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

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

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

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

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

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

(a) $f(x) = x^2 + e^x + x.$ **(b)** $f(x) = \frac{x^2}{2} + e^x + x.$

(c) $f(x) = x^4 + \ln(x) + \frac{1}{x}.$ **(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) $f(x) = x + \frac{3^x}{\ln(3)}.$ **(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) $f(x) = \frac{2x}{1+x^2}.$ **(d)** $f(x) = \frac{2}{x} + 1.$

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

Answers

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