

CALCULATORS ARE NOT PERMITTED

This review is identical in format to the exam. Only the actual values in the questions will vary.

Multiple-Choice Answers: (#1-20) You may write on the actual exam, but only answers recorded HERE will count towards your grade. Please write in capital letters to clearly distinguish between A and D. (*3 points each*)

Free-Response: (Total 20 points...exact points are listed in *italics* in each problem.)
You must show a reasonable amount of work that leads to your answer. Where it is impossible to show work, explain the mental leaps that you made to draw your conclusion.

A particle moves along the x-axis such that its velocity is given by the function
 $v(t) = 3t^2 - 16t + 5$ for $t \geq 0$. The position of the particle at $t = 1$ is 7.

A. Write an equation for the acceleration, $a(t)$, of the particle at any time $t \geq 0$. (*3 points*)

B. Write an equation for the position, $x(t)$, of the particle at any time $t \geq 0$. (*5 points*)

C. During what time intervals is the particle moving to the right? (*7 points*)

D. During what time intervals is the particle speeding up? (*5 points*)

Ch.5B Review

Evaluate each indefinite integral.

1) $\int -20x^3 \cdot \sec^2(x^4 - 5) dx$

- A) $-5\sin(x^4 - 5) + C$
 B) $-5\sec(x^4 - 5) + C$
 C) $-5\tan(x^4 - 5) + C$
 D) $-5\csc(x^4 - 5) + C$

2) $\int 10e^{2x} \csc(e^{2x} - 5) \cdot \cot(e^{2x} - 5) dx$

- A) $-5\csc(e^{2x} - 5) + C$
 B) $-5\tan(e^{2x} - 5) + C$
 C) $-5\cot(e^{2x} - 5) + C$
 D) $-5\sec(e^{2x} - 5) + C$

3) $\int -\frac{4x}{x^2 - 3} dx$

- A) $-\frac{2 \cdot 5^{x^2 - 3}}{\ln 5} + C$
 B) $5^{x^2 - 3} + C$
 C) $-2\ln|x^2 - 3| + C$
 D) $\ln|x^2 - 3| + C$

4) $\int 15x^4 e^{x^5 - 2} dx$

- A) $3e^{x^5 - 2} + C$
 B) $\ln|x^5 - 2| + C$
 C) $2^{x^5 - 2} + C$
 D) $\frac{3 \cdot 2^{x^5 - 2}}{\ln 2} + C$

5) $\int -\frac{2 \cdot 4^{-1 + \ln -4x}}{x} dx$

- A) $-\frac{2 \cdot 4^{-1 + \ln -4x}}{\ln 4} + C$
 B) $-2\ln|-1 + \ln -4x| + C$
 C) $-2e^{-1 + \ln -4x} + C$
 D) $\ln|-1 + \ln -4x| + C$

6) $\int \frac{1}{x(2 + \ln -4x)} dx$

- A) $\frac{3^{2 + \ln -4x}}{\ln 3} + C$
 B) $2\ln|2 + \ln -4x| + C$
 C) $\ln|2 + \ln -4x| + C$
 D) $2e^{2 + \ln -4x} + C$

$$7) \int 10x^4(2x^5 + 5)^5 dx$$

$$A) \frac{5}{4}(2x^5 + 5)^4 + C$$

$$B) \frac{2}{5}(2x^5 + 5)^5 + C$$

$$C) \frac{1}{6}(2x^5 + 5)^6 + C$$

$$D) \frac{1}{2}(2x^5 + 5)^6 + C$$

$$8) \int 20x^3(x^4 + 3)^{-5} dx$$

$$A) -\frac{5}{3(x^4 + 3)^3} + C$$

$$B) -\frac{2}{(x^4 + 3)^2} + C$$

$$C) -\frac{2}{3(x^4 + 3)^3} + C$$

$$D) -\frac{5}{4(x^4 + 3)^4} + C$$

$$9) \int 10e^{5x}\sqrt{e^{5x} + 1} dx$$

$$A) 3(e^{5x} + 1)^{\frac{4}{3}} + C$$

$$B) 2(e^{5x} + 1)^{\frac{3}{2}} + C$$

$$C) \frac{4}{3}(e^{5x} + 1)^{\frac{3}{2}} + C$$

$$D) \frac{3}{2}(e^{5x} + 1)^{\frac{4}{3}} + C$$

$$10) \int \frac{2(-2 + \ln -2x)^{-5}}{x} dx$$

$$A) -\frac{1}{(-2 + \ln -2x)^3} + C$$

$$B) -\frac{2}{3(-2 + \ln -2x)^3} + C$$

$$C) -\frac{1}{(-2 + \ln -2x)^2} + C$$

$$D) -\frac{1}{2(-2 + \ln -2x)^4} + C$$

Use u substitution to express each definite integral in terms of u . Do not evaluate the integral.

$$11) \int_0^1 -\frac{12x}{(2x^2 + 2)^2} dx$$

$$A) \int_2^5 -\frac{3}{u^2} du; u = 2x^2 + 2$$

$$B) \int_2^{-4} -\frac{3}{u^2} du; u = 2x^2 + 2$$

$$C) \int_9^4 -\frac{3}{u^2} du; u = 2x^2 + 2$$

$$D) \int_2^4 -\frac{3}{u^2} du; u = 2x^2 + 2$$

$$12) \int_0^1 \frac{12x}{(2x^2 + 3)^2} dx$$

$$A) \int_3^5 \frac{3}{u^2} du; u = 2x^2 + 3$$

$$B) \int_6^1 \frac{3}{u^2} du; u = 2x^2 + 3$$

$$C) \int_{-1}^{13} \frac{3}{u^2} du; u = 2x^2 + 3$$

$$D) \int_3^{14} \frac{3}{u^2} du; u = 2x^2 + 3$$

Evaluate each definite integral.

$$13) \int_{-3}^0 -\frac{2x}{(x^2 + 1)^2} dx$$

- A) $\frac{9}{10} = 0.9$ B) $\frac{9}{11} \approx 0.818$
C) $\frac{2}{5} = 0.4$ D) $\frac{1}{2} = 0.5$

$$14) \int_0^2 \frac{12x}{(3x^2 + 4)^2} dx$$

- A) $\frac{1}{16} \approx 0.063$ B) $\frac{3}{8} = 0.375$
C) $\frac{3}{2} = 1.5$ D) $-\frac{1}{2} = -0.5$

For each problem, find the average value of the function over the given interval.

$$15) f(x) = -2x + 2; [0, 4]$$

- A) 7 B) 1
C) -2 D) 9

$$16) f(x) = 3x^{\frac{1}{2}}; [0, 3]$$

- A) $6\sqrt{5} \approx 13.416$
B) 6
C) $8\sqrt{3} \approx 13.856$
D) $2\sqrt{3} \approx 3.464$

$$17) f(x) = -x^{\frac{1}{2}}; [0, 1]$$

- A) $\frac{11}{3} \approx 3.667$
B) $-\frac{2}{3} \approx -0.667$
C) $-\frac{1}{3} \approx -0.333$
D) $\frac{4}{3} \approx 1.333$

For each problem, find $F'(x)$.

$$18) F(x) = \int_{-1}^x (t^2 - 4t - 1) dt$$

- A) $F'(x) = -x^2 + 4$
B) $F'(x) = -x^2 - 6x - 7$
C) $F'(x) = -x^2 - 8x - 15$
D) $F'(x) = x^2 - 4x - 1$

$$19) F(x) = \int_{-4}^{x^3} (-t^2 - 2t + 5) dt$$

- A) $F'(x) = 3x^8 + 24x^5 + 30x^2$
B) $F'(x) = 3x^8 + 18x^5 + 33x^2$
C) $F'(x) = -3x^8 + 18x^2$
D) $F'(x) = -3x^8 - 6x^5 + 15x^2$

$$20) F(x) = \int_x^{x^2} (-2t - 1) dt$$

A) $F'(x) = -4x^3 + 1$

B) $F'(x) = 4x^3 + 2x + 1$

C) $F'(x) = -2x^3 + 4x + 1$

D) $F'(x) = -2x^3 - 2x + 1$

Answers to Ch.5B Review

1) C
5) A
9) C
13) A
17) B

2) A
6) C
10) D
14) B
18) D

3) C
7) C
11) D
15) C
19) D

4) A
8) D
12) A
16) D
20) A