = A(-7)$. (In other words, $2 = A$.) We think that

$$\frac{x-9}{(x+5)(x-2)} = \frac{2}{x+5} + \frac{-1}{x-2}.$$

We check this claim before going any further. The right side is

$$\frac{2(x-2) - (x+5)}{(x-2)(x+5)} = \frac{x-9}{(x-2)(x+5)},$$

as we expected. Now we integrate:

$$\int \frac{x-9}{(x+5)(x-2)} dx = \int \frac{2}{x+5} + \frac{-1}{x-2} dx = \boxed{2 \ln |x+5| - \ln |x-2| + C.}$$