Standard Derivative & Integral

Function | f(x)	Derivative | f'(x)	Integral | F(x)
1	0	$x + C$
x	1	$\frac{1}{2}x^2 + C$
$\frac{1}{x}$	$-\frac{1}{x^2}$	$\ln\lvert x\rvert + C$
$x^a\ with\ a\ \in\ \mathbb{R}$	ax^{a-1}	$\frac{x^{a+1}}{a+1} + C$
$\sin(x)$	$\cos(x)$	$-\cos(x) + C$
$\cos(x)$	$-\sin(x)$	$\sin(x) + C$
$\tan(x)$	$1 + \tan^2(x) = \frac{1}{\cos^2(x)}$	$-\ln\lvert\cos(x)\rvert + C$
$\cot(x)$	$-1 - \cot^2(x) = -\frac{1}{\sin^2(x)}$	$\ln(\sin(x)) + C$
e^x	e^x	$e^x + C$
a^x	$\ln(a) \cdot a^x$	$\frac{a^x}{\ln(a)} + C$
$\ln(x)$	$\frac{1}{x}$	$x\ln(x) - x + C$
$\log_a(x)$	$\frac{1}{x\ln(a)}$	$x\log_a(x) - \frac{x}{\ln(a)} + C$
$\arcsin(x)$	$\frac{1}{\sqrt{1-x^2}}$	$x\arcsin(x) + \sqrt{1-x^2} + C$
$\arccos(x)$	$-\frac{1}{\sqrt{1-x^2}}$	$x\arccos(x) - \sqrt{1-x^2} + C$
$\arctan(x)$	$\frac{1}{1+x^2}$	$x\arctan(x) - \frac{1}{2}\ln\left(1+x^2\right) + C$

Partial Fraction Decomposition

1. The fractions numerator needs to be of a lower polynomial degree than the denominator
2. Guess one of the Zeros with the values: $(-3, -2, -1, 1, 2, 3)$
3.

Horners Method

begin by guessing one of the zero points with the values: $(-3, -2, -1, 1, 2, 3)$

$$f(x) = 5x^3 - 8x^2 - 27x + 18 \rightarrow x = -2$$

factors before x go into table

$\downarrow$

5	-8	-27	18
	$5 \cdot (-2) = -10$	$-18 \cdot (-2) = 36$	$9 \cdot (-2) = -18$
5	$-8 + (-10) = -18$	$-27 + 36 = 9$	$18 + (-18) = 0$