Total Distance/Total Amount/Position(Cartesian) - MC

80. Insects destroyed a crop at the rate of $\frac{100e^{-0.1t}}{2-e^{-3t}}$ tons per day, where time t is measured in days. To the nearest ton, how many tons did the insects destroy during the time interval $7 \le t \le 14$?

A) 125 B) 100 C) 88 D) 50 E) 12

82. The rate of change of the altitude of a hot-air balloon is given by $r(t) = t^3 - 4t^2 + 6$ for $0 \le t \le 8$. Which of the following expressions gives the change in altitude of the balloon during the time the altitude is decreasing?

A) $\int_{1.572}^{3.514} r(t)dt$

B) $\int_{0}^{8} r(t)dt$

C) $\int_{0}^{2.667} r(t)dt$

D) $\int_{1.572}^{3.514} r'(t)dt$

E) $\int_{0}^{2.667} r'(t)dt$

77. Water is pumped out of a lake at the rate $R(t) = 12\sqrt{\frac{t}{t+1}}$ cubic meters per minute, where t is measured in minutes. How much water is pumped from time t = 0 to t = 5?

A) 9.439 cubic meters

B) 10.954 cubic meters
C) 43.816 cubic meters
D) 47.193 cubic meters
E) 54.772 cubic meters

87. An object traveling in a straight line has position x(t) at time $t \geq 0$. If the initial position is x(0) = 2 and the velocity of the object is $v(t) = \sqrt[3]{1+t^2}$, what is the position of the object at time t = 3?

A) .431 B) 2.154 C) 4.512 D) 6.512 E) 17.408

89. A particle moves along a line so that its acceleration for $t \geq 0$ is given by $a(t) = \dfrac{t+3}{\sqrt{t^3+1}}$. If the particle's velocity at t = 0 is 5m, what is the velocity of the particle at t = 3?

A) 0.713 B) 1.134 C) 6.134 D) 6.710 E) 11.710

87. A particle moves along the x-axis so that at any time $t \geq 0$, its velocity is given by $v(t) = \cos(2 - t^2)$. The position of the particle is 3 at time t = 0. What is the position of the particle when its velocity is first equal to 0?

A) 0.411 B) 1.310 C) 2.816 D) 3.091 E) 3.411