

Write legibly. Show your work. Graph neatly. Use a ruler for all straight lines.

(1) Fill in the indefinite integral (anti-derivative) of each function. Don't forget the +C!

	Indefinite Integral / Anti-Derivative
example: $\int x^2 dx$	answer: $\int x^2 dx = \frac{x^3}{3} + C$
$\int a dx$ (where a is constant)	$\int a dx = ax + C$ ✓
$\int x^n dx$	$\int x^n dx = \frac{x^{n+1}}{n+1} + C$ ✓ For all n except n = <u>-1</u> ✓
$\int \sin(x) dx$	$\int \sin(x) dx = -\cos(x) + C$ ✓
$\int \cos(x) dx$	$\int \cos(x) dx = \sin(x) + C$ ✓
$\int \frac{1}{x} dx$	$\int \frac{1}{x} dx = \ln x + C$ ✓
$\int e^x dx$	$\int e^x dx = e^x + C$ ✓

Showing your work neatly, completely, and correctly, find each integral: Give exact answers!

(2) $\int_{-\frac{\pi}{3}}^0 \cos(x) dx$

$$= \sin(x) \Big|_{-\frac{\pi}{3}}^0 \quad \checkmark$$

$$= \sin(0) - \sin\left(-\frac{\pi}{3}\right) \quad \checkmark$$

$$= 0 - -\frac{\sqrt{3}}{2}$$

$$= \boxed{\frac{\sqrt{3}}{2}} \quad \checkmark$$

(3) $\int_1^5 \frac{1}{x^2} + \frac{1}{x} dx$

$$= \int_1^5 x^{-2} + \frac{1}{x} dx$$

$$= \left[\frac{x^{-1}}{-1} + \ln|x| \right]_1^5 \quad \checkmark$$

$$= \left[-\frac{1}{x} + \ln|x| \right]_1^5$$

$$= \left[-\frac{1}{5} + \ln(5) \right] - \left[-1 + \ln(1) \right]$$

$$= \boxed{\frac{4}{5} + \ln(5)} \quad \checkmark$$