

Exercise Group: 3-16

Section: 7.4

1. Find the arc length of the graph of the function $y = \frac{x^9}{18} + \frac{1}{14x^7}$ over the interval $[1,2]$.

Ans: $\frac{458,999}{16,128}$

Exercise Group: 3-16

Section: 7.4

2. Find the arc length of the graph of the function $y = \frac{3}{2}x^{\frac{2}{3}} + 5$ over the interval $[1,64]$.

Ans: $17\sqrt{17} - 2\sqrt{2}$

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Section: 7.4

3. Find the arc length of the graph of the function $x = \frac{1}{3}(y^2 + 2)^{\frac{3}{2}}$ over the interval

$0 \leq y \leq 5$.

Ans: $\frac{140}{3}$

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Section: 7.4

4. Find the arc length of the graph of the function $x = \frac{1}{3}(y-3)\sqrt{y}$ over the interval

$1 \leq y \leq 36$.

Ans: $\frac{230}{3}$

Exercise Group: 1-4

Section: 7.5

5. Determine the work done by lifting a 150 pound bag of sugar 9 feet.

Ans: 1,350 ft-lb

Exercise Group: 5-12

Section: 7.5

6. A force of 250 Newtons stretches a spring 40 centimeters. How much work is done in

stretching the spring from 25 centimeters to 55 centimeters?

Ans: 75 joules

Exercise Group: 5-12

Section: 7.5

7. An overhead garage door has two springs, one on each side of the door. A force of 16 pounds is required to stretch each spring 1 foot. Because of the pulley system, the springs stretch only one-half the distance the door travels. The door moves a total of 14 feet and springs are at their natural length when the door is open. Find the work done by pair of strings.

Ans: 784 ft-lb

Exercise Group: 5-12

Section: 7.5

8. A force of 15 pounds stretches a spring 11 inches in an exercise machine. Find the work done in stretching the spring 2 feet from its natural position.

Ans: $\frac{360}{11}$ ft-lb

Exercise Group: 1-4

Section: 7.7

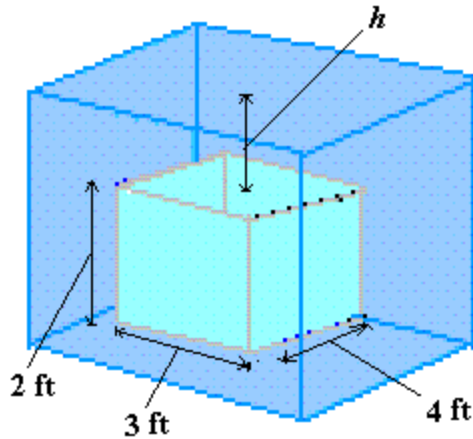
9. The area of the top side of a piece of sheet metal is 9 square feet. The sheet metal is submerged horizontally in 7 feet of water. Find the fluid force on the top side. Round your answer to one decimal place.

Ans: 3931.2 lb

Exercise Group: 5-6

Section: 7.7

10. Find the buoyant force of a rectangular solid of the given dimensions submerged in water so that the top side is parallel to the surface of the water. The buoyant force is the difference between the fluid forces on the top and bottom sides of the solid. Round your answer to two decimal places.



Ans: 1497.60 lb

Exercise Group: 1-10

Section: 9.1

11. Write the first five terms of the sequence.

$$a_n = (-1)^{n+2} \left(\frac{13}{n} \right)$$

Ans: $-13, \frac{13}{2}, -\frac{13}{3}, \frac{13}{4}, -\frac{13}{5}$

Exercise Group: 45-72

Section: 9.1

12. Determine the convergence or divergence of the sequence with the given n th term. If the sequence converges, find its limit.

$$a_n = \frac{3^n}{9^n}$$

Ans: The sequence converges to 0.

Exercise Group: 45-72

Section: 9.1

13. Determine the convergence or divergence of the sequence with the given n th term. If the sequence converges, find its limit.

$$a_n = \frac{\ln(\sqrt[5]{n})}{7n}$$

Ans: The sequence converges to 0.

Exercise Group: 45-72

Section: 9.1

14. Determine the convergence or divergence of the sequence with the given n th term. If the sequence converges, find its limit.

$$a_n = \frac{\ln(n^{10})}{6n}$$

Ans: The sequence converges to 0.

Exercise Group: 73-86

Section: 9.1

15. Write an expression for the n th term of the sequence 6,14,22,30,....

Ans: $8n - 2$

Exercise Group: 73-86

Section: 9.1

16. Write an expression for the n th term of the sequence $\frac{5}{6}, \frac{9}{10}, \frac{13}{14}, \frac{17}{18}, \dots$.

Ans: $\frac{4n+1}{4n+2}$

Exercise Group: 9-18

Section: 9.2

17. True or false. The infinite series $\sum_{n=1}^{\infty} \frac{n}{9n+13}$ diverges.

Ans: true

Exercise Group: 37-52

Section: 9.2

18. Find the sum of the convergent series.

$$\sum_{n=0}^{\infty} \left(-\frac{7}{8}\right)^n$$

Ans: $\frac{8}{15}$

Exercise Group: 37-52

Section: 9.2

19. Find the sum of the convergent series.

$$\sum_{n=1}^{\infty} \frac{3}{(n+7)(n+9)}$$

Ans: $\frac{17}{48}$

Exercise Group: 59-76

Section: 9.2

20. True or false. The series $\sum_{n=0}^{\infty} \frac{16}{8^n}$ is divergent.

Ans: false

Exercise Group: 59-76

Section: 9.2

21. Determine the convergence or divergence of the series.

$$\sum_{n=0}^{\infty} \frac{10}{4^n}$$

Ans: Converges

Exercise Group: 1-24

Section: 9.3

22. Use the Integral Test to determine the convergence or divergence of the series.

$$\sum_{n=1}^{\infty} \frac{3}{n+3}$$

Ans: diverges

Exercise Group: 1-24

Section: 9.3

23. Use the Integral Test to determine the convergence or divergence of the series.

$$\sum_{n=1}^{\infty} ne^{-\frac{n}{4}}$$

Ans: converges

Exercise Group: 1-24

Section: 9.3

24. True or false: The series $\sum_{n=1}^{\infty} \frac{1}{(2n+3)^3}$ diverges.

Ans: false

Exercise Group: 35-42

Section: 9.3

25. Use Theorem 9.11 to determine the convergence or divergence of the series.

$$\sum_{n=1}^{\infty} \frac{10}{n^3}$$

Ans: diverges

Exercise Group: 35-42

Section: 9.3

26. Use Theorem 9.11 to determine the convergence or divergence of the series.

$$1 + \frac{1}{\sqrt{2^4}} + \frac{1}{\sqrt{3^4}} + \frac{1}{\sqrt{4^4}} + \frac{1}{\sqrt{5^4}} + \dots$$

Ans: converges

Exercise Group: 35-42

Section: 9.3

27. Use Theorem 9.11 to determine the convergence or divergence of the series.

$$\sum_{n=1}^{\infty} \frac{1}{n^{1.26}}$$

Ans: converges

Exercise Group: 11-36

Section: 9.5

28. True or false: The series $\sum_{n=1}^{\infty} \frac{(-1)^n}{5^n}$ converges.

Ans: true

Exercise Group: 11-36

Section: 9.5

29. Use the *Alternating Series Test* (if possible) to determine whether the series

$$\sum_{n=1}^{\infty} (-1)^n \frac{6n^5 + 7}{7n^5 + 4n + 6} \text{ converges or diverges?}$$

Ans: diverges

Exercise Group: 11-36

Section: 9.5

30. True or false: The series $\sum_{n=1}^{\infty} \sec(n\pi)$ diverges.

Ans: true

Exercise Group: 11-36

Section: 9.5

31. True or false: The series $\sum_{n=1}^{\infty} \frac{(-1)^n}{(7n+3)!}$ converges.

Ans: true

Exercise Group: 13-24

Section: 9.7

32. Find the Maclaurin polynomial of degree 4 for the function.

$$f(x) = e^{5x}$$

$$\text{Ans: } 1 + 5x + \frac{25}{2}x^2 + \frac{125}{6}x^3 + \frac{625}{24}x^4$$

Exercise Group: 13-24

Section: 9.7

33. Find the Maclaurin polynomial of degree 5 for the function.

$$f(x) = \sin(x)$$

$$\text{Ans: } x - \frac{1}{6}x^3 + \frac{1}{120}x^5$$

Exercise Group: 13-24

Section: 9.7

34. Find the Maclaurin polynomial of degree 4 for the function.

$$f(x) = \cos(x)$$

Ans: $1 - \frac{1}{2}x^2 + \frac{1}{24}x^4$

Exercise Group: 13-24

Section: 9.7

35. Find the fourth degree Maclaurin polynomial for the function.

$$f(x) = \frac{1}{x+6}$$

Ans: $\frac{1}{6} - \frac{1}{36}x + \frac{1}{216}x^2 - \frac{1}{1296}x^3 + \frac{1}{7776}x^4$

Exercise Group: 25-30

Section: 9.7

36. Find the third Taylor polynomial for $f(x) = \frac{12}{x}$, expanded about $c = 1$.

Ans: $P_3(x) = 12 - 12(x-1) + 12(x-1)^2 - 12(x-1)^3$

Exercise Group: 25-30

Section: 9.7

37. Find the third degree Taylor polynomial centered at $c = 1$ for the function.

$$f(x) = \sqrt{x}$$

Ans: $1 + \frac{1}{2}(x-1) - \frac{1}{8}(x-1)^2 + \frac{1}{16}(x-1)^3$

Exercise Group: 25-30

Section: 9.7

38. Find the fourth degree Taylor polynomial centered at $c = 9$ for the function.

$$f(x) = \ln x$$

Ans: $\ln 9 + \frac{1}{9}(x-9) - \frac{1}{162}(x-9)^2 + \frac{1}{2187}(x-9)^3 - \frac{1}{26,244}(x-9)^4$

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Section: 7.4

39. Find the arc length of the graph of the function $y = 24x^{\frac{3}{2}} + 3$ over the interval $[0,5]$.

Prof. Israel N Nwaguru MATH 2414 CHAPTER 7 & 9 - REVIEW. PLEASE, DO NOT
WRITE OR MARK ON THIS EXAM PAPER. SHOW ALL STEP BY STEP ON SEPARATE PAPER/PAPERS
THEN CHOSE THE BEST ANSWER. YOU MUST SHOW WORK. AGAIN " NO WORK NO CREDIT ".

$$\text{Ans: } \frac{6481\sqrt{6481} - 1}{1,944}$$