

## Avg. Value, MVTI, 2nd FTC Review

For each problem, find the average value of the function over the given interval.

1)  $f(x) = -\cos x$ ;  $[-\frac{\pi}{4}, \frac{\pi}{3}]$

2)  $f(x) = \frac{5}{x}$ ;  $[2, 4]$

For each problem, find the average value of the function over the given interval. Then, find the values of  $c$  that satisfy the Mean Value Theorem for Integrals.

3)  $f(x) = 2x + 1$ ;  $[-2, 3]$

4)  $f(x) = 2x^2 - 16x + 27$ ;  $[2, 5]$

5)  $f(x) = \frac{3}{(x+2)^2}$ ;  $[-1, 2]$

6)  $f(x) = 2(x+1)^{\frac{1}{2}}$ ;  $[-1, 2]$

For each problem, find  $F'(x)$ .

7)  $F(x) = \int_0^{3x} (t^2 - 6t + 6) dt$

8)  $F(x) = \int_{\frac{\pi}{2}}^{2x} 2\csc t \cot t dt$

9)  $F(x) = \int_{-3}^{2x} 3e^t dt$

10)  $F(x) = \int_x^{x^2} (-t^2 + 4t + 2) dt$

11)  $F(x) = \int_x^{x^2} -2\csc t \cot t dt$

12)  $F(x) = \int_x^{2x} \frac{2}{t} dt$

## Answers to Avg. Value, MVTI, 2nd FTC Review

$$1) \frac{-6\sqrt{3} - 6\sqrt{2}}{7\pi} \approx -0.858$$

$$2) \frac{5\ln 4 - 5\ln 2}{2} \approx 1.733$$

3) Average value of function: 2

Values that satisfy MVT:  $\frac{1}{2} = 0.5$

4) Average value of function: -3

Values that satisfy MVT: 3, 5

5) Average value of function:  $\frac{3}{4} = 0.75$

Values that satisfy MVT: 0

6) Average value of function:  $\frac{4\sqrt{3}}{3} \approx 2.309$

Values that satisfy MVT:  $\frac{1}{3} \approx 0.333$

$$7) F'(x) = 27x^2 - 54x + 18$$

$$8) F'(x) = 4\csc 2x \cot 2x$$

$$9) F'(x) = 6e^{2x}$$

$$10) F'(x) = -2x^5 + 8x^3 + x^2 - 2$$

$$11) F'(x) = -4x \csc x^2 \cot x^2 + 2 \csc x \cot x$$

$$12) F'(x) = 0$$