Review Problems Lessons 29-36

Use the Trapezoidal Rule to approximate the integral $\int_1^4 e^{(x^2-1)}\ dx$ with 3 trapezoids.

57. **A**◯ $T_3 = 1 + e^3 + e^8 + e^{15}$

B◯ $T_3 = e^3 + e^8 + e^{15}$

C◯ $T_3 = \frac{1}{4} + \frac{1}{2}e^3 + \frac{1}{2}e^8 + \frac{1}{4}e^{15}$

D◯ $T_3 = e^3 + e^8 + \frac{1}{2}e^{15}$

E◯ $T_3 = \frac{1}{2} + 2e^3 + 2e^8 + 2e^{15}$

F◯ $T_3 = \frac{1}{2} + e^3 + e^8 + \frac{1}{2}e^{15}$

Given $\frac{dy}{dt} = -4y$ and $y(3) = 42$, find $y(5)$.

43. **A**◯ $42e^{-36}$

B◯ $42e^{-20}$

C◯ $42e^{32}$

D◯ $42e^{-8}$

E◯ $42e^{14}$

F◯ $42e^{12}$

Find the value of $R_{100} - L_{100}$, which is the difference of the right Riemann sum and the left Riemann sum using 100 rectangles to estimate the (signed) area under the function $f(x) = 7x$ on $[0, 10]$.

55. **A**◯ 8

B◯ 9

C◯ 6

D◯ 5

E◯ 10

F◯ 7

Given that $\int_1^8 f(x)\ dx = 3$, $\int_0^4 f(x)\ dx = -7$, and $\int_0^8 f(x)\ dx = 10$, find $\int_1^4 f(x)\ dx$.

24. **A**◯ -14

B◯ 0

C◯ -20

D◯ 6

E◯ -8

F◯ 10

Robot A and Robot B start moving at the same time and their velocity functions are $v_A(t) = t + 2$ feet per minute and $v_B(t) = 2t$ feet per minute respectively. Choose the correct statement below.

44. **A**◯ The two robots have the same displacement 1 minute after they start moving.

B◯ The two robots have the same displacement half a minute after they start moving.

C◯ The two robots have the same displacement 3 minutes after they start moving.

D◯ The two robots have the same displacement 4 minutes after they start moving.

E◯ The two robots have the same displacement 2 minutes after they start moving.

F◯ The two robots will never have the same displacement after they start moving.

A car is travelling at 60 mph. The acceleration of the car t seconds after the driver steps on the brake, before the car comes to a full stop, is $a(t) = -(t-3)^2$ mph per second. How fast is the car traveling 3 second after the brake is applied?

42. **A**◯ 35 mph

B◯ 49 mph

C◯ 39 mph

D◯ 51 mph

E◯ 46 mph

F◯ 55 mph

Use the left Riemann sum to approximate $\int_1^3 x^3 dx$ with four rectangles.

2. **A**◯ 10

B◯ 27

C◯ 54

D◯ 20

E◯ 14

F◯ 28

Suppose that the half life of some radioactive isotope is 50,000 years. If you start out with 2,500 grams of this radioactive isotope, how much will be left after 65,000 years? Round your answer to the nearest whole number.

20. **A**○ 994 grams

B○ 1005 grams

C○ 983 grams

D○ 1028 grams

E○ 1015 grams

F○ 920 grams

Compute the definite integral $\int_{\frac{\pi}{6}}^{\frac{\pi}{3}} (2\sec^2\theta + 3\theta)\, d\theta$.

37. **A**○ $\frac{3\sqrt{3}}{3} + \frac{\pi^2}{2}$

B○ $\frac{52\sqrt{3}}{27} + \frac{\pi^2}{2}$

C○ $\frac{4\sqrt{3}}{3} + \frac{\pi^2}{8}$

D○ $\frac{4\sqrt{3}}{3} + \frac{\pi^2}{4}$

E○ $\frac{3\sqrt{3}}{3} + \frac{\pi^2}{4}$

F○ $\frac{52\sqrt{3}}{27} + \frac{\pi^2}{8}$

Joe has invested \$50,000 in a fund which pays an annual interest of 8%, compounded continuously. He estimates that he can retire with \$200,000. How long will that take?

33. **A**○ 25.96 years

B○ 15.21 years

C○ 19.42 years

D○ 17.33 years

E○ 30.26 years

F○ 13.65 years

Find the signed area enclosed by the region bounded by the curves of

$$y = \frac{x + \sqrt[4]{x}}{\sqrt{x}},\ y = 0,\ x = 0 \text{ and } x = 16.$$

39. **A**○ $\frac{160}{3}$

B○ 120

C○ $\frac{156}{5}$

D○ $\frac{80}{3}$

E○ $\frac{21}{20}$

F○ 240

Compute $\int_{-\pi}^{1} (3x + \pi)\, dx$.

14. **A**○ $\frac{3}{2} + 2\pi + \frac{\pi^2}{2}$

B○ $\frac{3}{2} + 2\pi - \frac{\pi^2}{2}$

C○ $\frac{3}{2} + \pi + \frac{\pi^2}{2}$

D○ $\frac{3}{2}(1 + \pi^2)$

E○ $\frac{3}{2}(1 - \pi^2)$

F○ $\frac{3}{2} + \pi - \frac{\pi^2}{2}$