

**1107.**  $\int_{\pi/6}^{\pi/2} \cot x \, dx =$

- A)
- $\ln \frac{1}{2}$
- B)
- $\ln 2$
- C)
- $\frac{1}{2}$
- D)
- $\ln(\sqrt{3} - 1)$
- E) None of these

**1108.**  $\int_{-2}^3 |x + 1| \, dx =$

- A)
- $\frac{5}{2}$
- B)
- $\frac{17}{2}$
- C)
- $\frac{9}{2}$
- D)
- $\frac{11}{2}$
- E)
- $\frac{13}{2}$

**1109.**  $\int_1^2 (3x - 2)^3 \, dx =$

- A)
- $\frac{16}{3}$
- B)
- $\frac{63}{4}$
- C)
- $\frac{13}{3}$
- D)
- $\frac{85}{4}$
- E) None of these

**1110.**  $\int_{\pi/4}^{\pi/2} \sin^3 \theta \cos \theta \, d\theta =$

- A)
- $\frac{3}{16}$
- B)
- $\frac{1}{8}$
- C)
- $-\frac{1}{8}$
- D)
- $-\frac{3}{16}$
- E)
- $\frac{3}{4}$

**1111.**  $\int_0^1 \frac{e^x}{(3 - e^x)^2} \, dx =$

- A)
- $3 \ln(e - 3)$
- B) 1      C)
- $\frac{1}{3 - e}$
- D)
- $\frac{e - 1}{2(3 - e)}$
- E)
- $\frac{e - 2}{3 - e}$

**1112.**  $\int_{-1}^0 e^{-x} \, dx =$

- A)
- $1 - e$
- B)
- $\frac{1 - e}{e}$
- C)
- $e - 1$
- D)
- $1 - \frac{1}{e}$
- E)
- $e + 1$

**1113.**  $\int_0^1 \frac{x}{x^2 + 1} \, dx =$

- A)
- $\frac{\pi}{4}$
- B)
- $\ln \sqrt{2}$
- C)
- $\frac{1}{2}(\ln 2 - 1)$
- D)
- $\frac{3}{2}$
- E)
- $\ln 2$

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Anyone who cannot cope with mathematics is not fully human. At best he is a tolerable subhuman who has learned to wear shoes, bathe, and not make messes in the house. —Robert A. Heinlein

**1114.** The acceleration of a particle moving along a straight line is given by  $a = 6t$ . If, when  $t = 0$  its velocity  $v = 1$  and its distance  $s = 3$ , then at any time  $t$  the position function is given by

- A)  $s = t^3 + 3t + 1$
- B)  $s = t^3 + 3$
- C)  $s = t^3 + t + 3$
- D)  $s = \frac{1}{3}t^3 + t + 3$
- E)  $s = \frac{1}{3}t^3 + \frac{1}{2}t^2 + 3$

**1115.** If the displacement of a particle on a line is given by  $s = 3 + (t - 2)^4$ , then the number of times the particle changes direction is

- A) 0
- B) 1
- C) 2
- D) 3
- E) None of these

**1116.**  $\int_0^{\pi/2} \cos^2 x \sin x \, dx =$

- A)  $-1$
- B)  $-\frac{1}{3}$
- C)  $0$
- D)  $\frac{1}{3}$
- E)  $1$

**1117.**  $\int_0^1 (3x^2 - 2x + 3) \, dx =$

- A)  $0$
- B)  $5$
- C)  $3$
- D)  $8$
- E) None of these

**1118.**  $\int_1^e \left(x - \frac{1}{2x}\right) \, dx =$

- A)  $\frac{1}{2}e^2$
- B)  $\frac{1}{2}e^2 + 1$
- C)  $\frac{1}{2}(e^2 + 1)$
- D)  $\frac{1}{2}(e^2 - 1)$
- E) None of these

**1119.**  $\int_0^1 (2 - 3x)^5 \, dx =$

- A)  $-\frac{1}{2}$
- B)  $\frac{1}{6}$
- C)  $\frac{1}{2}$
- D)  $-\frac{1}{18}$
- E) None of these

1.  $\int \sin 3\theta \, d\theta =$

- A)  $3 \cos 3\theta + C$
  - B)  $-3 \cos 3\theta + C$
  - C)  $-\cos 3\theta + C$
  - D)  $\frac{1}{3} \cos 3\theta + C$
  - E)  $-\frac{1}{3} \cos 3\theta + C$
- 

2.  $\int 3^{x^2} x \, dx =$

- A)  $\frac{3^{x^2+1}}{x^2+1} + C$
  - B)  $\frac{3^{x^2}}{\ln 9} + C$
  - C)  $3^{x^2} \ln 3 + C$
  - D)  $3^{x^3/3} + C$
  - E) None of these
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3. Let  $f(x)$  be defined as below. Evaluate  $\int_0^6 f(x) \, dx$ .

$$f(x) = \begin{cases} x & 0 < x \leq 2 \\ 1 & 2 < x \leq 4 \\ \frac{1}{2}x & 4 < x \leq 6 \end{cases}$$

- A) 5
- B) 6
- C) 7
- D) 8
- E) 9

4.  $\int_0^1 \frac{x}{x^2 + 1} dx =$

- A)  $\frac{\pi}{4}$
  - B)  $\ln \sqrt{2}$
  - C)  $\frac{1}{2}(\ln 2 - 1)$
  - D)  $\frac{3}{2}$
  - E)  $\ln 2$
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5. The average value of  $g(x) = (x - 3)^2$  in the interval  $[1, 3]$  is

- A) 2
  - B)  $\frac{2}{3}$
  - C)  $\frac{4}{3}$
  - D)  $\frac{8}{3}$
  - E) None of these
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6.  $\int_0^5 \frac{dx}{\sqrt{3x + 1}} =$

- A)  $\frac{1}{2}$
- B)  $\frac{2}{3}$
- C) 1
- D) 2
- E) 6