

Name _____

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

Use a finite sum to estimate the average value of the function on the given interval by partitioning the interval and evaluating the function at the midpoints of the subintervals.

1) $f(x) = 3|x|$ on $[-3, 3]$ divided into 4 subintervals

1) _____

A) $\frac{9}{2}$

B) 2

C) $\frac{27}{4}$

D) 18

Write the sum without sigma notation and evaluate it.

2) $\sum_{k=1}^4 \frac{k^2}{2}$

2) _____

A) $\frac{1^2}{2} + \frac{2^2}{2} + \frac{3^2}{2} + \frac{4^2}{2} = 15$

B) $\frac{1^2}{2} + \frac{2^2}{2} + \frac{3^2}{2} + \frac{4^2}{2} = \frac{15}{2}$

C) $\frac{1^2}{2} + \frac{4^2}{2} = \frac{17}{2}$

D) $\frac{1^2}{2} \cdot \frac{2^2}{2} \cdot \frac{3^2}{2} \cdot \frac{4^2}{2} = \frac{567}{16}$

Express the sum in sigma notation.

3) $3 + 6 + 9 + 12 + 15$

3) _____

A) $\sum_{k=1}^5 3(k+1)$

B) $\sum_{k=2}^5 3(k-1)$

C) $\sum_{k=1}^6 3k$

D) $\sum_{k=0}^4 3(k+1)$

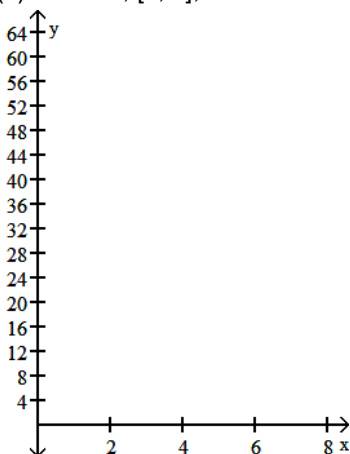
Graph the function $f(x)$ over the given interval. Partition the interval into 4 subintervals of equal length. Then add to

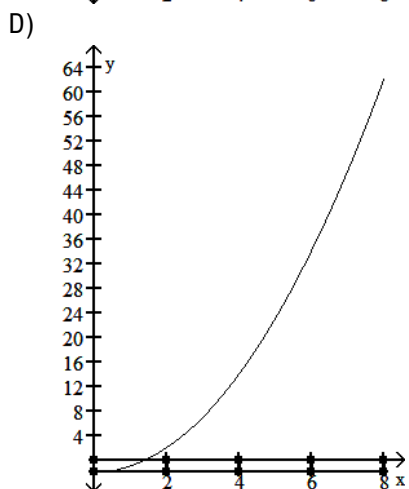
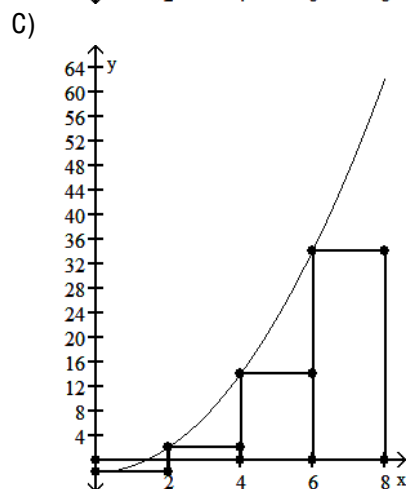
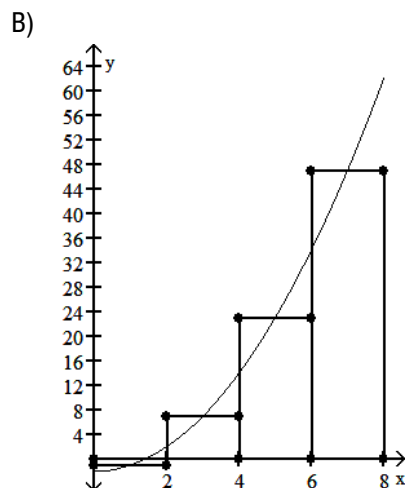
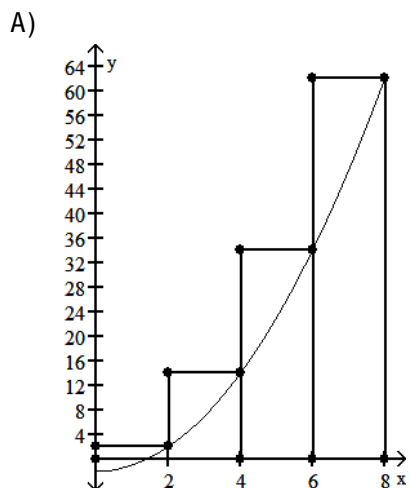
your sketch the rectangles associated with the Riemann sum $\sum_{k=1}^4 f(c_k) \Delta x_k$, using the indicated point in the k th

subinterval for c_k .

4) $f(x) = x^2 - 2$, $[0, 8]$, left-hand endpoint

4) _____





Express the limit as a definite integral.

5) $\lim_{\|P\| \rightarrow 0} \sum_{k=1}^n \frac{11}{4 - 11c_k^2} \Delta x_k$, where P is a partition of [7, 9]

5) _____

A) $\int_1^n \frac{11}{4 - 11x} dx$

B) $\int_7^9 \frac{11}{4 - 11x} dx$

C) $\int_7^9 \frac{11}{4 - 11x^2} dx$

D) $\int_9^7 \frac{11}{4 - 11x^2} dx$

Graph the integrand and use areas to evaluate the integral.

6) $\int_{-4}^2 (-2x + 4) dx$

6) _____

A) 72

B) 36

C) 12

D) 48

Evaluate the integral.

7) $\int_2^{\sqrt{14}} (z - \sqrt{14}) dz$

7) _____

A) $-9\sqrt{14}$

B) $-7\sqrt{14}$

C) $-9 + 2\sqrt{14}$

D) $-\sqrt{14}$

Use a definite integral to find an expression that represents the area of the region between the given curve and the x-axis on the interval $[0, b]$.

8) $y = 18\pi x^2$

A) $6\pi b^3$

B) $-6\pi b^3$

C) $36\pi b$

D) $-36\pi b$

8) _____

Find the average value of the function over the given interval.

9) $f(x) = 6 - |x|$ on $[-6, 6]$

A) 3

B) $\frac{3}{2}$

C) 6

D) 36

9) _____

Find the derivative.

10) $\frac{d}{dt} \int_0^{\sin t} \frac{1}{9 - u^2} du$

A) $\frac{1}{9 - \sin^2 t}$

B) $\frac{-\cos t}{9 - \sin^2 t}$

C) $\frac{\cos t}{9 - \sin^2 t}$

D) $\frac{1}{\cos t (9 - \sin^2 t)}$

10) _____

Solve the initial value problem.

11) $\frac{dy}{dx} = \sin(3x + \pi)$, $y(0) = 6$

A) $y = -\cos(3x + \pi) + 5$

B) $y = -\frac{1}{3}\cos(3x + \pi) + 6$

C) $y = 3\cos(3x + \pi) + 6$

D) $y = -\frac{1}{3}\cos(3x + \pi) + \frac{17}{3}$

11) _____

Evaluate the integral.

12) $\int \frac{1}{t^2} \sin\left(\frac{7}{t} + 5\right) dt$

A) $7\cos\left(\frac{7}{t} + 5\right) + C$

B) $-\cos\left(\frac{7}{t} + 5\right) + C$

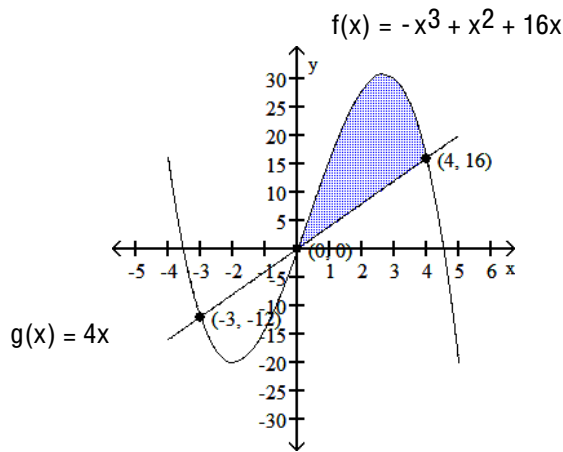
C) $\frac{1}{7}\cos\left(\frac{7}{t} + 5\right) + C$

D) $-\frac{1}{7}\cos\left(\frac{7}{t} + 5\right) + C$

12) _____

Find the area of the shaded region.

13)



13) _____

A) $-\frac{343}{12}$

B) $\frac{937}{12}$

C) $\frac{343}{12}$

D) $\frac{1153}{12}$

Find the area enclosed by the given curves.

14) Find the area of the region in the first quadrant bounded by the line $y = 8x$, the line $x = 1$, the curve $y = \frac{1}{\sqrt{x}}$, and the x-axis.

14) _____

A) $\frac{5}{4}$

B) $\frac{3}{4}$

C) $\frac{3}{2}$

D) 6

Find the volume of the described solid.

15) The base of a solid is the region between the curve $y = 3\cos x$ and the x-axis from $x = 0$ to $x = \pi/2$. The cross sections perpendicular to the x-axis are squares with bases running from the x-axis to the curve.

15) _____

A) 2π

B) $\frac{9}{2}\pi$

C) $\frac{3}{2}\pi$

D) $\frac{9}{4}\pi$

Find the volume of the solid generated by revolving the region bounded by the given lines and curves about the x-axis.

16) $y = x^2 + 3$, $y = 3x + 3$

16) _____

A) 27π

B) $\frac{297}{5}\pi$

C) $\frac{513}{5}\pi$

D) $\frac{297}{10}\pi$

17) $y = x + 2$, $y = 0$, $x = -2$, $x = 2$

17) _____

A) 16π

B) $\frac{64}{3}\pi$

C) 6π

D) 2π

Solve the problem.

18) Suppose that f and g are continuous and that $\int_4^8 f(x) dx = -5$ and $\int_4^8 g(x) dx = 10$.

18) _____

Find $\int_4^8 [2f(x) + g(x)] dx$.

A) 10

B) 15

C) 0

D) 12

Provide an appropriate response.

19) What definite integral is represented by $\lim_{n \rightarrow \infty} \sum_{i=1}^n \left(\frac{4i}{n}\right)^2 \frac{4}{n}$? Use the Fundamental Theorem to 19) _____

evaluate the integral.

A) $\int_0^1 4x^2 dx = \frac{4}{3}$

B) $\int_1^4 x^2 dx = 21$

C) $\int_0^4 x^2 dx = \frac{64}{3}$

D) $\int_0^4 x^3 dx = 64$

Evaluate the integral using the given substitution.

20) $\int 6(y^6 + 5y^3 + 5)^3(2y^5 + 5y^2) dy$, $u = y^6 + 5y^3 + 5$ 20) _____

A) $\frac{1}{2}(y^6 + 5y^3 + 5)^4 + C$

B) $\frac{3}{2}(y^6 + 5y^3 + 5)^4 + C$

C) $6(y^6 + 5y^3 + 5)^2 + C$

D) $\frac{3}{2}(y^6 + 5y^3 + 5)^4(10y^4 + 10y) + C$