

# Sample Documents

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## AP Calculus (APC)

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AP Calculus  
Practice Exam

Name \_\_\_\_\_

Date \_\_\_\_\_

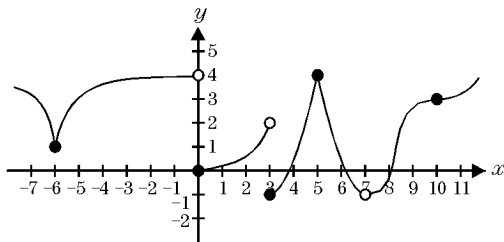
ID # \_\_\_\_\_

Score \_\_\_\_/\_\_\_\_

Solve each of the following problems then indicate which is the best choice by blackening the corresponding circle.

1. Given the parametric equations  $x = 2 \cos^3 t$  and  $y = 2 \sin^3 t$ , find  $\frac{d^2y}{dx^2}$ . 1. (A) (B) (C) (D) (E)
- (A)  $\frac{2}{3} \cos^4 t \sin t$       (B)  $\frac{2}{3} \cos^3 t \sin t$       (C)  $\frac{2}{3} \cos t \sin^4 t$   
 (D)  $\frac{8}{3} \cos^4 t \sin t$       (E)  $\frac{1}{3} \cos^4 t \sin t$
- 

This figure shows the graph of  $f$ . Use this figure to answer the following question(s).



2.  $\lim_{x \rightarrow 3^-} f$  is 2. (A) (B) (C) (D) (E)
- (A) 1      (B) 3      (C) 2      (D) 0  
 (E) no limit
- 

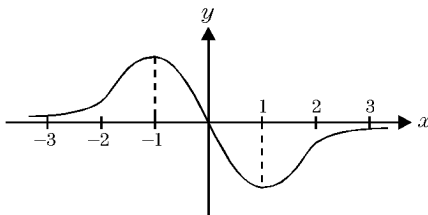
3. If  $f(x) = \sqrt{4 + e^{2x}}$ , then  $f'(x) =$  3. (A) (B) (C) (D) (E)
- (A)  $\frac{e^{2x}}{\sqrt{4 + e^{2x}}}$       (B)  $e^x$       (C)  $\frac{1}{\sqrt{4 + e^{2x}}}$   
 (D)  $\frac{1}{2\sqrt{2e^{2x}}}$       (E)  $\frac{xe^{2x-1}}{\sqrt{4 + e^{2x}}}$
- 

4. Integrate:  $\int \frac{4 + 5x^{3/2}}{\sqrt{x}} dx$  4. (A) (B) (C) (D) (E)
- (A)  $2\sqrt{x} + \frac{5}{2}x^2 + C$       (B)  $-2x^{-3/2} + 5 + C$       (C)  $8\sqrt{x} + \frac{5}{2}x^2 + C$   
 (D)  $2x^{-3/2} + \frac{5}{2}x^2 + C$       (E)  $4x^{-1/2} + 5x + C$
-

5. The figure shows the graph of  $f'$ , the derivative of the function  $f$ . The domain of the function  $f$  is  $-10 \leq x \leq 10$ . For what value(s) is the graph of  $f$  concave downwards?

5. (A) (B) (C) (D) (E)

- (A)  $-3 < x < 3$       (B)  $0 < x < 3$   
 (C)  $-1 < x < 1$       (D)  $\emptyset$   
 (E)  $-3 < x < 0$



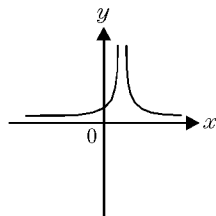
6. Find the area of the region bounded by the graphs of  $f(x) = 6x - x^2$  and  $g(x) = x^2 - 2x$ .

6. (A) (B) (C) (D) (E)

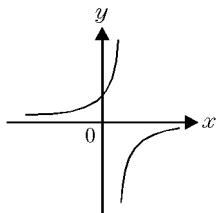
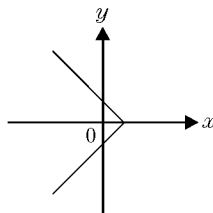
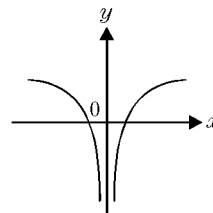
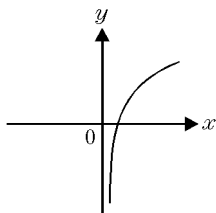
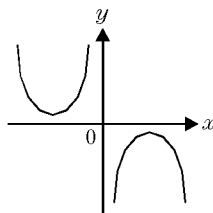
- (A) 128      (B)  $\frac{64}{3}$       (C) 36      (D)  $\frac{20}{3}$       (E) 32

7. The graph of the derivative of  $f(x)$  is shown.

7. (A) (B) (C) (D) (E)



From the following graphs choose  $f$ .

- (A) 
- (B) 
- (C) 
- (D) 
- (E) 

8. A particle's motion is described by  $x(t) = 4t^3 - 5t^2$ ,  $t \geq 0$ , where  $t$  is in seconds and distance in meters. Find the average velocity in the third second.

8. (A) (B) (C) (D) (E)

- (A) 48 m/s      (B) 51 m/s      (C) 19 m/s      (D) 78 m/s      (E) 38 m/s

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AP Calculus    Practice Exam    1/8/99

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**Answer List**

- |         |         |         |
|---------|---------|---------|
| 1.    A | 2.    C | 3.    A |
| 4.    C | 5.    C | 6.    B |
| 7.    A | 8.    D |         |
- 

**Catalog List**

- |                 |                 |                 |
|-----------------|-----------------|-----------------|
| 1.    APC DH 20 | 2.    APC CA 14 | 3.    APC DG 11 |
| 4.    APC FA 22 | 5.    APC EH 20 | 6.    APC FP 9  |
| 7.    APC EH 31 | 8.    APC GA 4  |                 |

Calculus  
Problem Set 12

Name \_\_\_\_\_

Date \_\_\_\_\_

1.  $\lim_{x \rightarrow -1^+} \frac{x^2}{(1-x)(1+x)}$  is

- a)  $\infty$       b)  $1^-$       c)  $-\infty$       d)  $1^+$   
e) none of these

2.  $\lim_{x \rightarrow -2^-} \frac{x}{(x+2)(x-3)}$  is

- a) 3      b)  $\infty$       c)  $-\infty$       d) 0  
e) none of these

3. Assume  $f(7) = 0$ ,  $f'(7) = 14$ ,  $g(7) = 1$ , and  $g'(7) = \frac{1}{7}$ . Find  $h'(7)$  given  $h(x) = \frac{f(x)}{g(x)}$ .

- a)  $\frac{49}{2}$       b) 14      c) -14      d) -2  
e) none of these

4. Assume  $f(3) = 0$ ,  $f'(3) = 6$ ,  $g(3) = 1$ , and  $g'(3) = \frac{1}{3}$ . Find  $h'(3)$  given  $h(x) = \frac{f(x)}{g(x)}$ .

- a)  $\frac{9}{2}$       b) -2      c) 6      d) 18  
e) none of these

5. Given a function defined by  $f(x) = 3x^5 - 5x^3 + 12$ , for what value(s) of  $x$  is there a point of relative *minimum*?

- a) -1 only      b) 0 only  
c) 0 and -1      d) 0 and 1  
e) none of these

6. Given a function defined by  $f(x) = 3x^5 - 5x^3 - 8$ , for what value(s) of  $x$  is there a point of relative *maximum*?

- a) 1 and -1      b) 1 only  
c) 0 and -1      d) 0 and 1  
e) none of these

7. Evaluate:  $\int_0^2 x(x^4 + 4x^2 + 4) dx$

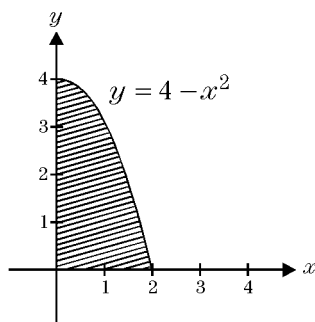
- a) 104      b)  $\frac{3}{104}$       c)  $\frac{104}{3}$       d)  $\frac{104}{9}$   
e) none of these

8. Evaluate:  $\int_0^1 x^2(x^3 + 8)^2 dx$

- a)  $\frac{103}{9}$       b)  $\frac{31}{9}$       c)  $\frac{217}{3}$       d)  $\frac{217}{9}$   
e) none of these

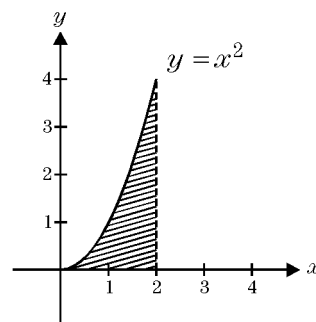
9. Which of the following definite integrals represents the area of the shaded region?

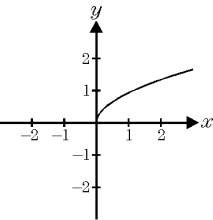
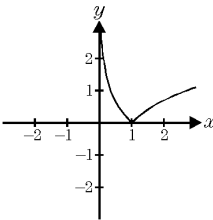
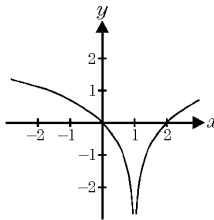
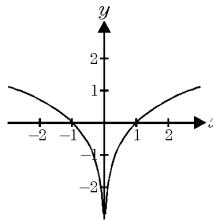
- a)  $\int_0^4 (4 - x^2) dx$   
b)  $\int_0^2 (4 - x^2) dx$   
c)  $\int_2^4 (4 - x^2) dx$   
d)  $\int_0^2 (4 - x^2)$   
e) none of these



10. Which of the following definite integrals represents the area of the shaded region?

- a)  $\int_1^2 x^2 dx$   
b)  $\int_0^2 x^2 dx$   
c)  $\int_0^4 x^2 dx$   
d)  $\int_0^4 x^2 dx$   
e) none of these



11. Determine whether the integral  $\int_1^{\infty} \frac{1}{x^{3/4}} dx$  converges or diverges and evaluate the integral if it converges.
- a) converges,  $\frac{1}{3}$                       b) converges, 1  
 c) converges,  $\frac{4}{3}$                       d) diverges  
 e) none of these
12. Determine whether the integral  $\int_{-\infty}^0 \frac{1}{(x-1)^3} dx$  converges or diverges and evaluate the integral if it converges.
- a) converges,  $-\frac{1}{2}$                       b) converges, 1  
 c) converges,  $\frac{3}{2}$                       d) converges, 2  
 e) none of these
13. Which of the following is the graph of  $f(x) = \ln(\sqrt{x})$ ?
- a)                       b)                       c)                       d) 
- e) none of these
14. A mold culture doubles its mass every three days. Find the growth model for a plate seeded with 1.2 grams of mold.
- a)  $y = 1.2e^{0.10034t}$                       b)  $y = 1.2e^{0.23856t}$   
 c)  $y = 1.2e^{0.54931t}$                       d)  $y = 1.2e^{0.38761t}$   
 e) none of these
15. A mold culture doubles its mass every seven days. Find the growth model for a plate seeded with 0.9 grams of mold.
- a)  $y = 0.9e^{0.12183t}$                       b)  $y = 0.9e^{0.38541t}$   
 c)  $y = 0.9e^{0.81818t}$                       d)  $y = 0.9e^{0.45128t}$   
 e) none of these
16. Evaluate:  $\sum_{i=1}^{10} (i^2 - 2i + 3)$
- a) 83                      b) 865                      c) 81                      d) 305  
 e) none of these
17. Evaluate:  $\sum_{i=1}^{10} (2 - 3i + 2i^2)$ .
- a) 625                      b) 735                      c) 1395                      d) 717  
 e) none of these
18. Find the point on the curve  $f(x) = x^2 + 1$  that is nearest to the the point  $B(3, 1)$ .
- a) (0, 1)                      b) (2, 5)                      c)  $(\frac{1}{3}, \frac{2}{3})$                       d) (5, 2)  
 e) none of these
19. Find a point on the curve  $x^2 - 9y = 0$  that is closest to the point  $P(5, -2)$ .
- a) (2, 5)                      b) (-1, 4)                      c) (-3, 1)                      d) (2, 1)  
 e) none of these
20. For any time  $t \geq 0$ ,  $x(t) = e^{2t}$  and  $y(t) = e^{-4t}$ . Find  $\frac{dy}{dx}$  at  $t = \frac{1}{6}$ .
- a)  $\frac{-2}{e}$                       b)  $4e$                       c) 2                      d)  $e$   
 e) none of these
21. For any time  $t \geq 0$ ,  $x(t) = t^3$  and  $y(t) = 3 \ln t$ . Find  $\frac{dy}{dx}$ .
- a)  $\frac{1}{t^2}$                       b)  $t^4$                       c)  $t^3$                       d)  $t^2$   
 e) none of these

**Answer List**

- |       |       |       |
|-------|-------|-------|
| 1. a  | 2. c  | 3. b  |
| 4. c  | 5. e  | 6. e  |
| 7. c  | 8. d  | 9. b  |
| 10. e | 11. d | 12. a |
| 13. e | 14. e | 15. e |
| 16. d | 17. a | 18. e |
| 19. e | 20. a | 21. e |
- 

**Catalog List**

- |               |               |               |
|---------------|---------------|---------------|
| 1. APC CD 17  | 2. APC CD 13  | 3. APC DC 11  |
| 4. APC DC 13  | 5. APC EF 19  | 6. APC EF 21  |
| 7. APC FL 9   | 8. APC FL 13  | 9. APC FO 2   |
| 10. APC FO 3  | 11. APC FQ 3  | 12. APC FQ 9  |
| 13. APC BG 35 | 14. APC GB 18 | 15. APC GB 21 |
| 16. APC HA 5  | 17. APC HA 8  | 18. APC EK 3  |
| 19. APC EK 5  | 20. APC DH 3  | 21. APC DH 4  |