Hoffmann Chapter 5 Questions

1. 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) $x^3 + 3$

2. 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

3. 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) $\frac{4x^3}{3} + 11$

4. 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) $\dfrac{e^{3x-2}}{3}+C$

6. 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

7. Water flows into a tank at the rate of $\sqrt{6t+5}$ ft ^{3} /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

8. Use the fundamental theorem of calculus to find the area of the region under the line $y = 2x + 7$ above the interval $1 \le x \le 7$.

A) 106

B) 104

C) 90

D) 88

9. 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 $D(q) = \dfrac{400}{(0.2q+1)^2}$ 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, $D(q) = \dfrac{400}{0.7q+8}$ 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