

Fundamental Theorem of Calculus III - Answer

1. Evaluate $f'(3)$ where $f(y) = \int_2^y (2x - 3)e^{\sqrt{x^2-3x}} dx$.

Ans: $\frac{104}{3}$

Ans: 3

2. On which interval is f increasing where $f(y) = \int_2^y (2x - 3)e^{\sqrt{x^2-3x}} dx$.

Ans: $(1.5, \infty)$.

3. Find the inflection point(s) of f where $f(y) = \int_2^y (2x - 3)e^{-(x^2-3x)} dx$.

Ans: $1.5 \pm \frac{\sqrt{2}}{2}$

4. If $u(x) = v'(x)$ and $v(y) = \int_0^y g'(x) dx$, find the relationship between the functions u and g .

Ans: $u(x) = g''(x)$

5. Find the maximum value of g where $g(t) = \int_0^t (4t^2 + t - 28) dt$.

6. Evaluate $f'(x)$ if $f(x) = \int_{-1}^{x^2} \sin(\sqrt{t}) dt$.

Ans: $2x \sin x$

7. Evaluate $f'(x)$ if $f(x) = \int_0^{\sqrt{x}} \cos(t^2) dt$.

Ans: $\frac{\cos x}{2\sqrt{x}}$

8. Evaluate $f'(x)$ if $f(x) = \int_x^{x^2} \sin(\sqrt{t}) dt$.

Ans: $2x \sin x - \sin \sqrt{x}$

9. Evaluate $f'(x)$ if $f(x) = \int_{e^{-x}}^1 \ln(t^2) dt$.

Ans: $-2xe^{-x}$

10. Evaluate $f''(x)$ if $f(x) = \int_x^{e^x} \ln(t^2) dt$.

Ans: $2(x+1)e^x - \frac{2}{x}$