

Hoffmann Chapter 5 Questions

- Find the function whose tangent line has the slope  $3x^2 + 1$  for each value of  $x$  and whose graph passes through  $(0, 2)$ .  
A)  $x^3 + x + 2$   
B)  $x^3 + x$   
C)  $x^3 + x - 2$   
D)  $x^3 + 3$
- A manufacturer makes a certain product at a rate of  $t^2 - 3t + 5$  items per hour. How many items does the company make during the second hour?  
A) 2.83  
B) 11.83  
C) 4.83  
D) 10.83
- Find the function whose tangent line has the slope  $4x^2 + 7$  for each value of  $x$ , and whose graph passes through  $(0, 4)$ .  
A)  $\frac{4x^3}{3} + 7x + 4$   
B)  $\frac{4x^3}{3} + 7x$   
C)  $\frac{4x^3}{3} + 7x - 4$   
D)  $\frac{4x^3}{3} + 11$
- A study indicates that  $x$  months from now the population of a certain city will be increasing at the rate of  $(4 + 12x)x^{-1/2}$  people per month. By how much will the population increase over the next 4 months?  
A) 80 people  
B) 90 people  
C) 70 people  
D) 64 people

5. Evaluate  $\int e^{3x-2} dx$

- A)  $e^{3x-2} + C$   
B)  $(3x-2)e^{3x-2} + C$   
C)  $(3x-2)Ce^{3x-2}$   
D)  $\frac{e^{3x-2}}{3} + C$

- In a certain section of the country, the price of chicken is currently \$3 per kilogram. It is estimated that  $x$  weeks from now the price will be increasing at a rate of  $3\sqrt{x+1}$  cents per kilogram, per week. How much will chicken cost 9 weeks from now?  
A) \$3.61  
B) \$0.62  
C) \$4.61  
D) \$2.62
- Water flows into a tank at the rate of  $\sqrt{6t+5}$  ft<sup>3</sup>/min. If the tank is empty when  $t = 0$ , how much water does it contain 8 minutes later? Express the answer to two decimal places.  
A) 0.56  
B) 41.63  
C) 267.33  
D) 58.24
- Use the fundamental theorem of calculus to find the area of the region under the line  $y = 2x + 7$  above the interval  $1 \leq x \leq 7$ .  
A) 106  
B) 104  
C) 90  
D) 88
- Suppose the marginal cost is  $C'(x) = e^{-0.6x}$ , where  $x$  is measured in units of 200 items and the cost is measured in units of \$10000. Find the cost corresponding to the production interval  $[200, 1000]$ .  
A) \$4990  
B) \$2994  
C) \$8317  
D) \$6019

10. Determine the area between  $f(x) = \sqrt{x}$  and  $g(x) = x^3$  on the domain determined by the points where the graphs of the functions cross.
- A) 0.4355  
B) 0.4167  
C) 0.5563  
D) 0.7210
11. For the demand function  $D(q) = \frac{400}{(0.2q+1)^2}$  dollars per unit, find the total amount of money consumers are willing to spend when  $q = 3$  units.
- A) \$700  
B) \$720  
C) \$740  
D) \$750
12. Given a consumer's demand function,  $D(q) = \frac{400}{0.7q+8}$  dollars per unit, find the total amount of money consumers are willing to pay to get 20 units of the commodity.
- A) 1.01  
B) 404.64  
C) 289.03  
D) 578.06
13. For the demand function  $D(q) = 3(80 - q^2)$  dollars per unit, find the total amount of money consumers are willing to spend when  $q = 5$  units.
- A) \$1,002  
B) \$1,053  
C) \$1,061  
D) \$1,075
14. Money is transferred continuously into an account at the constant rate of \$1400 per year. The account earns interest at the annual rate of 8% compounded continuously. How much will be in the account at the end of 5 years?
- A) \$2609.69  
B) \$955466.63  
C) \$26105.93  
D) \$7000

15. An investment will generate income continuously at the constant rate of \$2300 per year for 5 years. If the prevailing annual interest rate remains fixed at 8% compounded continuously, what is the present value of the investment?
- A) \$9478.3  
B) \$947.83  
C) \$94.78  
D) \$11883.92

**Answer Key**

1. A
2. A
3. A
4. A
5. D
6. A
7. B
8. C
9. C
10. B
11. D
12. D
13. D
14. C
15. A