Problems for Gateway #2: The Definition of an Antiderivative

1. The function $F(x) = \frac{1}{3}x^3 + 1$ is an antiderivative of:

    (a) $f(x) = x^2 + 1.$

    (b) $f(x) = x^2.$

    (c) $f(x) = x^4 + x.$

    (d) $f(x) = \dfrac{x^4}{12} + 1 + x.$

2. The function $F(x) = x \cdot \ln(x) - x$ is an antiderivative of:

    (a) $f(x) = x^2 \cdot \ln(x) - x^2 + C.$

    (b) $f(x) = \ln(x) - 1.$

    (c) $f(x) = \dfrac{1}{x} - 1.$

    (d) $f(x) = \ln(x).$

3. The function $F(x) = e^x + \frac{1}{4}x^4 + 2$ is an antiderivative of:

    (a) $f(x) = x^3 - 2x.$

    (b) $f(x) = \ln(x^2) + e^x.$

    (c) $f(x) = e^x + x^3.$

    (d) $f(x) = 2x + x^3.$

4. The function $F(x) = -2x + 1$ is an antiderivative of:

    (a) $f(x) = -2$.

    (b) $f(x) = -x^2 + x + C$.

    (c) $f(x) = x^2 + x + C$.

    (d) $f(x) = \frac{-1}{2}x^2 + x + C$

5. The function $F(x) = \frac{1}{5}x^5 + 5^x + 5$ is an antiderivative of:

    (a) $f(x) = x^2 - \ln(5^X)$.

    (b) $f(x) = \dfrac{x^6}{6} + 5^x$.

    (c) $f(x) = x^4 + \ln(5)\cdot 5^x$.

    (d) $f(x) = x^4 + \dfrac{5^x}{\ln(5)}$.

6. The function $F(x) = x^3 - e^x + 150000000$ is an antiderivative of:

    (a) $f(x) = 3x^2 + e^x$.

    (b) $f(x) = x^2 + e^x$.

    (c) $f(x) = \dfrac{x^4}{4} + \ln(x) + x$.

    (d) $f(x) = \dfrac{x^4}{12} + \ln(e^x) + 150000000x$.

7. The function $F(x) = x + e^x + 1$ is an antiderivative of:

   (a) $f(x) = x^2 + e^x + x.$

   (b) $f(x) = \dfrac{x^2}{2} + e^x + x.$

   (c) $f(x) = x^4 + \ln(x) + \dfrac{1}{x}.$

   (d) $f(x) = 1 + e^x.$

8. The function $F(x) = \frac{1}{2}x^2 + 3^x + 100$ is an antiderivative of:

   (a) $f(x) = x^2 - 3^x.$

   (b) $f(x) = x + \ln(3) \cdot 3^x.$

   (c) $f(x) = x + \dfrac{3^x}{\ln(3)}.$

   (d) $f(x) = 100x.$

9. The function $F(x) = \ln(x^2 + 1)$ is an antiderivative of:

   (a) $f(x) = 2 \cdot \ln(x) + 1.$

   (b) $f(x) = 2x \cdot \ln(x) + 1.$

   (c) $f(x) = \dfrac{2x}{1 + x^2}.$

   (d) $f(x) = \dfrac{2}{x} + 1.$

10. The function $F(x) = e^x + x \cdot \ln(x) + e^{100}$ is an antiderivative of:

    (a) $f(x) = e^x + \ln(x) + 1.$

    (b) $f(x) = e^x + e^{100x}.$

    (c) $f(x) = e^x + 1 + e^{100}x.$

    (d) $f(x) = e^x + \dfrac{1}{x} + 100 \cdot e^{99}.$

Answers

1.	B	2.	D	3.	C	4.	A	5.		C	6.		A
7.	D	8.	B	9.	C	10.	A						