

Week 12 Friday Homework (1329186)

Question 123456789101112131415161718

1. Question DetailsSCalcET6 5.2.035.MI. [1386386]
Evaluate the integral by interpreting it in terms of areas.

$$\int_0^3 \left(\frac{5}{2}x - 5 \right) dx$$

[Tutorial](#)

2. Question DetailsSCalcET6 5.2.038.MI. [1387394]
Evaluate the integral by interpreting it in terms of areas.

$$\int_{-5}^3 (6 - 4x) dx$$

[Tutorial](#)

3. Question DetailsSCalcET6 5.2.039. [1290780]
Evaluate the integral by interpreting it in terms of areas.

$$\int_{-3}^8 |x| dx$$

4. Question DetailsSCalcET6 5.2.042. [1291007]
Given.

$$\int_0^1 3x\sqrt{x^2 + 9} dx = 10\sqrt{10} - 27$$

Evaluate.

$$\int_1^0 3u\sqrt{u^2 + 9} du$$

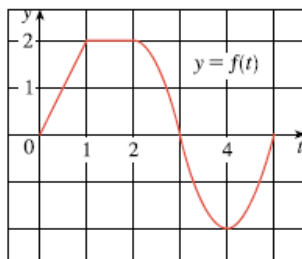
5. Question DetailsSCalcET6 5.2.046. [1290514]
The following facts are known.


$$\int_a^b x dx = \frac{b^2 - a^2}{2}, \int_0^{\pi/2} \cos(x) dx = 1$$

Use these, together with the properties of integrals to evaluate the given integral.

$$\int_0^{\pi/2} (5 \cos(x) - 4x) dx$$

6. Question DetailsSCalcET6 5.3.AE.01. [708916]



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EXAMPLE 1 Let f be the function whose graph is shown in the figure to the left. Consider the function $g(x)$ defined below.

$$g(x) = \int_0^x f(t) dt$$

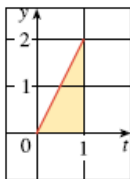
Find the values of $g(0)$, $g(1)$, $g(2)$, $g(3)$, $g(4)$, and $g(5)$. Then sketch a rough graph of g .

SOLUTION First, we notice that

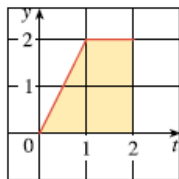
$$g(0) = \int_0^0 f(t) dt = 0$$

From the figure below we see that $g(1)$ is the area of the triangle:

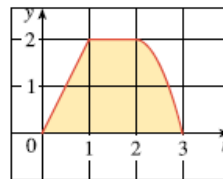
$$g(1) = \int_0^1 f(t) dt = \frac{1 \cdot 2}{2} = \boxed{}$$



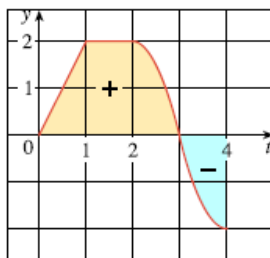
$$g(1) = 1$$



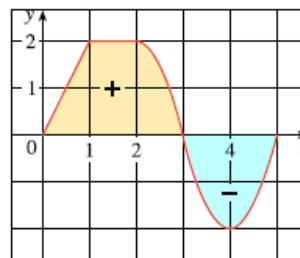
$$g(2) = 3$$



$$g(3) \approx 4.3$$



$$g(4) \approx 3$$



$$g(5) \approx 1.7$$

To find $g(2)$, we add to $g(1)$ the area of the rectangle:

$$\begin{aligned} g(2) &= \int_0^2 f(t) dt = \int_0^1 f(t) dt + \int_1^2 f(t) dt \\ &= 1 + \boxed{} = \boxed{} \end{aligned}$$

We estimate that the area under f from 2 to 3 is about 1.3, so

$$g(3) = g(2) + \int_2^3 f(t) dt \approx 3 + 1.3 = 4.3$$

For $t > 3$, $f(t)$ is negative and so we start subtracting areas:

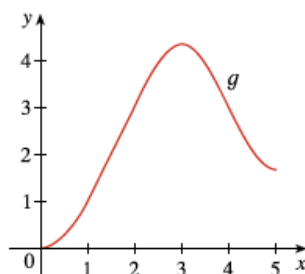
$$g(4) = g(3) + \int_3^4 f(t) dt \approx 4.3 + (-1.3)$$

$$= \boxed{}$$


$$g(5) = g(4) + \int_4^5 f(t) dt \approx 3 + (-1.3)$$

$$= \boxed{}$$

We use these values to sketch the graph of g below. Notice that, because $f(t)$ is positive for $t < 3$, we keep adding area for $t < 3$ and so g is increasing up to $x = 3$ where it attains a maximum value. For $x > 3$, g is decreasing because $f(t)$ is negative.



7. Question DetailsSCalcET6 5.3.AE.02. [1290140]

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EXAMPLE 2 Find the derivative of the function below.

$$g(x) = \int_0^x \sqrt{1+t^6} dt$$

SOLUTION Since $f(t) = \sqrt{1+t^6}$ is continuous, Part 1 of the Fundamental Theorem of Calculus gives the answer.

$$g'(x) = \boxed{}$$

8. Question DetailsSCalcET6 5.3.AE.05. [1289885]

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EXAMPLE 5 Evaluate the integral below.

$$\int_1^4 e^x dx$$

SOLUTION The function $f(x) = e^x$ is continuous everywhere and we know that an antiderivative is $F(x) = e^x$, so Part 2 of the Fundamental Theorem gives

$$\begin{aligned} \int_1^4 e^x dx &= F(b) - F(a) \\ &= \boxed{} \end{aligned}$$

Notice that the Fundamental Theorem of Calculus says we can use any antiderivative F of f . So we may as well use the simplest one, namely $F(x) = e^x$, instead of $e^x + 7$ or $e^x + C$.

9. Question DetailsSCalcET6 5.3.Tut.02. [700165]

10. Question DetailsSCalcET6 5.3.Tut.05. [700171]

11. Question DetailsSCalcET6 5.3.007.MI. [1387698]

Use Part 1 of the Fundamental Theorem of Calculus to find the derivative of the function.

$$g(x) = \int_1^x \frac{7}{t^3 + 3} dt$$

$g'(x) =$ [Tutorial](#)

12. Question DetailsSCalcET6 5.3.014. [1290601]

Use Part 1 of the Fundamental Theorem of Calculus to find the derivative of the function.

$$h(x) = \int_6^{x^2} \sqrt{3 + r^3} dr$$

$h'(x) =$

13. Question DetailsSCalcET6 5.3.016. [1291391]

Use Part 1 of the Fundamental Theorem of Calculus to find the derivative of the function.

$$y = \int_1^{\cos(x)} (2 + v^3)^5 dv$$

$y' =$

14. Question DetailsSCalcET6 5.3.019. [872829]

Evaluate the integral.

$$\int_{-2}^1 (x^3 - 4x) dx$$

15. Question DetailsSCalcET6 5.3.020. [698756]
Evaluate the integral.

$$\int_{-2}^3 8dx$$

16. Question DetailsSCalcET6 5.3.021. [698788]
Evaluate the integral.

$$\int_2^6 (6 - 2t + 3t^2) dt$$

17. Question DetailsSCalcET6 5.3.024. [656986]
Evaluate the integral.

$$\int_1^{32} \sqrt[5]{x} dx$$

18. Question DetailsSCalcET6 5.3.027. [872789]
Evaluate the integral.

$$\int_1^2 x(1 + x^5) dx$$

Assignment Details

Name (AD): **Week 12 Friday Homework (1329186)**

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Author: **Jernigan, John** (jjernigan@ccp.edu)

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