

1.(1 pt) If $f(x) = \int_3^x t^4 dt$

then

$f'(x) =$ _____

$f'(3) =$ _____

2.(1 pt) If $f(x) = \int_x^{20} t^2 dt$ then

$f'(x) =$ _____

3.(1 pt) If $f(x) = \int_x^6 t^8 dt$

then

$f'(x) =$ _____

4.(1 pt) If $f(x) = \int_{-1}^{x^3} t^4 dt$ then

$f'(x) =$ _____

5.(1 pt) If $f(x) = \int_x^{x^2} t^2 dt$

then

$f'(x) =$ _____

$f'(-1) =$ _____

6.(1 pt) If $f(x) = \int_x^{x^2} t^2 dt$

then

$f'(x) =$ _____

7.(1 pt) If $f(x) = \int_0^x (t^3 + 7t^2 + 1) dt$

then

$f''(x) =$ _____

8.(1 pt) Given

$$f(x) = \int_0^x \frac{t^2 - 4}{1 + \cos^2(t)} dt$$

At what value of x does the local max of $f(x)$ occur?

$x =$ _____

9.(1 pt) Given

$$f(t) = \int_0^t \frac{x^2 + 10x + 21}{1 + \cos^2(x)} dx$$

At what value of t does the local max of $f(t)$ occur?

$t =$ _____

10.(1 pt) NOTE: It will be easier to see the function $f(x)$ if you use the display mode "typeset". Keep in mind, though, that loading the problem into your computer using this display mode will take longer.

Let

$$f(x) = \begin{cases} 0 & \text{if } x < -5 \\ 2 & \text{if } -5 \leq x < 1 \\ -3 & \text{if } 1 \leq x < 5 \\ 0 & \text{if } x \geq 5 \end{cases}$$

and

$$g(x) = \int_{-5}^x f(t) dt$$

Determine the value of each of the following:

(a) $g(-8) =$ _____

(b) $g(-4) =$ _____

(c) $g(2) =$ _____

(d) $g(6) =$ _____

(e) The absolute maximum of $g(x)$ occurs when $x =$ ___ and is the value _____

It may be helpful to make a graph of $f(x)$ when answering these questions.

11.(1 pt) Use part I of the Fundamental Theorem of Calculus to find the derivative of

$$f(x) = \int_4^x \left(\frac{1}{4}t^2 - 1 \right)^{12} dt$$

$f'(x) =$ _____

[NOTE: Enter a function as your answer. Make sure that your syntax is correct, i.e. remember to put all the necessary *, (,), etc.]

12.(1 pt) Use part I of the Fundamental Theorem of Calculus to find the derivative of

$$f(x) = \int_{-1}^x \sqrt{t^3 + 1} dt$$

$f'(x) =$ _____

[NOTE: Enter a function as your answer. Make sure that your syntax is correct, i.e. remember to put all the necessary (,), etc.]

13.(1 pt) Use part I of the Fundamental Theorem of Calculus to find the derivative of

$$f(x) = \int_5^x \frac{1}{1+t^3} dt$$

$f'(x) =$ _____

14.(1 pt) Use part I of the Fundamental Theorem of Calculus to find the derivative of

$$F(x) = \int_x^3 \sin(t^3) dt$$

$F'(x) =$ _____

[NOTE: Enter a function as your answer.]

15.(1 pt) Use part I of the Fundamental Theorem of Calculus to find the derivative of

$$h(x) = \int_{-4}^{\sin(x)} (\cos(t^2) + t) dt$$

$h'(x) =$ _____

[NOTE: Enter a function as your answer. Make sure that your syntax is correct, i.e. remember to put all the necessary *, (,), etc.]

16.(1 pt) Use part I of the Fundamental Theorem of Calculus to find the derivative of

$$h(x) = \int_{-5}^{\sin(x)} (\cos(t^4) + t) dt$$

$h'(x) =$ _____

[NOTE: Enter a function as your answer. Make sure that your syntax is correct, i.e. remember to put all the necessary *, (,), etc.] For more help see: **WeBWorK functions**

17.(1 pt) Find the derivative of

$$g(x) = \int_{5x}^{8x} \frac{u+4}{u-1} du$$

18.(1 pt) Use part I of the Fundamental Theorem of Calculus to find the derivative of

$$g(x) = \int_{2x}^{5x} \frac{u+4}{u-5} du$$

[NOTE: Enter a function as your answer. Make sure that your syntax is correct, i.e. remember to put all the necessary *, (,), etc.] For more help see: **WeBWorK functions**

19.(1 pt) Find the derivative of the following function

$$F(x) = \int_{x^3}^{x^5} (2t-1)^3 dt$$

using the Fundamental Theorem of Calculus.

$F'(x) =$ _____

20.(1 pt) Find the derivative of the following function

$$F(x) = \int_{\sqrt{x}}^1 \frac{s^2}{4+3s^4} ds$$

using the appropriate form of the Fundamental Theorem of Calculus.

$F'(x) =$ _____

21.(1 pt) Find a function f and a number a such that

$$2 + \int_a^x \frac{f(t)}{t^7} dt = 5x^{-3}$$

$f(x) =$ _____

$a =$ _____

22.(1 pt) Evaluate the definite integral

$$\int_2^5 \left(\frac{d}{dt} \sqrt{5+2t^4} \right) dt$$

using the Fundamental Theorem of Calculus.

You will need accuracy to at least 4 decimal places for your numerical answer to be accepted. You can also leave your answer as an algebraic expression involving square roots.

$$\int_2^5 \left(\frac{d}{dt} \sqrt{5+2t^4} \right) dt =$$

23.(1 pt) Evaluate the following definite integrals using the Fundamental Theorem of Calculus.

$$\int_{-14}^1 s |49 - s^2| ds =$$

$$\int_0^{49\pi^2} \frac{\sin(\sqrt{x})}{\sqrt{x}} dx =$$

$$\int_7^{14} \frac{t-7}{t^2-14t+50} dt =$$

24.(1 pt) Compute the following limit. Use INF to denote ∞ and MINF to denote $-\infty$.

$$\lim_{x \rightarrow 0} \frac{x}{\int_x^{x^2} \sqrt[3]{64-5t^3} dt} =$$
