1. Suppose F is a function such that $F(1) = 3$ and $F'(x) = x^2$. Then $F(4) = ...?$

(A) 20

(B) 22

(C) 24

(D) None of the above

2. True or False?

Let f be a differentiable function and

$$A(x) = \int_0^x f(t)\,dt.$$

If f is increasing, then A is concave up.

3. Suppose we want to calculate $\int x^3 \cos(x^4)\, dx$ using substitution. What substitution should we use?

(A) $u = \cos(x)$

(B) $u = \cos(x^4)$

(C) $u = x^4$

(D) None of the above

4. Suppose we want to calculate $\int \frac{\ln(x)}{x}\,dx$ using substitution. What substitution should we use?

(A) $u = \ln(x)$

(B) $u = x\ln(x)$

(C) $u = 1/x$

(D) None of the above

5. True or False?

$$\int_1^e \frac{\ln x}{x}\, dx = \int_1^e u\, du.$$

6. Suppose we want to calculate $\int \frac{dx}{x \ln x}$ using substitution. What substitution should we use?

(A) $u = \ln(x)$

(B) $u = x \ln(x)$

(C) $u = 1/x$

(D) None of the above

7. True or False?

$$\int_0^1 x(x+1)^9\,dx = \int_1^2 (u^{10} - u^9)\,du.$$

8. True or False?

For any positive integer n, we have

$$\int_0^{\pi/2} (\sin x)^n \cos x \, dx = \frac{1}{n+1}.$$

9. True or False?

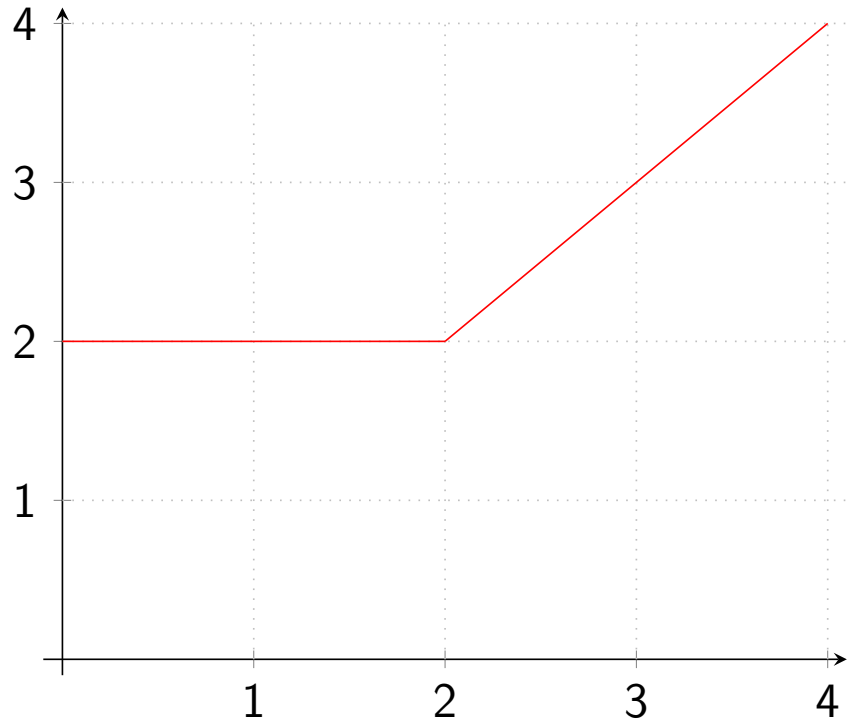
Let f be a differentiable function and

$$A(x) = \int_0^x f(t)\,dt.$$

If c is an inflection point of A, then c is a critical point of f.

The graph of a function f is depicted to the right, and

$$A(x) = \int_0^x f(t)\,dt.$$



10. True or False?

$$A(x) = \begin{cases} 2x & \text{if } 0 \le x \le 2 \\ 2x + \dfrac{(x-2)^2}{2} & \text{if } 2 < x \le 4 \end{cases}$$