1. *Chapter 1, Review Exercises, Question 044

Use the figure to estimate the limits if they exist.

If the limit does not exist enter NA.

(a) \( \lim_{x \to 0} f(x) = 3 \)

(b) \( \lim_{x \to 3} f(x) = \text{NA} \)

(c) \( \lim_{x \to 6} f(x) = 3 \)

(d) \( \lim_{x \to 9^-} f(x) = 0 \)

2. *Chapter 1, Section 1.8, Question 002

Use the figure to estimate the limits if they exist.

If the limit does not exist, enter NA.
3. *Chapter 1, Section 1.8, Question 009ab

Estimate the limits using the following graphs.

(a) \( \lim_{x \to 6^-} f(x) = 6 \)

(b) \( \lim_{x \to 6^+} f(x) = \text{NA} \)

(c) \( \lim_{x \to 6} f(x) = \text{NA} \)

(d) \( \lim_{x \to 12^-} f(x) = 6 \)

(e) \( \lim_{x \to 12^+} f(x) = 6 \)

(f) \( \lim_{x \to 12} f(x) = 6 \)
If the limit does not exist, enter NA.

(a) \[ \lim_{x \to 2^-} (f(x) + g(x)) = 16 \]

(b) \[ \lim_{x \to 2^+} (f(x) + 16g(x)) = 40 \]

4. *Chapter 1, Section 1.8, Question 009cd

Estimate the limits using the following graphs.

If the limit does not exist, enter NA.

(a) \[ \lim_{x \to 7^-} (f(x)g(x)) = 15 \]
5. Chapter 1, Section 1.8, Question 031

Find the following limits for \( f(x) = 4x^7 + 26x^6 - 36x^5 - 300x^4 + 9x + 12 \).

Enter the exact answers.

\[
\lim_{x \to -\infty} f(x) = \infty
\]

\[
\lim_{x \to +\infty} f(x) = -\infty
\]

6. Chapter 1, Section 1.8, Question 032
Find the following limits for \( f(x) = \frac{3x^3+13x^2+44}{5x^3+10x+12}. \)

Enter the exact answers.

\[
\lim_{x \to +\infty} f(x) = \frac{3}{5}
\]

7. Chapter 1, Section 1.8, Question 033

Find the following limits for \( f(x) = 12x^{-3}. \)

Enter the exact answers.

\[
\lim_{x \to -\infty} f(x) = 0
\]

8. Chapter 1, Section 1.8, Additional Question 001
Assuming that limits as \( x \to \infty \) have the same properties as limits as \( x \to c \), use algebraic manipulations to evaluate \( \lim_{x \to \infty} f(x) \) for the function.

\[
f(x) = \frac{\pi + 9x}{\pi x} - 9
\]

Include a multiplication sign between symbols. For example, \( a \cdot \pi \).

\[
\lim_{x \to \infty} f(x) = \frac{9}{\pi}
\]

9. *Chapter 1, Section 1.8, Additional Question 003

Assuming that limits as \( x \to \infty \) have the same properties as limits as \( x \to c \), use algebraic manipulations to evaluate \( \lim_{x \to \infty} f(x) \) for the function.

\[
f(x) = \frac{8^{-x} + 5}{3^{-x} + 6}
\]

\[
\lim_{x \to \infty} f(x) = \frac{5}{6}
\]

10. Chapter 1, Section 1.8, Additional Question 010

Consider the function \( f(x) = 2x + 1 \). What is \( \lim_{x \to 1} f(x) \)?

\[
\lim_{x \to 1} f(x) = 3
\]
11. Chapter 1, Section 1.8, Additional Question 015

Compute \( \lim_{x \to \infty} \frac{2x + 1}{x^2} \).

If the limit does not exist, enter NA.

\[
\lim_{x \to \infty} \frac{2x + 1}{x^2} = 0
\]

12. Chapter 1, Section 1.8, Additional Question 019

Compute the following limit.

Enter the exact answer. If the limit does not exist, enter NA.

\[
\lim_{x \to \infty} \frac{x^2}{x + 1} = \text{NA}
\]

13. Chapter 1, Section 1.8, Additional Question 021

Compute the limit \( \lim_{x \to 0} \frac{x}{x + 1} \).

If the limit does not exist, enter NA.

\[
\lim_{x \to 0} \frac{x}{x + 1} = 0
\]

14. Chapter 1, Section 1.8, Question 035
Find left and right limits of the function \( f(x) = \frac{|x|}{x} \) at \( x = 0 \). Is \( f(x) \) continuous?

If the left or right limit does not exist, enter NA.

\[
\lim_{x \to 0^-} f(x) = \quad \text{(Enter -1)}
\]

\[
\lim_{x \to 0^+} f(x) = \quad \text{(Enter 1)}
\]

\( f(x) \) \text{ is not continuous.}

15. Chapter 1, Section 1.8, Question 037

Use algebra to evaluate the limits \( \lim_{x \to a^+} f(x) \), \( \lim_{x \to a^-} f(x) \), and \( \lim_{x \to a} f(x) \) if they exist.

\[
a = 8, \quad f(x) = \frac{|x-8|}{x}
\]

If the limit does not exist, enter NA in the answer area.

\[
\lim_{x \to a^+} f(x) = \quad \text{(Enter 0)}
\]

\[
\lim_{x \to a^-} f(x) = \quad \text{(Enter 0)}
\]

\[
\lim_{x \to a} f(x) = \quad \text{(Enter 0)}
\]

16. *Chapter 1, Section 1.9, Question 004

Use algebra to simplify the expression and find the limit.
Enter the exact answer.

\[
\lim_{x \to 4} \frac{x^2 - 4x}{x - 4} = 4
\]

17. Chapter 1, Section 1.9, Question 006

Use algebra to simplify the expression and find the limit.

Enter the exact answer.

To enter \(\sqrt{a}\), type \(\text{sqrt}(a)\).

\[
\lim_{x \to 0} \frac{x^3 - 7x}{x\sqrt{6x+7}} = \text{-sqrt(7)}
\]

18. *Chapter 1, Section 1.9, Question 009

Use algebra to simplify the expression and find the limit.

Enter the exact answer.

\[
\lim_{x \to 1} \frac{x^2 + 10x - 11}{x^2 - 6x + 5} = -3
\]

19. *Chapter 1, Section 1.9, Question 016

Use algebra to simplify the expression and find the limit.

Enter the exact answer.

\[
\lim_{x \to 3} \frac{\frac{3}{x} - 1}{x - 3} = -\frac{1}{3}
\]
20. *Chapter 1, Section 1.9, Question 018

Use algebra to simplify the expression and find the limit.

Enter the exact answer.

\[
\lim_{t \to 0} \frac{9}{t+9} - \frac{1}{t} = \frac{-1}{9}
\]

21. Chapter 1, Section 1.9, Question 020

Use algebra to simplify the expression and find the limit.

Enter the exact answer.

To enter \( \sqrt{a} \), type \( \text{sqrt}(a) \).

\[
\lim_{z \to 4} \frac{\sqrt{z-2}}{z-4} = \frac{1}{4}
\]

22. *Chapter 1, Section 1.9, Question 038

Find a value of the constant \( k \) such that the limit exists.

\[
\lim_{x \to 4} \frac{x^2 - k^2}{x - 4}
\]

Enter your answers in increasing order.

\( k = -4 \)

\( k = 4 \)
23. *Chapter 2, Section 2.1, Question 001

The distance, \( s \), a car has traveled on a trip is given in the table as a function of the time, \( t \), since the trip started. Find the average velocity between \( t = 2 \) and \( t = 5 \).

<table>
<thead>
<tr>
<th>( t ) (hours)</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>( s(t) ) (km)</td>
<td>0</td>
<td>40</td>
<td>125</td>
<td>220</td>
<td>310</td>
<td>405</td>
</tr>
</tbody>
</table>

Enter the exact answer.

The average velocity between \( t = 2 \) and \( t = 5 \) is \( \frac{280}{3} \) km/hr.

24. *Chapter 2, Section 2.1, Question 004

The figure below shows a particle's distance from a point as a function of time, \( t \). What is the particle's average velocity from \( t = 0 \) to \( t = 6 \)?

Round your answer to the nearest integer.

The particle's average velocity from \( t = 0 \) to \( t = 6 \) is \( 1 \) *1 meter(s)/sec.

Significant digits are disabled; the tolerance is +/-2%

25. *Chapter 2, Section 2.1, Question 007

At time \( t \) in seconds, a particle's distance \( s(t) \), in micrometers (\( \mu \)m), from a point is given by
\( s(t) = e^t - 1 \). What is the average velocity of the particle from \( t = 1 \) to \( t = 3 \)?

Round your answer to three decimal places.

The average velocity of the particle from \( t = 1 \) to \( t = 3 \) is \( 8.684 \) \( \mu \) m/sec.

*Significant digits not applicable; the absolute tolerance is +/-0.001

26. *Chapter 2, Section 2.1, Question 015

Estimate the limit by substituting smaller and smaller values of \( h \).

\[
\lim_{h \to 0} \frac{(6 + h)^3 - 216}{h}
\]

Round your estimate to the nearest integer.

\[
\lim_{h \to 0} \frac{(6 + h)^3 - 216}{h} = 108
\]

*Significant digits not applicable; the absolute tolerance is +/-1

27. *Chapter 2, Section 2.2, Question 001

The table below shows values of \( f(x) = x^4 \) near \( x = 2 \) (to three decimal places). Use it to estimate \( f'(2) \).

<table>
<thead>
<tr>
<th>( x )</th>
<th>1.998</th>
<th>1.999</th>
<th>2.000</th>
<th>2.001</th>
<th>2.002</th>
</tr>
</thead>
<tbody>
<tr>
<td>( x^4 )</td>
<td>15.936</td>
<td>15.968</td>
<td>16.000</td>
<td>16.032</td>
<td>16.064</td>
</tr>
</tbody>
</table>

Round your estimate to the nearest integer.

\( f'(2) = \boxed{32} \)
28. *Chapter 2, Section 2.2, Question 019

Suppose that \( f(x) \) is a function with \( f(105) = 30 \) and \( f'(105) = 3 \). Estimate \( f(106) \).

\[
f(106) = \boxed{33}
\]

29. *Chapter 2, Section 2.2, Question 024

Use the figure below to fill in the blanks in the statements about the function \( g \) at point \( B \).

(a) \( g(\boxed{3}) = \boxed{4} \)

(b) \( g'(\boxed{3}) = \boxed{-0.2} \)

30. *Chapter 2, Section 2.2, Question 045

Use algebra to evaluate the limit.

\[
\lim_{h \to 0} \frac{(-7 + h)^2 - 49}{h}
\]

Enter the exact answer.
31. *Chapter 2, Section 2.2, Question 048

Use algebra to evaluate the limit.

$$\lim_{h \to 0} \frac{(-7 + h)^2 - 49}{h} = -14$$

Enter the exact answer.

32. *Chapter 2, Section 2.2, Question 058

Find the derivative of \(g(t) = 3t^2 + 2t\) at \(t = -1\) algebraically.

\[g'(-1) = -4\]

33. *Chapter 2, Section 2.2, Question 060

Find the derivative of \(g(x) = \frac{1}{x}\) at \(x = 7\) algebraically.

Enter the exact answer.

\[g'(7) = -\frac{1}{49}\]
34. Chapter 2, Section 2.2, Question 062

Find the equation of the line tangent to the function, \( f(x) = 5x^2 \), at the point \( x = 10 \).

The equation of the line is \( y = 100x - 500 \).

35. Chapter 2, Section 2.2, Question 064

Find the equation of the line tangent to the function, \( f(x) = x \), at the point \( x = 8 \).

The equation of the line is \( y = x \).