AP Calculus

Chapter 5 Multiple Choice Review/Practice Name: ______________________________

DO NOT USE Calculator unless the problems notes calc required!

1. Using the substitution *u = 2x + 1,* $\int_0^1 \sqrt[3]{2x+1}\ dx$ is equivalent to:

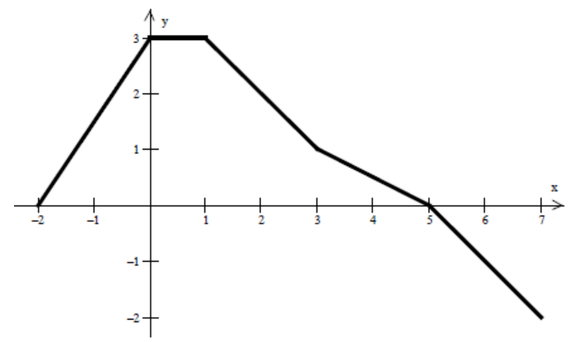
a) $\int_0^1 \sqrt[3]{u}\ du$ b) $2\int_0^1 \sqrt[3]{u}\ du$ c) $\frac{1}{2}\int_0^1 \sqrt[3]{u}\ du$ d) $\int_1^3 \sqrt[3]{u}\ du$ e) $\frac{1}{2}\int_1^3 \sqrt[3]{u}\ du$

2. $\frac{d}{dx}\left(\int_4^{x^2} \sin(t^3)\ dt\right) =$

a) $\sin x^2$ b) $-\cos x^6$ c) $2x\sin x^6$ d) $2x\sin x^3$ d) $2x\cos x^6$

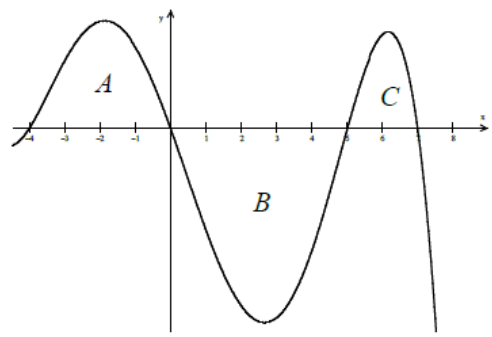
3. The graph of *f′* the derivative of f is shown. If *f(1) = -4,* then *f(7) =*

a) -4 b) -1 c) 0 d) 1 e) 9



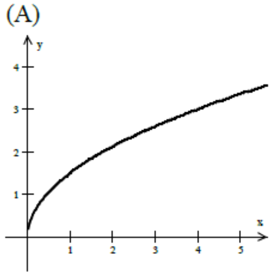
4. The regions A, B and C in the figure are bounded by the graph of the function *f* and the x-axis. The areas of regions A, B and C are 12, 25 and 3 respectively. What is the value of $\int_{-4}^{7} (f(x)+3)dx$?

a) -10 b) 10 c) 23 d) 33

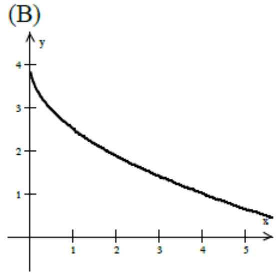


5. If a trapezoidal sum **under** approximates $\int_0^5 f(x)dx$, and a **RIGHT** Riemann sum **over** approximates $\int_0^5 f(x)dx$, which of the following could be the graph of *y = f(x)*?

(A)



(B)



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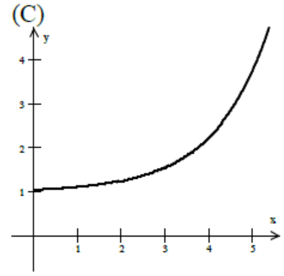

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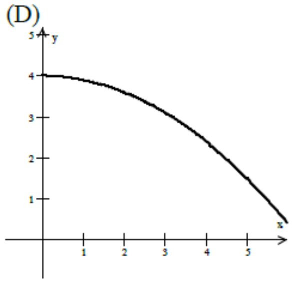
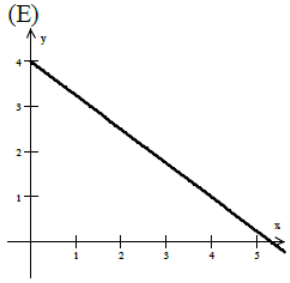


(E)



6. A particle moves along the x-axis so that at any time t > 0, its acceleration is given by $a(t) = \sqrt{2t - 1}$. If the velocity of the particle at t = 1 is $6\frac{1}{3}$ m/s, find the velocity of the particle at t = 5.

a) 4 b) 5 c) 6 d) 10 e) 15

7. Let h be the function given by $h(x) = \int_0^x (t^2 - 3t - 40)dt$. On which of the following intervals is h decreasing?

a) $5 \le x \le 8$ b) $-8 \le x \le -5$ c) $-8 \le x \le 5$ d) $-5 \le x \le 8$ e) $-3 \le x \le 10$

8. $\int \frac{1}{x^4} dx =$ a) $-\frac{1}{5x^5} + C$ b) $-\frac{1}{3x^3} + C$ c) $\frac{1}{3x^3} + C$ d) $\frac{1}{5x^5} + C$ e) $-\frac{x^5}{5} + C$

9. $\int(\sin(4x) + \cos(4x))dx =$

a) $-4\sin(4x) + 4\cos(4x) + C$ b) $4\sin(4x) - 4\cos(4x) + C$ c) $-\frac{1}{4}\sin(4x) + \frac{1}{4}\cos(4x) + C$

d) $\frac{1}{4}\sin(4x) - \frac{1}{4}\cos(4x) + C$ e) $\frac{1}{4}\sin(4x) + \frac{1}{4}\cos(4x) + C$

10. The rate at which customers arrive at a counter to be served is modeled by the function *F* defined by $F(t) = 12 + 6\cos(\frac{t}{\pi})$ for $0 \le t \le 60$, where *F(t)* is measured in customers per minute and *t* is measured in minutes. To the nearest whole number, how many customers arrive at the counter over the 60-minute period?
***Calculator Required**

a) 720 b) 725 c) 732 d) 744 e) 756

11. A particle moves along the x-axis with a velocity given by *v(t) = 2 + sin t*. When t = 0 the particle is at x = -2. Where is the particle when t = π?

a) π b) 2 π c) π – 1 d) π – 2 e) π + 1

12. Evaluate: $\int_{-1}^{0} \frac{x^2}{\sqrt[3]{2x^3+1}} dx$

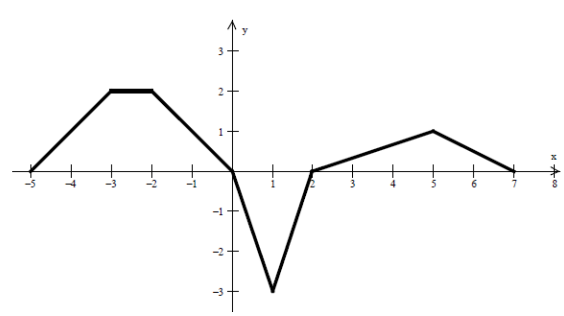
a) $\frac{-5}{12}$ b) $\frac{4}{15}$ c) 0 d) $\frac{5}{12}$ e) Not integrable on $-1 \le x \le 0$

13. If $\int_{-2}^{5} f(x)dx = -12$ and $\int_{8}^{-2} f(x)dx = 4$, what is the value of $\int_{5}^{8} f(x)dx$?

a) -16 b) -8 c) 0 d) 4 e) 8

14. The graph of the piecewise linear function *f* is shown.
If $g(x) = \int_{-2}^{x} f(t)dt$, which of the following values is the greatest?

a) g(-4) b) g(-2) c) g(0) d) g(5) e) g(7)



15. The graph of the function *f* is shown for $0 \le x \le 5$. Which of the following has the least value?

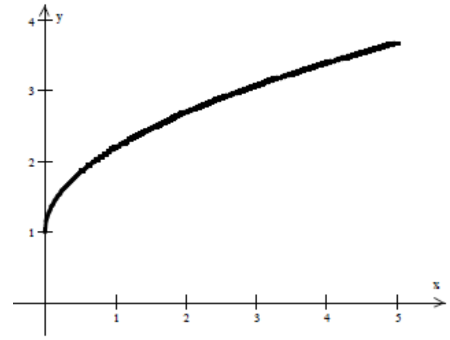
a) $\int_1^5 f(x)dx$

b) Left Riemann sum approximation of $\int_1^5 f(x)dx$ with 4 subintervals of equal length

c) Right Riemann sum approximation of $\int_1^5 f(x)dx$ with 4 subintervals of equal length

d) Midpoint Riemann sum approximation of $\int_1^5 f(x)dx$ with 4 subintervals of equal length

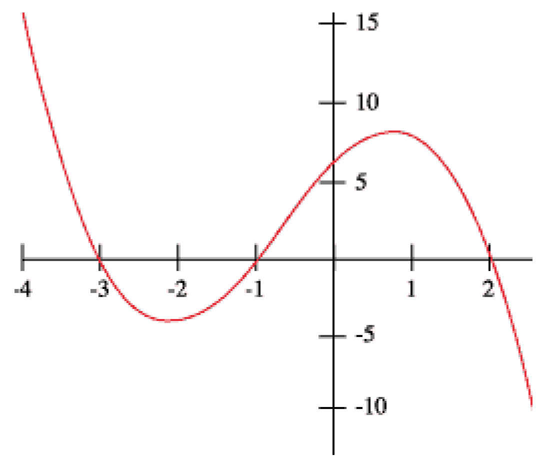
e) Trapezoidal sum approximation of $\int_1^5 f(x)dx$ with 4 subintervals of equal length



16. The graph of the function *f* shown has horizontal tangents at x = 1 and x = -2. It also has zero's at x = -3, x = -1 and x = 2. Let *g* be the function defined by $g(x) = \int_0^x f(t)dt$. For what values of x does the graph of *g* have a point of inflection?

a) -2 only c) 1 only e) -2 and 1

b) -1 only d) 2 only f) -3, -1 and 2



17. The table gives values of a function *f* and its derivative at selected values of *x*. If *f′* is continuous on the interval [-6, -1], what is the value of $\int_{-4}^{-2} f'(x)dx$?

a) -19 b) -10 c) 0 d) 1 e) 9

x	-6	-4	-2	-1
f(x)	8	9	10	11
f′(x)	-2	-5	-9	-1

18. If $\int_a^b f(x)dx = 2a - 3b$, then $\int_a^b (f(x) + 3)dx =$

a) 2a – 3b + 3 b) 3b – 3a c) –a d) 5a – 6b e) a – 6b

19. If $\int_1^3 f(x)dx = p \; and \; \int_1^7 f(x)dx = -4$, what is the value of $\int_7^3 (x + f(x))dx$?

a) *p* + 4 b) *p* – 4 c) 16 – *p* d) -16 – *p* e) -16 + *p*

20. Find $\int_0^2 3x^2 f(x^3)dx \; if \; \int_0^8 f(t)dt = k$

a) k^3 b) 9*k* c) 3*k* d) *k* e) $\frac{k}{3}$