50. What is the average value of $3t^3 - t^2$ over the interval -1 ≤ t ≤ 2?

A. $\frac{11}{4}$ B. $\frac{7}{2}$ C. 8 D. $\frac{33}{4}$ E. 16

---

position - velocity - acceleration derivative anti-derivative

51. If the velocity of a particle moving along the x-axis is v(t) = 2t – 4 and if at t = 0 its position is 4, then at any time t its position x(t) is

A. $t^2 - 4$ B. $t^2 - 4t - 4$ C. $t^2 - 4t + 4$ D. $2t^2 - 4$ E. $2t^2 - 4t + 4$

---

52. The position of a particle moving along a straight line at any time t is given by $s(t) = t^2 + 4t + 4$. What is the acceleration of the particle when t = 4?

A. 0 B. 2 C. 4 D. 8 E. 12

---

53. A particle moves along the x-axis so that at any time t ≥ 0 its position is given by $x(t) = t^3 - 3t^2 - 9t + 1$. For what values of t is the particle at rest?

A. None B. 1 only C. 3 only D. 5 only E. 1 and 3

Area = $\int_{x_1}^{x_2}$ top - bottom dx Area = $\int_{y_1}^{y_2}$ right - left dy

54. Find the area of the region bounded by the parabolas $y = x^2$ and $y = 6x - x^2$.

A. 9 B. 27 C. 6 D. -9 E. -18

---

55. The base of a solid S is the region enclosed by the graph of $4x + 5y = 20$, the x-axis, and the y-axis. If the cross-sections of S perpendicular to the x-axis are semicircles, then the volume of S is Volume = $\int$ Area cross section

A. $\frac{5\pi}{4}$ B. $\frac{10\pi}{4}$ C. $\frac{50\pi}{4}$ D. $\frac{225\pi}{4}$ E. $\frac{425\pi}{4}$

$\pi \int_{x_1}^{x_2} R^2 dx$ or $\pi \int_{x_1}^{x_2} R^2 - r^2 dx$

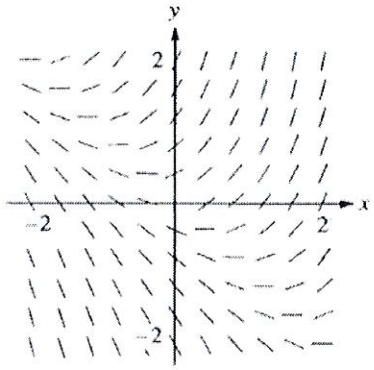
56. The volume of the solid that results when the area between the curve $y = e^x$ and the line y = 0, from x = 1 to x = 2, is revolved around the x-axis is

A. $2\pi(e^4 - e^2)$ B. $\frac{\pi}{2}(e^4 - e^2)$ C. $\frac{\pi}{2}(e^2 - e)$ D. $2\pi(e^2 - e)$ E. $2\pi e^2$

---

57. Which of the following is the solution to the differential equation $\frac{dy}{dx} = \frac{x^2}{y}$ with the initial condition y(3) = -2?

A. $y = 2e^{-9+x^3/3}$ B. $y = -2e^{-9+x^3/3}$ C. $y = -\sqrt{\frac{2x^3}{3} - 14}$ D. $y = \sqrt{\frac{2x^3}{3} - 14}$ E. $y = \sqrt{\frac{2x^3}{3}}$



58.

Shown above is a slope field for which of the following differential equations?

A. $\frac{dy}{dx} = 1 + x$ B. $\frac{dy}{dx} = x^2$ C. $\frac{dy}{dx} = x + y$ D. $\frac{dy}{dx} = \frac{x}{y}$ E. $\frac{dy}{dx} = \ln y$

---

t (sec)	0	2	4	6
$a(t)$ (ft/sec^2)	5	2	8	3

59.

The data for the acceleration a(t) of a car from 0 to 6 seconds are given in the table above. If the velocity at t = 0 is 11 feet per second, the approximate value of the velocity at t = 6, computed using a left-hand Riemann sum with three subintervals of equal length, is

A. 26 ft/sec B. 30 ft/sec C. 37 ft/sec D. 39 ft/sec D. 41 ft/sec

---

60. If $f(x) = g(x) + 7$ for $3 \le x \le 5$, then $\int_3^5 [f(x) + g(x)]dx =$

A. $2\int_3^5 g(x)dx + 7$ B. $2\int_3^5 g(x)dx + 28$ C. $\int_3^5 g(x)dx + 14$ D. $2\int_3^5 g(x)dx + 14$ E. $\int_3^5 g(x)dx + 7$