

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Find the most general antiderivative.

1) $\int \left(\frac{1}{x^3} - x^3 - \frac{1}{2} \right) dx$

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

$= \frac{x^{-2}}{-2} - \frac{x^4}{4} - \frac{1}{2}x + C$

$= -\frac{1}{2x^2} - \frac{x^4}{4} - \frac{1}{2}x + C$

1) B

A) $\frac{1}{3x^4} - \frac{x^4}{4} - \frac{1}{2x} + C$

B) $\frac{-1}{2x^2} - \frac{x^4}{4} - \frac{x}{2} + C$

C) $-3x^2 - 3x^3 + C$

D) $\frac{1}{4x^4} - \frac{x^2}{2} + \frac{1}{4} + C$

2) $\int (-6 \cos t) dt$

$= -6 \int \cos t dt$

$= -6 \sin t + C$

2) C

A) $-\frac{\sin t}{6} + C$

B) $-\frac{6}{\sin t} + C$

C) $-6 \sin t + C$

D) $-6 \cos t + C$

3) $\int (-8 \sec^2 x) dx$

$= -8 \int \sec^2 x dx$

$= -8 \tan x + C$

3) B

A) $\frac{\tan x}{8} + C$

B) $-8 \tan x + C$

C) $-8 \cot x + C$

D) $8 \cot x + C$

Evaluate the integral.

4) $\int_0^{\pi/2} 25 \sin x dx$

$= 25 (-\cos x) \Big|_{x=0}^{x=\pi/2}$

$= -25 (\cos \pi/2 - \cos 0)$

$= -25 (0 - 1)$

$= 25$

4) D

A) -25

B) 0

C) 1

D) 25

$$\begin{aligned}
 5) \int_{-\pi/4}^{3\pi/4} 6 \sec \theta \tan \theta \, d\theta &= 6 \int_{-\pi/4}^{3\pi/4} \sec \theta \tan \theta \, d\theta \\
 &= 6 \sec \theta \Big|_{x=-\pi/4}^{x=3\pi/4} \\
 &= 6 \left[\sec \frac{3\pi}{4} + \sec \left(-\frac{\pi}{4}\right) \right] \\
 &= 6 \left[-\sqrt{2} - \sec \frac{\pi}{4} \right] \\
 &= 6 \left[-\sqrt{2} - \sqrt{2} \right] \\
 &= \boxed{-12\sqrt{2}}
 \end{aligned}$$

5) C

- A) $6\sqrt{2}$ B) 0 C) $-12\sqrt{2}$ D) $-6\sqrt{2}$

$$\begin{aligned}
 6) \int_{\pi/4}^{3\pi/4} 9 \csc^2 x \, dx &= 9 \int_{\pi/4}^{3\pi/4} \csc^2 x \, dx \\
 &= 9 (-\cot x) \Big|_{x=\pi/4}^{x=3\pi/4} \\
 &= -9 (\cot 3\pi/4 - \cot \pi/4) \\
 &= -9 (-1 - 1) \\
 &= \boxed{18}
 \end{aligned}$$

6) B

- A) -18 B) 18 C) 0 D) 9