1. **(1 pt) Library/Michigan/Chap6Sec2/Q31.pg**
Find an antiderivative P of

$$p(t) = \frac{1}{\sqrt{t}}.$$

$P(t) =$ _____
SOLUTION
Thinking of the root of t as t to the $-1/2$ power we have $P(s) = 2\sqrt{t}$ (or this, plus any constant).
Correct Answers:

- `2 sqrt(t)`

2. **(1 pt) Library/Rochester/setDerivatives3WordProblems/s2_3_24.pg**
The population of a slowly growing bacterial colony after t hours is given by $p(t) = 3t^2 + 23t + 100$. Find the growth rate after 4 hours. _____

Correct Answers:

- `47`

3. **(1 pt) Library/Rochester/setDerivatives3WordProblems/s2_3_27.pg**
The cost of producing x units of stuffed alligator toys is $c(x) = 0.003x^2 + 10x + 4000$. Find the marginal cost at the production level of 1000 units. _____

Correct Answers:

- `16`

4. **(1 pt) Library/Rochester/setDerivatives3WordProblems/s2_3_10.pg**
The area of a square with side s is $A(s) = s^2$. What is the rate of change of the area of a square with respect to its side length when $s = 16$? _____

Correct Answers:

- `32`

5. **(1 pt) Library/UCSB/Stewart5_3_3/Stewart5_3_3_11.pg**

(a) A company makes computer chips from square wafers of silicon. It wants to keep the side length of a wafer very close to 15 mm, and it wants to know how the area $A(x)$ of a wafer changes when the side length x changes.
Find $A'(15)$. [Can you explain its meaning in this situation?]
(b) What is the rate of change of the area of the square with respect to its side length when the perimeter is 50 mm?
(a) $A'(15) =$ _____ sq mm/ mm
(b) $A'(?) =$ _____ sq mm/mm
Correct Answers:

- `30`
- `25`

6. **(1 pt) Library/UCSB/Stewart5_3_3/Stewart5_3_3_31.pg**

If $p(x)$ is the total value of the production when there are x workers in the plant, then the *average productivity* of the workforce at the plant is $A(x) = \dfrac{p(x)}{x}$.
Find $A'(x)$. (Why does the company want to hire more people if $A'(x) > 0$?)
*Enter $p(x)$ as "p" and $p'(x)$ as "q" below.
$A'(x) =$ _____
Correct Answers:

- `(x*q- p)/x^2`

7. **(1 pt) Library/UCSB/Stewart5_3_3/Stewart5_3_3_26.pg**

Suppose that a bacteria population starts with 500 bacteria and triples every hour.
(a) What is the population after t hours?
(b) Use (5) in Section 3.1 to estimate the rate of increase of the bacteria population after 6 hours.
(a) _____
(b) _____
Correct Answers:

- `500*(3^t)`
- `400950`

8. **(1 pt) Library/UCSB/Stewart5_3_3/Stewart5_3_3_29.pg**

Suppose that the cost (in dollars) for a company to produce x pairs of a new line of jeans is $C(x) = 2000 + 3x + .01x^2 + .0002x^3$.
(a) Find the marginal cost function.
(b) Find $C'(100)$. (What does this mean?)
(c) Find the cost of manufacturing the 101^{st} pair of jeans.
(a) $C'(x) =$_____
(b) $C'(100) =$_____ dollars/pair
(c) Cost = _____ dollars
Correct Answers:

- `3+.02 x + .0006 x^2`
- `11`
- `11.07`

9. **(1 pt) Library/UCSB/Stewart5_3_3/Stewart5_3_3_8.pg**

If a ball is given a push so that it has an initial velocity of 5 m/s down a certian inclined plane, then the distance it has after t seconds is $s(t) = 5t + 3t^2$.
(a) Find the velocity after 2 sec.
(b) How long does it take for the velocity to reach 38 m/s?
(a) $v(2) =$ _____ m/s
(b) $t =$ _____ seconds

Correct Answers:

- 17
- 5.5

---

10. **(1 pt) Library/UCSB/Stewart5_3_3/Stewart5_3_3_23.pg**

The table gives the population of the world in the 20th century.

Year	Population (in millions)	Year	Population (in millions)
1900	1650	1960	3040
1910	1750	1970	3710
1920	1860	1980	4450
1930	2070	1990	5280
1940	2300	2000	6080
1950	2560		

(a) Estimate the rate of population growth in 1920 by averaging the slopes of two secant lines (using the years 1910 and 1920, then 1920 and 1930).
(b) Repeat the same process for 1980.
(a) _____ million/year
(b) _____ million/year
Correct Answers:

- 16
- 78.5

---

11. **(1 pt) Library/UCSB/Stewart5_3_3/Stewart5_3_3_30.pg**

The cost function of a certain commodity is $C(x) = 78 + .16x - .0006x^2 + .000003x^3$.
(a) Find $C'(100)$. (What does this mean?)
(b) Find the cost of producing the 101^{st} item.
(a)$C'(100) =$ _____ dollars/item
(b) Cost = _____ dollars
Correct Answers:

- 0.13
- 0.13

---

12. **(1 pt) Library/UCSB/Stewart5_3_3/Stewart5_3_3_10.pg**

If a ball is thrown vertically upward with a velocity of 80 ft/s, then its height after t seconds is $s(t) = 80t - 16t^2$.
(a) What is the maximum height reached by the ball?
(b) What is the velocity of the ball when it is 96 ft above the ground on its way up?
(c) What is the velocity of the ball when it is 96 ft above the ground on its way down?
(a) height = _____ ft
(b) velocity = _____ ft/s
(c) velocity = _____ ft/s
Correct Answers:

- 100
- 16
- -16

---

13. **(1 pt) Library/ma122DB/set4/s3_3_24.pg**

The population of a slowly growing bacterial colony after t hours is given by $p(t) = 5t^2 + 29t + 150$. Find the growth rate after 4 hours.

Answer:_____
Correct Answers:

- 2*5*4 + 29

---

14. **(1 pt) Library/ma122DB/set4/s3_3_8.pg**

If a ball is thrown vertically upward from the roof of 32 foot building with a velocity of 96 ft/sec, its height after t seconds is $s(t) = 32 + 96t - 16t^2$.

a.) What is the maximum height the ball reaches?
Answer: _____

b.) What is the velocity of the ball when it hits the ground (height 0)?
Answer: _____
Correct Answers:

- 32 + 96*6/2 -4*6^2
- -16*(6*6+4*2)^.5

---

15. **(1 pt) Library/ma122DB/set4/s3_3_27.pg**

Suppose that the cost, in dollars, for a company to produce x pairs of a new line of jeans is

$$C(x) = 7500 + 8x + 0.01x^2 + 0.0002x^3.$$

(a) Find the marginal cost function.
Answer: _____

(b) Find the marginal cost at $x = 100$.
Answer: _____

(c) Find the cost at $x = 100$.
Answer: _____
Correct Answers:

- 8+0.02*x+0.0006*x^2
- 8+0.02*100+0.0006*100^2
- 7500+8*100+0.01*100^2+0.0002*100^3

---

16. **(1 pt) Library/ma122DB/set4/s3_3_13.pg**

A spherical balloon is being inflated. Find the rate of increase of the surface area ($S = 4\pi r^2$) with respect to the radius r
when $r = 10$: _____
when $r = 12$: _____
Note: You may input *pi* for π.
Correct Answers:

- 8*pi*10
- 8*pi*12

17. **(1 pt) Library/ASU-topics/setQuadraticFunction/p5.pg**
The profit function for a computer company is given by $P(x) = -x^2 + 27x - 30$ where x is the number of units produced (in thousands) and the profit is in thousand of dollars.

a) Determine how many (thousands of) units must be produced to yield maximum profit. Determine the maximum profit.
(thousands of) units = _____
maximum profit = _____ thousand dollars
b) Determine how many units should be produced for a profit of at least 40 thousand.
more than _____ (thousands of) units
less than _____ (thousands of) units
Correct Answers:

- 13.5
- 152.25
- 2.90518994979145
- 24.0948100502085

18. **(1 pt) Library/ASU-topics/setDerivativeBasicFunctions/3-4-77.pg**
The total cost (in dollars) of producing x golf clubs per day is given by the formula

$$C(x) = 600 + 150x - 0.2x^2.$$

(A) Find the marginal cost at a production level of x golf clubs.
$C'(x)$ = _____

(B) Find the marginal cost of producing 50 golf clubs.
Marginal cost for 50 clubs = _____

Correct Answers:

- 150 - 2*0.2*x
- 130

19. **(1 pt) Library/ASU-topics/setDerivativeBasicFunctions/3-4-88.pg**
If a person learns y items in x hours, as given by

$$y = 15\sqrt[3]{x^2},$$

find the rate of learning for a person at the end of:
(A) 2 hours: _____
(B) 6 hours: _____

Correct Answers:

- 7.937005259841
- 5.50321208149104

20. **(1 pt) Library/UVA-Stew5e/setUVA-Stew5e-C03S03-RatesofChange/3-3-13.pg**
Find the rate of increase (with respect to r) in the surface area ($S = 4\pi r^2$) of a spherical balloon when:
(A) $r = 1$ inches $\rightarrow$ Rate of increase = _____
(B) $r = 4$ inches $\rightarrow$ Rate of increase = _____
(C) $r = 6$ inches $\rightarrow$ Rate of increase = _____
Correct Answers:

- 25.1327416
- 100.5309664
- 150.7964496

21. **(1 pt) Library/Rochester/setIntegrals16Tables/tab_int_102.pg**
Use the Table of Integrals in the back of your textbook to evaluate the integral.

$$\int \frac{2xdx}{(x^2+4)\ln(x^2+4)}$$

_____

Correct Answers:

- ln(ln(x^2 + 4))

22. **(1 pt) Library/Rochester/setIntegrals3Definite/osu_in_3_4.pg**
$\int_b^{2b} x^3\,dx =$ _____

Correct Answers:

- 3.75*b**4

23. **(1 pt) Library/Rochester/setIntegrals3Definite/s4_4_27.pg**
Evaluate the definite integral

$$\int_2^5 \frac{10x^2+4}{\sqrt{x}}dx$$

_____

Correct Answers:

- 207.554216073023

24. **(1 pt) Library/Rochester/setIntegrals3Definite/S05.02.DefiniteIntegral.PTP18.pg**
Let $\int_3^{12} f(x)dx = 8$, $\int_3^6 f(x)dx = 7$, $\int_9^{12} f(x)dx = 3$.
Find $\int_6^9 f(x)dx =$ _____
and $\int_9^6 (8f(x) - 7)dx =$ _____
Correct Answers:

- -2
- 37

25. **(1 pt) Library/Rochester/setIntegrals3Definite/s4_4_21.pg**
Evaluate the definite integral

$$\int_{-8}^{8} (64 - x^2)dx$$

_____

Solution:
Since the function $f(x) = 64 - x^2$ is even,

$$\int_{-8}^{8}(64 - x^2)dx = 2\int_0^8 (64 - x^2)dx = 2\left(64x - \frac{x^3}{3}\right)\Big|_0^8 =$$
$$2\left[\left(64\cdot 8 - \frac{8^3}{3}\right) - (0-0)\right] = 2\frac{1024}{3} = 682.666666666667$$

Correct Answers:

- 682.666666666667

26. **(1 pt) Library/Rochester/setIntegrals3Definite/c4s4p6_mo.pg**

The value of $\int_2^8 \frac{1}{x^4}dx$ is _____

Correct Answers:

- `(1/[-(4-1)*8^(4-1)]-1/[-(4-1)*2^(4-1)])`

27. **(1 pt) Library/Rochester/setIntegrals3Definite/osu_in_3_3.pg**

$\int_1^4 \frac{2x^2+4}{x^2}\,dx =$ _____

Correct Answers:

- `9`

28. **(1 pt) Library/Rochester/setIntegrals3Definite/osu_in_3_6.pg**

Consider the function

$$f(x) = \begin{cases} x & \text{if } x < 1 \\ \frac{1}{x} & \text{if } x \geq 1 \end{cases}$$

Evaluate the definite integral.

$$\int_{-2}^{3} f(x)\,dx$$

_____

Correct Answers:

- `-0.40138771133189`

29. **(1 pt) Library/Rochester/setIntegrals3Definite/osu_in_3_5.pg**

Note: You can get full credit for this problem by just answering the last question correctly. The initial questions are meant as hints towards the final answer and also allow you the opportunity to get partial credit.

The integral $\int_{-1}^{4} \left|7x^2 - x^3 - 6x\right| dx$ MUST be evaluated by breaking it up into a sum of three integrals:

$$\int_{-1}^{a} \left|7x^2 - x^3 - 6x\right| dx +$$
$$\int_{a}^{c} \left|7x^2 - x^3 - 6x\right| dx +$$
$$\int_{c}^{4} \left|7x^2 - x^3 - 6x\right| dx$$

where

a = _____

c = _____

$\int_{-1}^{a} \left|7x^2 - x^3 - 6x\right| dx =$ _____

$\int_{a}^{c} \left|7x^2 - x^3 - 6x\right| dx =$ _____

$\int_{c}^{4} \left|7x^2 - x^3 - 6x\right| dx =$ _____

Thus $\int_{-1}^{4} \left|7x^2 - x^3 - 6x\right| dx =$ _____

Correct Answers:

- `0`
- `1`
- `5.58333333333333`
- `0.916666666666667`
- `38.25`
- `44.75`

30. **(1 pt) Library/Rochester/setIntegrals3Definite/s4_4_17.pg**

Evaluate the definite integral

$$\int_2^8 (10x+8)dx$$

_____

Correct Answers:

- `348`

31. **(1 pt) Library/Rochester/setIntegrals0Theory/sc5_2_5.pg**

Use the Midpoint Rule to approximate the integral

$$\int_3^{12} (4x+0x^2)dx$$

with n=3.

_____

Correct Answers:

- `270`

32. **(1 pt) Library/Rochester/setIntegrals0Theory/sc5_2_24.pg**

Evaluate the integral below by interpreting it in terms of areas. In other words, draw a picture of the region the integral represents, and find the area using high school geometry.

$$\int_{-6}^{6} \sqrt{36-x^2}dx$$

_____

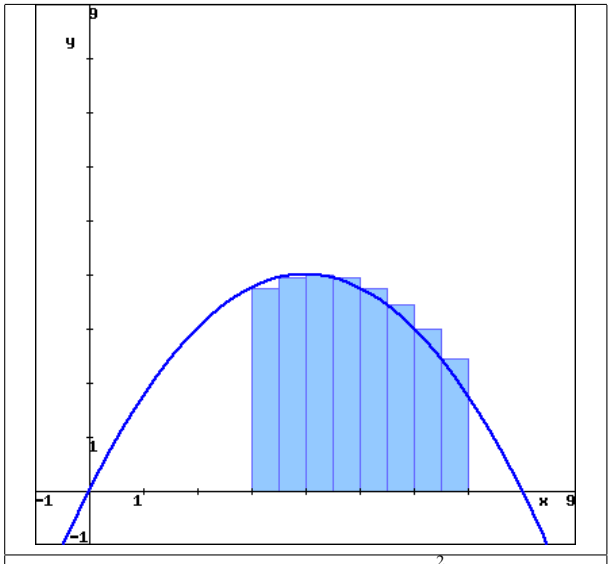
Correct Answers:

- `56.548667772`

33. **(1 pt) Library/Rochester/setIntegrals0Theory/S05.01.AreaDistance.PTP00.pg**

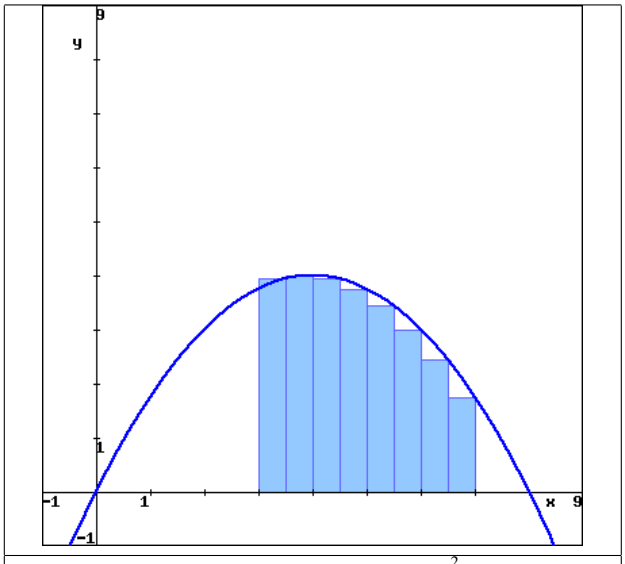
The rectangles in the graph below illustrate a left endpoint Riemann sum for $f(x) = -\frac{x^2}{4} + 2x$ on the interval $[3,7]$.

The value of this left endpoint Riemann sum is _____, and this Riemann sum is an $\boxed{?}$ the area of the region enclosed by $y = f(x)$, the x-axis, and the vertical lines x = 3 and x = 7.



Left endpoint Riemann sum for $y = -\frac{x^2}{4} + 2x$ on $[3,7]$

The rectangles in the graph below illustrate a right endpoint Riemann sum for $f(x) = -\dfrac{x^2}{4} + 2x$ on the interval $[3,7]$.
The value of this right endpoint Riemann sum is _____, and this Riemann sum is an [?] the area of the region enclosed by $y = f(x)$, the x-axis, and the vertical lines x = 3 and x = 7.



Right endpoint Riemann sum for $y = -\frac{x^2}{4} + 2x$ on $[3,7]$

Solution:

(A) The left endpoint Riemann sum is $f(3)\cdot 0.5 + f(3.5)\cdot 0.5 + \cdots + f(6.5)\cdot 0.5 = (3.75 + 3.9375 + \cdots + 2.4375)\cdot 0.5 = 14.125$.

(B) The right endpoint Riemann sum is $f(3.5)\cdot 0.5 + f(4)\cdot 0.5 + \cdots + f(7)\cdot 0.5 = (3.9375 + 4 + \cdots + 1.75)\cdot 0.5 = 13.125$.

Correct Answers:

- 14.125
- there is ambiguity
- 13.125
- there is ambiguity

---

34. **(1 pt) Library/Rochester/setIntegrals0Theory/sc5_2_3.pg**
Consider the integral

$$\int_4^{10} (2x^2 + 4x + 6)\,dx$$

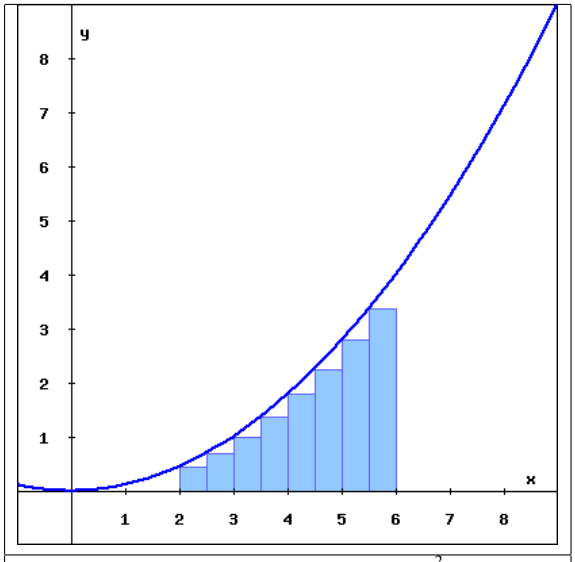
(a) Find the Riemann sum for this integral using right endpoints and $n = 3$.
$R_3 =$ _____
(b) Find the Riemann sum for this same integral, using left endpoints and $n = 3$.
$L_3 =$ _____

Correct Answers:

- 1028
- 644

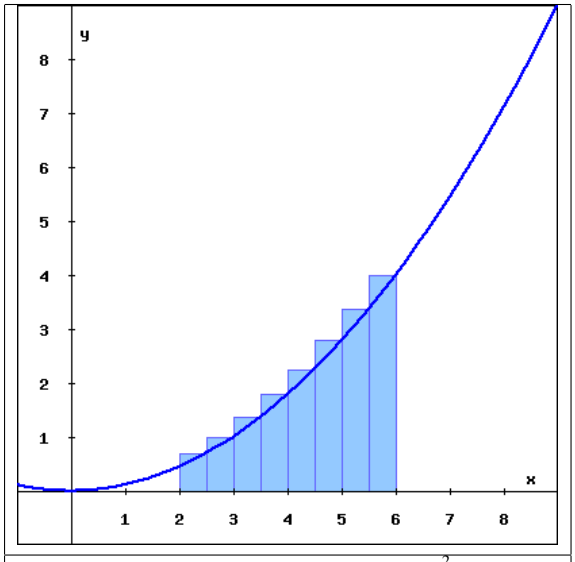
---

35. **(1 pt) Library/Rochester/setIntegrals0Theory/S05.01.AreaDistance.PTP01.pg**
The rectangles in the graph below illustrate a left endpoint Riemann sum for $f(x) = \dfrac{x^2}{9}$ on the interval $[2,6]$.
The value of this left endpoint Riemann sum is _____, and this Riemann sum is an [?] the area of the region enclosed by $y = f(x)$, the x-axis, and the vertical lines x = 2 and x = 6.



Left endpoint Riemann sum for $y = \frac{x^2}{9}$ on $[2,6]$

The rectangles in the graph below illustrate a right endpoint Riemann sum for $f(x) = \dfrac{x^2}{9}$ on the interval $[2,6]$.
The value of this right endpoint Riemann sum is _____, and this Riemann sum is an [?] the area of the region enclosed by $y = f(x)$, the x-axis, and the vertical lines x = 2 and x = 6.



Right endpoint Riemann sum for $y = \frac{x^2}{9}$ on $[2,6]$

Solution:

(A) The left endpoint Riemann sum is $f(2) \cdot 0.5 + f(2.5) \cdot 0.5 + \cdots + f(5.5) \cdot 0.5 = (0.444444444444444 + 0.694444444444444 + \cdots + 3.36111111111111) \cdot 0.5 = 6.83333$.

(B) The right endpoint Riemann sum is $f(2.5) \cdot 0.5 + f(3) \cdot 0.5 + \cdots + f(6) \cdot 0.5 = (0.694444444444444 + 1 + \cdots + 4) \cdot 0.5 = 8.61111$.

Correct Answers:

- 6.83333
- underestimate of
- 8.61111
- overestimate of

---

36. **(1 pt) Library/Rochester/setIntegrals0Theory/sc5_2_2a.pg**
Use the Midpoint Rule to approximate

$$\int_{-1.5}^{3.5} x^3 dx$$

with $n = 5$.

_____

Correct Answers:

- 35

---

37. **(1 pt) Library/Rochester/setIntegrals0Theory/sc5_2_28_mo.pg**
Evaluate the integral by interpreting it in terms of areas. In other words, draw a picture of the region the integral represents, and find the area using high school geometry.
$\int_0^5 |10x-6|dx =$ _____
Correct Answers:

- (1/2)*6*(6/10)+(1/2)*(5-6/10)*(10*5-6)

---

38. **(1 pt) Library/Indiana/Indiana_setIntegrals0Theory/ur_in_0_13.pg**
Let $\int_1^{8.5} f(x)dx = 2, \int_1^{3.5} f(x)dx = 9, \int_6^{8.5} f(x)dx = 2.$
Find $\int_{3.5}^{6} f(x)dx =$ _____
and $\int_{3.5}^{6} (2f(x)-9)dx =$ _____
Solution:

First recall the following fact from p.386 of your textbook:

$$\int_a^b f(x)dx + \int_b^c f(x)dx = \int_a^c f(x)dx$$

and therefore we can rearrange it to look like this:

$$\int_b^c f(x)dx = \int_a^c f(x)dx - \int_a^b f(x)dx$$

Applying that in this specific context, we find:

$$\int_{3.5}^{8.5} f(x)dx = \int_1^{8.5} f(x)dx - \int_1^{3.5} f(x)dx = 2 - 9 = -7$$

This is not our final answer, however; it is only an intermediate step.

We can also rearrange the original formula above to achieve the following:

$$\int_a^b f(x)dx = \int_a^c f(x)dx - \int_b^c f(x)dx$$

We use it as we proceed:

$$\int_{3.5}^{6} f(x)dx = \int_{3.5}^{8.5} f(x)dx - \int_{6}^{8.5} f(x)dx = -7 - 2 = -9$$

This is the answer to the first question in this problem.

As for the second question, we can use a few properties of the integral introduced on p.385 of your text:

$$\int_{3.5}^{6} (2f(x) - 9)dx = \int_{3.5}^{6} 2f(x)dx - \int_{3.5}^{6} 9dx$$

by Property 4 (integral of difference is difference of integrals)

$$= 2\int_{3.5}^{6} f(x)dx - \int_{3.5}^{6} 9dx$$

by Property 3 (can pull constant out of integral)

$$= 2\int_{3.5}^{6} f(x)dx - 9(6 - 3.5)$$

by Property 1 (integral of constant formula)

$$= 2(-9) - 9(6 - 3.5)$$

by substituting answer to first part of problem

$$= -18 - 22.5 = -40.5$$

Correct Answers:

- -9
- -40.5

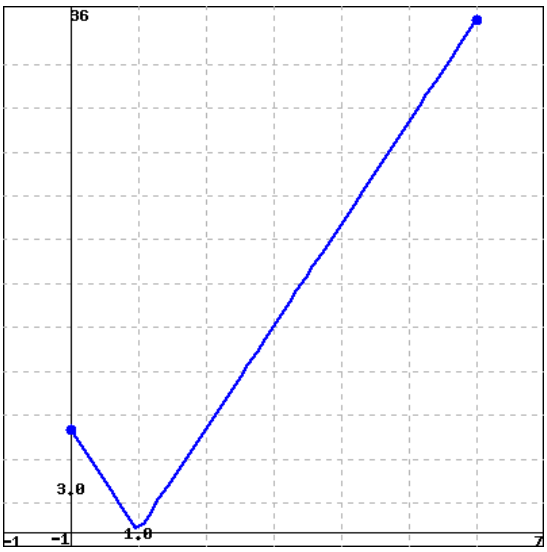
---

39. **(1 pt) Library/Indiana/Indiana_setIntegrals0Theory/sc5_2_28.pg**
Evaluate the integral by interpreting it in terms of areas. In other words, draw a picture of the region the integral represents, and find the area using high school geometry.

$$\int_0^6 |7x - 7|dx$$

Solution:

When we graph this function, we see it comes out as 2 line segments, one heading downwards from the y-intercept $(0,7)$ to the x-intercept $(1,0)$, and another heading from the x-intercept upwards and to the right, to the point $(6,35)$. The whole function looks like this:



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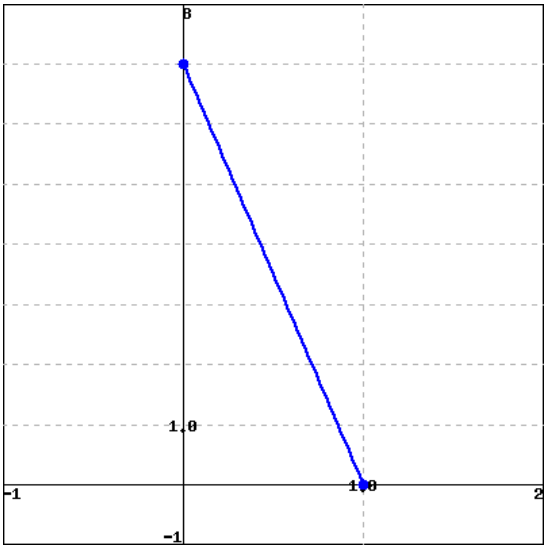
(click image to see large version in new window) ¡/center¿

We shall consider each portion of the graph separately. First, the section before the x-intercept: the interval $[0,1]$. Looking more carefully at just this portion of the graph, we see the following:



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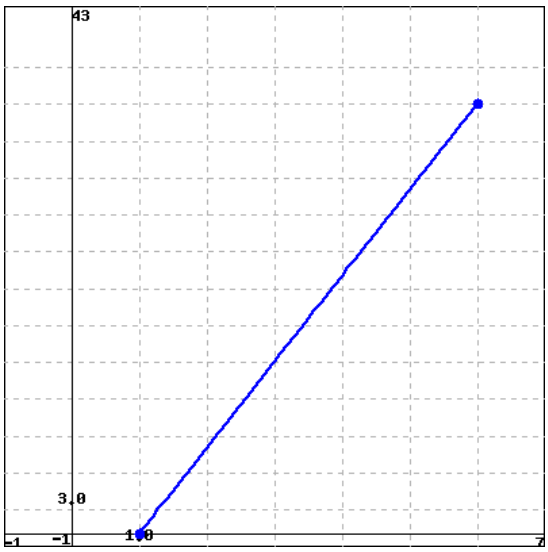
This forms a triangle with base the line segment from $(0,0)$ to $(1,0)$ and height the line segment from $(0,0)$ to $(0,7)$. The length of the base is clearly 1 and the length of the height is clearly 7. So the area under this portion of the function is the area of this triangle, specifically $A = \frac{1}{2} \cdot b \cdot h = \frac{1}{2} \cdot 1 \cdot 7 = 3.5$.

Next we examine the rest of the graph, from the x-intercept rightwards: the interval $[1,6]$. Looking more carefully at just this portion of the graph, we see the following:



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This, too, forms a triangle, with base the line segment from $(1,0)$ to $(6,0)$ and height the line segment form $(6,0)$ to $(6,35)$. The base therefore has length 5 and the height has length 35, giving this triangle area $A = \frac{1}{2} \cdot b \cdot h = \frac{1}{2} \cdot 5 \cdot 35 = 87.5$.

So putting the areas of these two triangles together, we get the area under the whole function: $3.5 + 87.5 = 91$.

Correct Answers:

- 91

---

40. **(1 pt) Library/Rochester/setIntegrals12Methods/mec_int3.pg**
Evaluate the indefinite integral.

$$\int \frac{e^{4x}}{e^{8x}+36}dx$$

Correct Answers:

- (1/(4*6))*arctan(e^(4 * x)/6)

---

41. **(1 pt) Library/Rochester/setIntegrals12Methods/osu_in_12_4.pg**
Find the indicated integrals (if they exist)

$\int x^2\sqrt{3x+8}\,dx =$ _____

$\int_{-\infty}^{\infty} \frac{e^{8x}}{e^{16x}+1}\,dx =$ _____

$\int \frac{4x+9}{3x^2+25x+8}\,dx =$ _____

$\int \frac{\ln(x)}{x^6}\,dx =$ _____

Correct Answers:

- (1/3^3)*((2/7)*(3*x+8)^(7/2)-(4/5)*8*(3*x+8)^(5/2)+(2/3)*8^2*(3*x+8)^(3/2))
- 0.196349540875
- ln(3*x+1)/3 + ln(x+8)
- (x^-5/-5)*(ln(x)-1/-5)

---

42. **(1 pt) Library/Rochester/setIntegrals4FTC/S05.03.FundThmCalc.PTP18.pg**
Evaluate the indefinite integral:

$$\int \frac{5-2xe^x}{x}\,dx = \_\_\_\_\_ + C.$$

Correct Answers:

- - 2*exp(x) + 5*ln(abs(x))

---

43. **(1 pt) Library/Union/setIntBasic/an7_2_7.pg**
Calculate the following antiderivatives:

(a) $\int x^8\,dx =$ _____ $+C.$

(b) $\int x^{8/9}\,dx =$ _____ $+C.$

(c) $\int x^{-6}\sqrt{x}\,dx =$ _____ $+C.$

Correct Answers:

- 1/9*x^9
- 9/17*x^(17/9)
- 1/(-4.5)*x^(-4.5)

---

44. **(1 pt) Library/Union/setIntBasic/an7_2_9.pg**
Calculate the following antiderivatives:

(a) $\int 14t - 6t^7 - 6\,dt =$ _____ $+C.$

(b) $\int \frac{1}{u^{3/4}} + 3.5\sqrt{u}\,du =$ _____ $+C.$

(c) $\int \frac{1}{3x^5}\,dx =$ _____ $+C.$

Correct Answers:

- -6/8*t^8+14/2*t^2+(-6)*t
- 4/1*u^(1/4)+3.5*2/3*u^(3/2)
- 1/3*1/(-4)*x^(-4)

---

45. **(1 pt) Library/Union/setIntBasic/an7_2_13.pg**
Calculate the following antiderivatives:

(a) $\int x\left(-2+x^4\right)\,dx =$ _____ $+C.$

(b) $\int \frac{-2x^4+9x^{10}}{x^{-4}}\,dx =$ _____ $+C.$

(c) $\int \left(3+x^6\right)^2\,dx =$ _____ $+C.$

Correct Answers:

- -2/2*x^2+1/6*x^6
- -2/9*x^9+9/15*x^15
- 9*x+6/7*x^7+1/13*x^13

---

46. **(1 pt) Library/UCSB/Stewart5_5_4/Stewart5_5_4_15.pg**

Using an upper-case "C" for any arbitrary constants, find the general indefinite integral

$$\int -9x\sqrt{x}\,dx$$

Integral = _____

Correct Answers:

- -9*2/5*x^(5/2)+C

47. **(1 pt) Library/UCSB/Stewart5_5_4/Stewart5_5_4_19.pg**

Evaluate the integral

$$\int_{-1}^{0} (-5x - 4e^x)\,dx$$

Integral = _____

Correct Answers:

- `(-4)-(-5*1/2+-4*exp(-1))`

---

48. **(1 pt) Library/UCSB/Stewart5_5_4/Stewart5_5_4_30.pg**

Evaluate the integral

$$\int_{1}^{9} \frac{-9x - 10}{\sqrt{x}}\,dx$$

Integral = _____

Correct Answers:

- `52/3*-9+4*-10`

---

49. **(1 pt) Library/UCSB/Stewart5_5_4/Stewart5_5_4_35.pg**

Evaluate the integral

$$\int_{1}^{64} \frac{1 + \sqrt[3]{x}}{1\sqrt{x}}\,dx$$

Integral = _____

Correct Answers:

- `256/5/1`

---

50. **(1 pt) Library/UCSB/Stewart5_5_4/Stewart5_5_4_39.pg**

Evaluate the integral

$$\int_{-1}^{2} (-9x - 4|x|)\,dx$$

Integral = _____

Correct Answers:

- `3/2*-9+5/2*-4`

---

51. **(1 pt) Library/UCSB/Stewart5_5_4/Stewart5_5_4_38.pg**

Evaluate the integral

$$\int_{4}^{9} \left(-3\sqrt{x} + \frac{-9}{\sqrt{x}}\right)^2 dx$$

Integral = _____

Correct Answers:

- `2*(-9)^2*ln(3)+10*-3*-9+65/2*(-3)^2-2*(-9)^2*ln(2)`

---

52. **(1 pt) Library/ASU-topics/setAntiderivatives/6-1-59.pg**

Evaluate the indefinite integral:

$$\int 3z^{-3} + 7z^{-2} + 3z^{-1}\,dz = \_\_\_\_\_ + C.$$

Correct Answers:

- `(3*z**(-2))/(-2) + (7*z**(-1))/(-1) + 3*ln(abs(z))`

---

53. **(1 pt) Library/Utah/Quantitative_Analysis/set8_Indefinite_Integrals-/pr_11.pg**

Evaluate the indefinite integral.

$$\int \frac{x^3}{x^4 + 4}\,dx = \_\_\_\_\_ + C$$

Correct Answers:

- `0.25 * ln(x^4 + 4)`

---

54. **(1 pt) Library/Utah/Quantitative_Analysis/set8_Indefinite_Integrals-/pr_2.pg**

Consider the function $f(x) = \frac{8}{x^3} - \frac{6}{x^7}$.
Let $F(x)$ be the antiderivative of $f(x)$ with $F(1) = 0$.
Then $F(3)$ equals _____

Correct Answers:

- `2.55692729766804`

---

55. **(1 pt) Library/Utah/Quantitative_Analysis/set8_Indefinite_Integrals-/pr_6.pg**

Find

$$F(x) = \int x(x^2 + 6)^3\,dx$$

Give a specific function for $F(x)$.

F(x) = _____

Correct Answers:

- `(x*x+6)**(3+1)/(2*(3+1))`

---

56. **(1 pt) Library/Utah/Quantitative_Analysis/set8_Indefinite_Integrals-/pr_14.pg**

Evaluate the indefinite integral.

$$\int \frac{1x - 2}{(1x^2 - 4x + 1)^4}\,dx$$

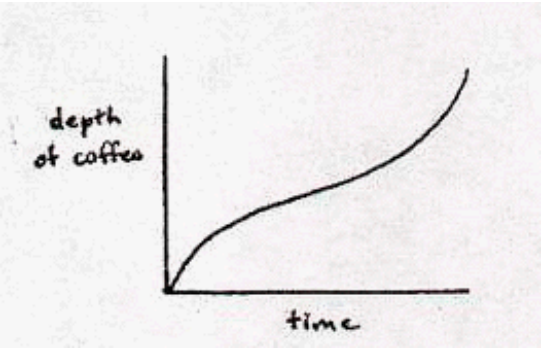
_____

Correct Answers:

- `-0.166666666666667 * (1 * x^2 - 4 * x + 1)^(-3)`

57. **(1 pt) Library/Utah/Quantitative_Analysis/set8_Indefinite_Integrals-/pr_15/pr_15.pg**

Coffee is poured into one of mugs above at a constant rate (constant volume per unit time). The graph below shows the depth of coffee in the mug as a function of time. (Click on images for better view.)



Which mug was filled with coffee? _____

For credit on this problem, send me a feedback EXPLAINING your choice. This problem is fun, but too easy to just guess away at. Enjoy your Java!! And yes, I will keep track of who sends the feedback!

Correct Answers:

- B

---

58. **(1 pt) Library/Utah/Quantitative_Analysis/set11_Indefinite_Integrals-/s1p6.pg**

Evaluate the indefinite integral.

$$\int x^4 e^{x^5}\,dx$$

_____ $+ C$

Correct Answers:

- 0.2 * e^(x^5)

---

59. **(1 pt) Library/Utah/Quantitative_Analysis/set11_Indefinite_Integrals-/s1p5.pg**

$\int \sqrt[8]{e^x}\,dx =$ _____ $+ C$

Correct Answers:

- 8*e^(x/8)

---

60. **(1 pt) Library/Utah/Quantitative_Analysis/set11_Indefinite_Integrals-/s1p12.pg**

Evaluate

$$\int \frac{e^{10x}}{e^{10x}+10}\,dx$$

_____ $+ C$

Correct Answers:

- 1/10*ln(e**(10*x) + 10)

---

61. **(1 pt) Library/Utah/AP_Calculus_I/set6_The_Integral-/1210set8p16.pg**

Suppose

$$f(x) = x+1$$

and F is an antiderivative of f that satisfies

$$F(0) = 1.$$

Then

$F(x) =$ _____.

Correct Answers:

- x^2/2+x+1

---

62. **(1 pt) Library/Rochester/setIntegrals4FTC/c4s4p1.pg**

If $f(x) = \int_1^x t^8 dt$

then

$f'(x) =$ _____

$f'(-2) =$ _____

Correct Answers:

- x^8
- 256

---

63. **(1 pt) Library/Rochester/setIntegrals4FTC/csuf_in_4_1.pg**

If $f(x) = \int_{-4}^{x^4} \sqrt{t^2+3}\,dt$ then

$f'(x) =$ _____

Solution:

Let $u = g(x) = x^4$ and $h(u) = \int_{-4}^{u} \sqrt{t^2+3}\,dt$, then $f(x) = h(g(x))$.

By the chain rule, $f'(x) = h'(g(x))g'(x)$.

By the Fundamental Theorem of Calculus, $h'(u) = \frac{d}{du}\int_{-4}^{u} \sqrt{t^2+3}\,dt = \sqrt{u^2+3}$.

$g'(x) = (x^4)' = 4x^3$.

Thus $f'(x) = h'(g(x))g'(x) = \sqrt{u^2+3}\cdot 4x^3 = \sqrt{(x^4)^2+3}\cdot 4x^3 = \sqrt{x^8+3}\cdot 4x^3$.

Correct Answers:

- sqrt(x^8+3)*4*x^(3)

64. **(1 pt) Library/Rochester/setIntegrals14Substitution/sc5_5_25.pg**
Evaluate the indefinite integral.

$$\int \frac{9\,dx}{x\ln(4x)}$$

_____

Correct Answers:

- `9*ln(|ln(4*x)|)`

65. **(1 pt) Library/Rochester/setIntegrals14Substitution/sc5_5_49.pg**
Evaluate the definite integral.

$$\int_0^4 \frac{dx}{4x+3}$$

_____

Correct Answers:

- `0.461456672624583`

66. **(1 pt) Library/Rochester/setIntegrals14Substitution/osu_in_14_3.pg**
Note: You can get full credit for this problem by just answering the last question correctly. The initial questions are meant as hints towards the final answer and also allow you the opportunity to get partial credit.

Consider the indefinite integral $\int \frac{1}{6x+7\sqrt{x}}\,dx$

Then the most appropriate substitution to simplify this integral is
$u =$ _____

Then $dx = f(x)\,du$ where
$f(x) =$ _____

After making the substitution and simplifying we obtain the integral $\int g(u)\,du$ where
$g(u) =$ _____

This last integral is: = _____ $+C$
(Leave out constant of integration from your answer.)

After substituting back for u we obtain the following final form of the answer:
= _____ $+C$
(Leave out constant of integration from your answer.)

Correct Answers:

- `6*sqrt(x)+7`
- `2*sqrt(x)/6`
- `2/(6*u)`
- `2*ln(u)/6`
- `2*ln(6*sqrt(x)+7)/6`

67. **(1 pt) Library/Michigan/Chap7Sec3/Q09.pg**
Antidifferentiate using the table of integrals. You may need to transform the integrand first.
$\int x^2 e^{8x}\,dx =$ _____
SOLUTION

$$\int x^2 e^{8x}\,dx = \frac{1}{8}x^2e^{8x} - \frac{2}{64}xe^{8x} + \frac{2}{512}e^{8x} + C.$$

Correct Answers:

- `1/8*x^2*e^(8*x)-2/64*x*e^(8*x)+2/512*e^(8*x)+C`

68. **(1 pt) Library/Michigan/Chap7Sec3/Q31.pg**
Antidifferentiate using the table of integrals. You may need to transform the integrand first.
$\int \frac{1}{z(z-9)}\,dz =$ _____
SOLUTION

$$\int \frac{1}{z(z-9)}\,dz = \frac{1}{9}(-(\ln(|z|)) + \ln(|z-9|)) + C.$$

Correct Answers:

- `1/9*(-[ln(|z|)]+ln(|z-9|))+C`

69. **(1 pt) Library/Rochester/setIntegrals14Substitution/sc5_5_7.pg**
Evaluate the indefinite integral.

$$\int \frac{(\ln(x))^5}{x}dx$$

_____ $+C$

Correct Answers:

- `(ln(x)^6)/6`

70. **(1 pt) Library/Michigan/Chap7Sec1/Q31.pg**
Find the following integral. Note that you can check your answer by differentiation.
$\int \frac{5e^{5\sqrt{y}}}{\sqrt{y}}\,dy =$ _____
SOLUTION
We use substitution with $w = \sqrt{y}$. Then $dw = \frac{1}{2}\frac{1}{\sqrt{y}}\,dy$, so that

$$\int \frac{5e^{5\sqrt{y}}}{\sqrt{y}}\,dy = 10\int e^{5w}\,dw = 2e^{5w} + C = 2e^{5\sqrt{y}} + C.$$

Correct Answers:

- `10*e^[5*sqrt(y)]/5+C`

71. **(1 pt) Library/Michigan/Chap7Sec3/Q29.pg**
Antidifferentiate using the table of integrals. You may need to transform the integrand first.
$\int \frac{1}{x^2+9x+20}\,dx =$ _____
SOLUTION

$$\int \frac{1}{x^2+9x+20}\,dx = \int \frac{1}{(x-(-4))(x-(-5))}\,dx = \frac{1}{5-4}(\ln(|x+4|)-\ln(|x+5|))+C.$$

Correct Answers:

- `1/(5-4)*[ln(|x+4|)-ln(|x+5|)]+C`

72. **(1 pt) Library/Michigan/Chap7Sec3/Q09.pg**
Antidifferentiate using the table of integrals. You may need to transform the integrand first.
$\int x^2 e^{7x}\,dx =$ _____
SOLUTION

$$\int x^2 e^{7x}\,dx = \frac{1}{7}x^2e^{7x} - \frac{2}{49}xe^{7x} + \frac{2}{343}e^{7x} + C.$$

Correct Answers:

- `1/7*x^2*e^(7*x)-2/49*x*e^(7*x)+2/343*e^(7*x)+C`

73. **(1 pt) Library/Michigan/Chap7Sec3/Q31.pg**
Antidifferentiate using the table of integrals. You may need to transform the integrand first.
$\int \frac{1}{z(z-9)}\,dz =$ _____
SOLUTION

$$\int \frac{1}{z(z-9)}\,dz = \frac{1}{9}(-(\ln(|z|)) + \ln(|z-9|)) + C.$$

Correct Answers:

- `1/9*(-[ln(|z|)]+ln(|z-9|))+C`

74. **(1 pt) Library/Michigan/Chap5Sec4/Q11.pg**
For the function $F(t) = 3^t$, let $f(t) = F'(t)$. Write the integral $\int_a^b f(t)\,dt$ and evaluate it with the Fundamental Theorem of Calculus.
$\int_0^3$ _____ $dt =$ _____
(Note that your answer must be exact, not a decimal approximation.)
SOLUTION
The integrand $f(t) = F'(t)$, so the integral we want is $\int_0^3 1.09861 \cdot 3^t\,dt$. We can evaluate this with the Fundamental Theorem of Calculus, and have $\int_0^3 1.09861 \cdot 3^t\,dt = 3^3 - 3^0$.
Correct Answers:

- `1.09861*3^t`
- `3^3-3^0`

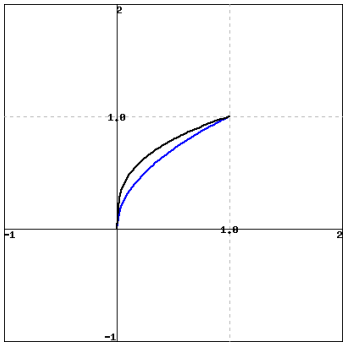
75. **(1 pt) Library/Michigan/Chap5Sec4/Q21.pg**
If $f(x)$ is odd and $\int_{-3}^{8} f(x)dx = 3$, then
$\int_3^8 f(x)dx =$ _____
SOLUTION
We have

$$3 = \int_{-3}^{8} f(x)dx = \int_{-3}^{3} f(x)dx + \int_3^8 f(x)dx.$$

Since f is odd, $\int_{-3}^{3} f(x)dx = 0$, so $\int_{-3}^{8} f(x)dx = 3$.
Correct Answers:

- `3`

76. **(1 pt) Library/Michigan/Chap5Sec4/Q07.pg**
Find the area of the region between $y = x^{1/2}$ and $y = x^{1/3}$ for $0 \le x \le 1$.
area = _____
SOLUTION
The graph of $y = x^{1/2}$ is below the curve $y = x^{1/3}$ for $0 \le x \le 1$, as shown in the figure below (the bottom curve, in blue, is $y = x^{1/2}$, and the top, in black, is $y = x^{1/3}$).



(Click on the graph for a larger version.)

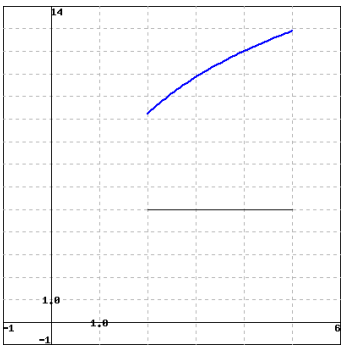
Therefore,

$$\text{Area } = \int_0^1 (x^{1/3} - x^{1/2})dx = 0.083.$$

The integral was evaluated on a calculator.
Correct Answers:

- `0.0833333333333334`

77. **(1 pt) Library/Michigan/Chap5Sec4/Q05.pg**
Find the area of the region under $y = 4\ln(5x)$ and above $y = 5$ for $2 \le x \le 5$.
area = _____
SOLUTION
The graph of $y = 4\ln(5x)$ is above the line $y = 5$ for $2 \le x \le 5$, as shown in the figure below.



(Click on the graph for a larger version.)

Therefore,

$$\text{Area } = \int_2^5 (4\ln(5x) - 5)dx = 18.957.$$

The integral was evaluated on a calculator.

Correct Answers:

- 18.9568357534116

---

78. **(1 pt) Library/Union/setIntSubstitution/an6_3_01.pg**

Evaluate the indefinite integral.

$\int e^{4x}\,dx =$ _____ $+C.$

Correct Answers:

- 1/4*e^(4*x)

---

79. **(1 pt) Library/maCalcDB/setIntegrals14Substitution/sc5_5_13.pg**

Evaluate the indefinite integral.

$$\int \frac{3}{(t+5)^8}dt$$

_____

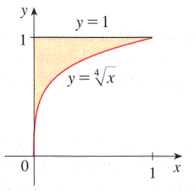
Correct Answers:

- -0.142857142857143 * 3 * (t + 5)^-7

---

80. **(1 pt) Library/UCSB/Stewart5_5_4/Stewart5_5_4_44-/Stewart5_5_4_44.pg**

The boundaries of the shaded region are the y-axis, the line $y = 1$, and the curve $y = \sqrt[4]{x}$. Find the area of this region by writing x as a function of y and integrating with respect to y.



Area = _____

Correct Answers:

- 1/5

---

81. **(1 pt) Library/UCSB/Stewart5_5_5/Stewart5_5_5_49.pg**

Evaluate the definite integral (if it exists)

$$\int_0^2 (x-1)^{25}\,dx$$

If the integral does not exist, type "DNE".

_____

Correct Answers:

- 0

---

82. **(1 pt) Library/UCSB/Stewart5_5_5/Stewart5_5_5_27.pg**

Evaluate the indefinite integral

$$\int e^x\sqrt{2+e^x}\,dx$$

Note: Any arbitrary constants used must be an upper-case "C".

_____

Correct Answers:

- 2/3*(2+exp(x))^(3/2)+C+c

---

83. **(1 pt) Library/Utah/Calculus_II/set5_Techniques_of_Integration-/set5_pr3.pg**

Find the indefinite integrals:

(a) $\int \frac{x^3}{x+1}dx =$ _____ $+ C.$

(b) $\int \frac{x^3}{x^2+1}dx =$ _____ $+ C.$

Correct Answers:

- (x**3)/3 - (x**2)/2 + x - ln(abs(x+1))
- (x**2)/2 - (1/2)ln(x**2 + 1)

---

84. **(1 pt) Library/Utah/Calculus_II/set15_Practice/osu_in_14_7.pg**

Evaluate the definite integral.

$$\int_1^{e^7} \frac{dx}{x(1+\ln x)}$$

_____

Correct Answers:

- 2.07944154167984

---

85. **(1 pt) Library/Utah/Calculus_II/set15_Practice/osu_in_14_10.pg**

Note: You can get full credit for this problem by just entering the answer to the last question correctly. The initial questions are meant as hints towards the final answer and also allow you the opportunity to get partial credit.

Consider the indefinite integral

$$\int \frac{8}{8+e^x}\,dx$$

The most appropriate substitution to simplify this integral is $u = f(x)$ where

$f(x) =$ _____

We then have

$$dx = g(u)\,du$$

where

$g(u) =$ _____

Hint: you need to back substitute for x in terms of u for this part.

After substituting into the original integral we obtain $\int h(u)\,du$ where

$h(u)$ = _____

To evaluate this integral rewrite the numerator as

$$8 = u - (u-8)$$

simplify, then integrate, thus obtaining

$$\int h(u)\,du = H(u)$$

where

$H(u)$ = _____ + C

After substituting back for u we obtain our final answer

$\int \frac{8}{8+e^x}\,dx$ = _____ + C

Correct Answers:

- `8+e^x`
- `1/(u-8)`
- `8/(u*(u-8))`
- `log(u-8)-log(u)`
- `x-log(e^x + 8)`

---

86. **(1 pt) Library/Utah/AP_Calculus_I/set9_Basic_Methods_of_Integration-/1220s10p2.pg**

Perform the indicated integrations.

$\int \frac{e^x}{e^x+1}\mathrm{d}x$ = _____.

$\int \frac{e^x}{e^{x+1}}\mathrm{d}x$ = _____.

$\int \frac{e^{x+1}}{e^x+1}\mathrm{d}x$ = _____.

Correct Answers:

- `ln(1 + e^x)`
- `x/exp(1)`
- `exp(1)*log(e^x+1)`

---

87. **(1 pt) Library/Rochester/setIntegrals25RationalFunctions-/nsAP_F_18.pg**

Write out the form of the partial fraction decomposition of the function:

$$Q = \int_5^{11} \frac{6x}{x^2+4x+4}dx$$

Determine the numerical values of the coefficients, A and B, where $B \leq A$

$$\frac{A}{denominator} + \frac{B}{denominator}$$

A = _____ B = _____

Correct Answers:

- `6`
- `-12`

---

88. **(1 pt) Library/Rochester/setIntegrals25RationalFunctions-/osu_in_25_7.pg**

Note: You can get full credit for this problem by just entering the final answer (to the last question) correctly. The initial questions are meant as hints towards the final answer and also allow you the opportunity to get partial credit.

Consider the indefinite integral $\int \frac{5x^3+2x^2+2x-1}{x^2-1}\,dx$

Then the integrand decomposes into the form

$$ax+b+\frac{c}{x-1}+\frac{d}{x+1}$$

where

a = _____

b = _____

c = _____

d = _____

Integrating term by term, we obtain that

$\int \frac{5x^3+2x^2+2x-1}{x^2-1}\,dx =$

_____ $+C$

Correct Answers:

- `5`
- `2`
- `4`
- `3`
- `5*x^2/2+2*x+4*ln(x-1)+3*ln(x+1)`

---

89. **(1 pt) Library/Rochester/setIntegrals25RationalFunctions-/ur_in_25_5.pg**

Let $f(x)$ be a quadratic function such that $f(0) = 4$ and

$$\int \frac{f(x)}{x^2(x+3)^7}\,dx$$

is a rational function.

Determine the value of $f'(0)$.

$f'(0)$ = _____

Correct Answers:

- `9.33333333333333`

---

90. **(1 pt) Library/Rochester/setIntegrals25RationalFunctions-/ur_in_25_3.pg**

Evaluate the integral.

$$\int_{-3}^{3} \frac{1}{(x^2+2x+1.25)}dx$$

_____

Correct Answers:

- `5.54253233529575`

91. **(1 pt) Library/Rochester/setIntegrals15ByParts/sc5_6_4.pg**
Use integration by parts to evaluate the integral.

$$\int 3x\ln(6x)\,dx$$

_____ $+C$

Solution:
Let $u = \ln(6x)$ and $dv = 3xdx$.
Then $du = \frac{1}{6x}\cdot 6dx = \frac{1}{x}dx$ and $v = 1.5x^2$.
$\int 3x\ln(6x)\,dx = uv - \int v\,du$
$= \ln(6x)1.5x^2 - \int 1.5x^2\frac{1}{x}\,dx$
$= 1.5x^2\ln(6x) - \int 1.5x\,dx$
$= 1.5x^2\ln(6x) - 0.75x^2 + C.$

Correct Answers:

- `3 * 1/2 * (x^2 * ln(6 * x) - 1/2 * x^2)`

92. **(1 pt) Library/Rochester/setIntegrals15ByParts/sc5_6_15.pg**
Evaluate the definite integral.

$$\int_0^1 te^{-t}dt$$

_____

Correct Answers:

- `0.264241117657115`

93. **(1 pt) Library/Rochester/setIntegrals15ByParts/ur_in_15_2.pg**
Evaluate the indefinite integral.

$$\int \ln(x^2+9x+20)\,dx$$

Answer = _____ $+C$

Correct Answers:

- `(x + 4)*ln(x + 4) + (x + 5)*ln(x + 5) - 2*x`

94. **(1 pt) Library/Rochester/setIntegrals15ByParts/sc5_6_1.pg**
Use integration by parts to evaluate the integral.

$$\int xe^{4x}dx$$

_____ $+C$

Correct Answers:

- `0.25 * (x * e^(4 * x) - 0.25 * e^(4 * x))`

95. **(1 pt) Library/Rochester/setIntegrals15ByParts/sc5_6_16.pg**
Use integration by parts to evaluate the integral.

$$\int_1^4 \sqrt{t}\ln t\,dt$$

_____

Correct Answers:

- `2/3 * 4^(3/2) * ln(4) - 4/9 * (4^(3/2) - 1)`

96. **(1 pt) Library/Rochester/setIntegrals15ByParts/sc5_6_11.pg**
Use integration by parts to evaluate the definite integral.

$$\int_1^e 6t^2\ln t dt$$

_____

Correct Answers:

- `27.4473825642502`