Name:_____ Class:_____ Date:_____

HW#1

Indicate the answer choice that best completes the statement or answers the question.

___ 1. Find the limit L.

$$\lim_{x \to -6} (x^2 + 4x)$$

a. $L = 60$

b. $L = 42$

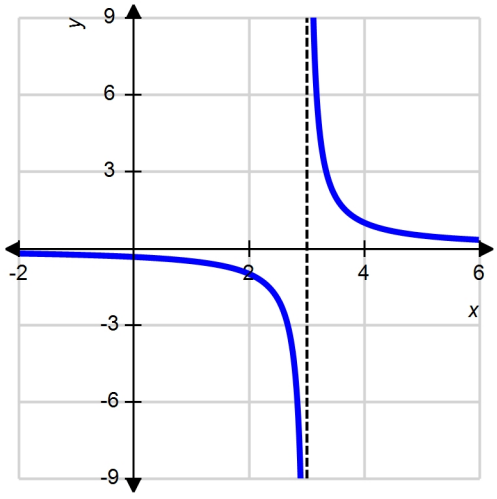
c. $L = 30$

d. $L = 12$

e. none of the above

___ 2. Determine the following limit. (Hint: Use the graph to calculate the limit.)

$$\lim_{x \to 3} \frac{1}{x - 3}$$



a. –3

b. 0

c. –6

d. 3

e. does not exist

Name:_____ Class:_____ Date:_____

HW#1

___ 3. Find the value of c guaranteed by the Intermediate Value Theorem.

$$f(x) = \frac{x^2 + 9x}{x - 1}, \left[\frac{11}{2}, 22\right], f(c) = 22$$

a. 13
b. 2
c. 1
d. 11
e. 12

___ 4. Suppose that $\lim_{x \to c} f(x) = 5$ and $\lim_{x \to c} g(x) = 6$. Find the following limit.

$$\lim_{x \to c} [f(x) - g(x)]$$

a. 5
b. –1
c. 30
d. 11
e. 0

___ 5. Determine the limit (if it exists).

$$\lim_{x \to 0} \frac{-14(1 - \cos x)}{x}$$

a. 0
b. –56
c. –3
d. –28
e. does not exist

___ 6. Find all vertical asymptotes (if any) of the function $f(x) = \frac{x^2 + 5x + 4}{x^3 - 4x^2 - 17x + 60}$.

a. $x = 3, 5$
b. $x = 3, 5, -4$
c. $x = -3, -5$
d. $x = 5$
e. $x = -5$

Name:_____ Class:_____ Date:_____

HW#1

___ 7. Find the limit (if it exists).

$$\lim_{x \to 10^+} \frac{10 - x}{x^2 - 100}$$

a. $\frac{1}{20}$

b. 0

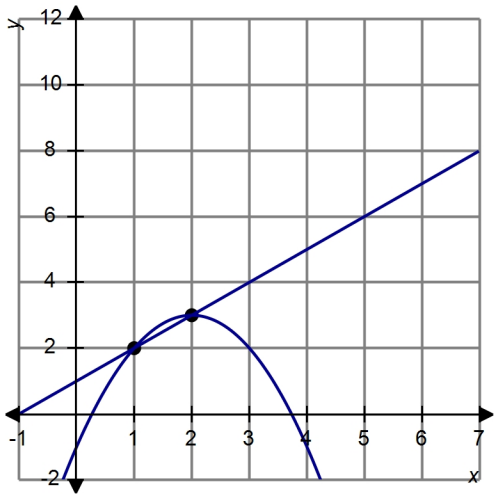
c. Limit does not exist.

d. $-\frac{1}{20}$

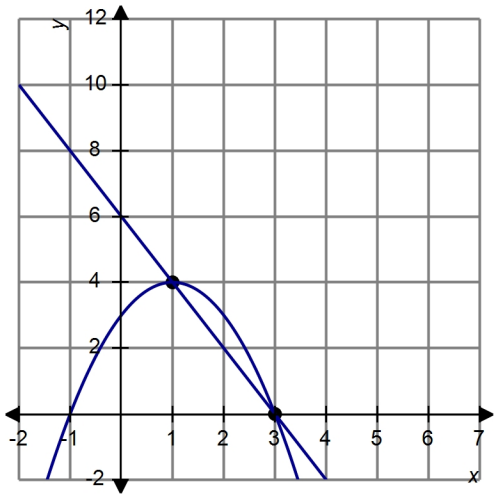
e. $\frac{1}{200}$

___ 8. Consider the function $f(x) = 4x - x^2$ and the point $P(2, 4)$ on the graph of f. Graph f and the secant line passing through $P(2, 4)$ and $Q(x, f(x))$ for $x = 1$.

a.



b.

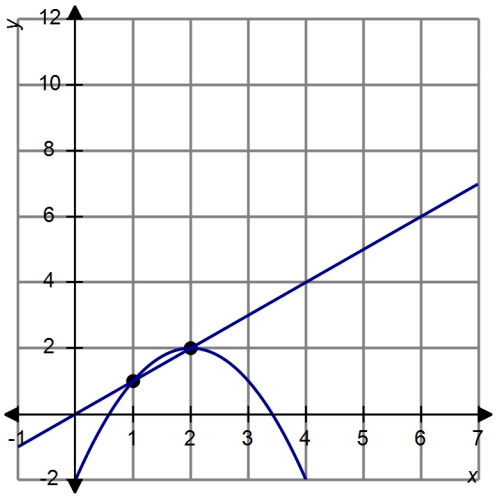


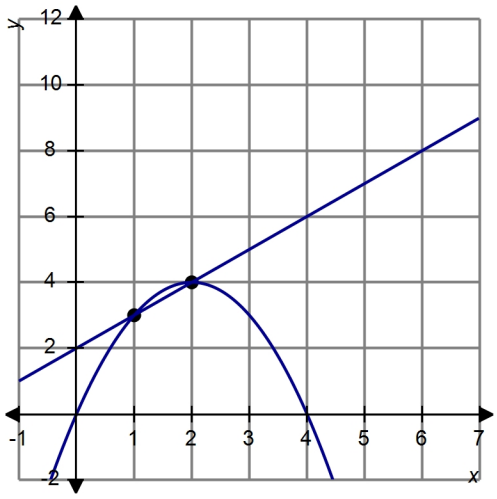
c.

d.

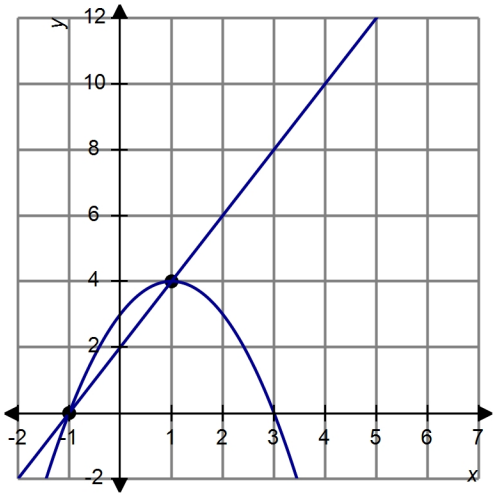
Name:_____ Class:_____ Date:_____

HW#1





e.



___ 9. Find the value of c guaranteed by the Intermediate Value Theorem.

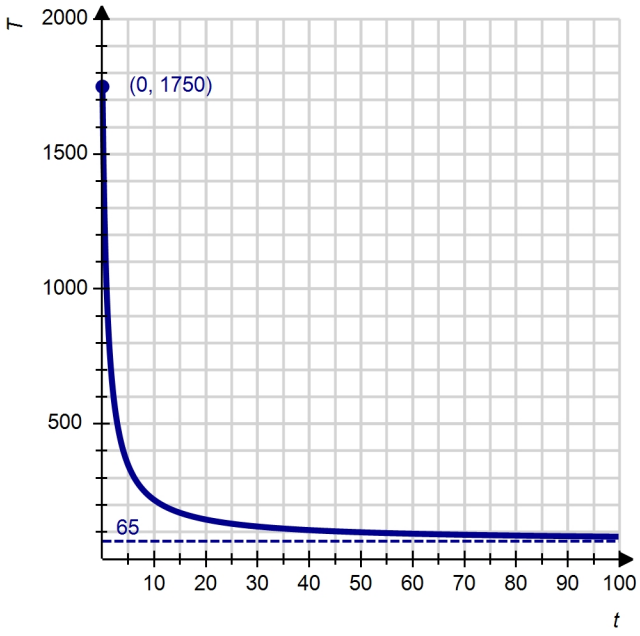
$f(x) = x^2 - x + 2, [2, 6], f(c) = 8$

a. 1
b. 3
c. 5
d. 2
e. 4

Name:_____ Class:_____ Date:_____

HW#1

___ 10. The graph shows the temperature T, in degrees Fahrenheit, of molten glass t seconds after it is removed from a kiln.



Find $\lim_{t \to \infty} T$.

a. 1,750°
b. 65°
c. 1,685°
d. 1,815°
e. 82°

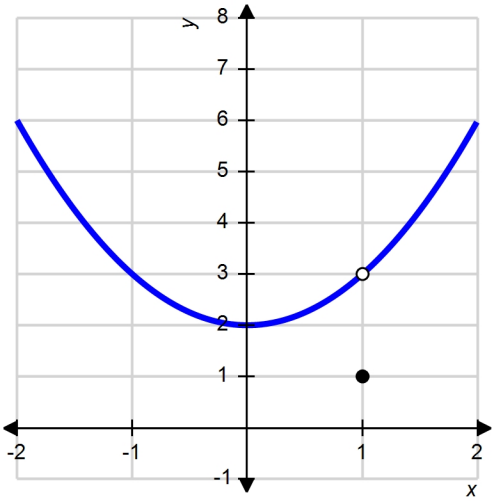
Name:_____ Class:_____ Date:_____

HW#1

___ 11. Let $f(x) = \begin{cases} x^2 + 2, & x \neq 1 \\ 1, & x = 1 \end{cases}$.

Determine the following limit. (Hint: Use the graph to calculate the limit.)

$$\lim_{x \to 1} f(x)$$



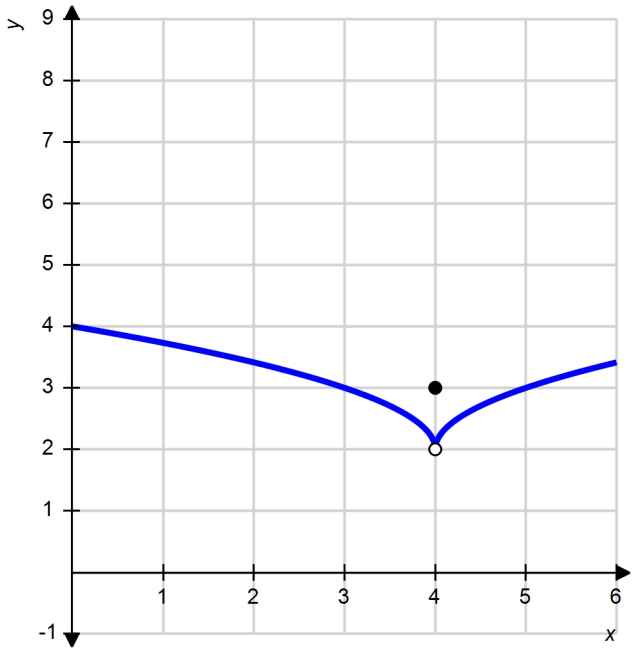
a. 3
b. 4
c. 1
d. 2
e. does not exist.

Name:_____ Class:_____ Date:_____

HW#1

___ 12. Use the graph as shown to determine the following limits, and discuss the continuity of the function at $x = 4$.

(i) $\lim_{x \to 4^+} f(x)$ (ii) $\lim_{x \to 4^-} f(x)$ (iii) $\lim_{x \to 4} f(x)$



a. 2, 2, 3, not continuous
b. 3, 3, 3, continuous
c. 4, 4, 4, not continuous
d. 3, 3, 3, not continuous
e. 2, 2, 3, continuous

___ 13. Find the limit (if it exists).

$$\lim_{x \to 1^-} f(x), \text{ where } f(x) = \begin{cases} x^3 + 1, & x < 1 \\ x + 1, & x \geq 1 \end{cases}$$

a. Limit does not exist.
b. 0
c. 1
d. 2
e. 3

Name:_____ Class:_____ Date:_____

HW#1

___ 14. For the function $f(x) = \dfrac{x}{\sqrt{9x^2 - 2}}$, use a graphing utility to complete the table and estimate the limit as x approaches infinity.

x	10^0	10^1	10^2	10^3	10^4	10^5	10^6
$f(x)$							

a. 0.3333
b. 1.5833
c. 2.7633
d. –0.3167
e. does not exist

___ 15. Find the limit.

$$\lim_{x \to 11^+} \frac{x + 9}{x - 11}$$

a. 1
b. $-\infty$
c. 0
d. ∞
e. –1

___ 16. Find the vertical asymptotes (if any) of the function $f(x) = \tan(13x)$.

a. $x = \dfrac{k}{13}\pi \ (k = 0, \pm 1, \pm 2, \ldots)$
b. $x = \dfrac{2k + 1}{26}\pi \ (k = 0, \pm 1, \pm 2, \ldots)$
c. $x = \dfrac{2k}{13}\pi \ (k = 0, \pm 1, \pm 2, \ldots)$
d. $x = \dfrac{2k + 1}{13}\pi \ (k = 0, \pm 1, \pm 2, \ldots)$
e. no vertical asymptotes

Name:_____ Class:_____ Date:_____

HW#1

___ 17. What is the limit of $f(x) = 8$ as x approaches π?

a. $\lim_{x \to \pi} (8) = \pi$
b. $\lim_{x \to \pi} (8) = 8$
c. $\lim_{x \to \pi} (8) = \frac{\pi}{8}$
d. $\lim_{x \to \pi} (8) = 8\pi$
e. none of the above

___ 18. Use a graphing utility to graph the function $f(x) = \frac{x^2 + x + 1}{x^3 - 1}$ and determine the one-sided limit $\lim_{x \to 1^+} f(x)$.

a. $-\infty$
b. ∞
c. 0
d. 3
e. 2

___ 19. Find the limit (if it exists).

$$\lim_{x \to 81^-} \frac{\sqrt{x} - 9}{x - 81}$$

a. 0
b. $-\frac{1}{18}$
c. $\frac{1}{162}$
d. $\frac{1}{18}$
e. Limit does not exist.

HW#1

___ 20. Find the limit.

$$\lim_{x \to \infty} \frac{-5x}{\sqrt{49x^2 - 5}}$$

a. $\frac{5}{49}$

b. $-\frac{5}{7}$

c. 1

d. –5

e. $-\infty$

___ 21. A model for the average typing speeds S (words per minute) of a typing student after t weeks of lessons is given by $S = \frac{104t^2}{12 + t^2}$, $t > 0$ Find $\lim_{t \to \infty} S$.

a. 96 words per minute

b. 12 words per minute

c. 72 words per minute

d. 208 words per minute

e. 104 words per minute

___ 22. Find the limit.

$$\lim_{x \to 4} \cos\frac{\pi x}{6}$$

a. $\frac{1}{2}$

b. $-\frac{1}{2}$

c. $-\frac{\sqrt{3}}{2}$

d. $\frac{\sqrt{3}}{2}$

e. 0

Name:_____ Class:_____ Date:_____

HW#1

___ 23. Find the limit L.

$$\lim_{x \to 6} (x + 2)$$

a. $L = 8$

b. $L = 2$

c. $L = 6$

d. $L = 14$

e. none of the above

___ 24. Find all the vertical asymptotes (if any) of the graph of the function $f(x) = \dfrac{2 + x}{x^2(3 - x)}$.

a. $x = -2$

b. $x = 3$

c. $x = 0$

d. $x = 3, x = 0$

e. no vertical asymptotes

___ 25. Find all the vertical asymptotes (if any) of the graph of the function $f(x) = \dfrac{2}{(x - 1)^3}$.

a. $x = -1$

b. $x = 2$

c. $x = 1, -1$

d. $x = 1$

e. no vertical asymptotes

Name:_____ Class:_____ Date:_____

HW#1

___ 26. Determine whether $f(x) = \dfrac{x^8}{x^2 - 25}$ approaches ∞ or $-\infty$ as x approaches -5 from the left and from the right by completing the tables below.

x	–5.5	–5.1	–5.01	–5.001
$f(x)$				

x	–4.999	–4.99	–4.9	–4.5
$f(x)$				

a. $\lim\limits_{x \to -5^-} f(x) = -\infty$, $\lim\limits_{x \to -5^+} f(x) = \infty$

b. $\lim\limits_{x \to -5^-} f(x) = \infty$, $\lim\limits_{x \to -5^+} f(x) = -\infty$

c. $\lim\limits_{x \to -5^-} f(x) = \infty$, $\lim\limits_{x \to -5^+} f(x) = \infty$

d. $\lim\limits_{x \to -5^-} f(x) = -\infty$, $\lim\limits_{x \to -5^+} f(x) = -\infty$

___ 27. Determine the limit (if it exists).

$$\lim_{x \to 0} \frac{\sin x(1 - \cos x)}{3x^7}$$

a. 7

b. 1

c. 0

d. 3

e. does not exist

___ 28. Suppose that $\lim\limits_{x \to c} f(x) = 5$. Find the following limit.

$$\lim_{x \to c} \left(-2f(x)\right)$$

a. 5

b. 10

c. –10

d. $-2c$

e. –2

Name:_____ Class:_____ Date:_____

HW#1

___ 29. For the function $f(x) = \dfrac{-3x - 8}{7x + 7}$, use a graphing utility to complete the table and estimate the limit as x approaches infinity.

x	10^0	10^1	10^2	10^3	10^4	10^5	10^6
$f(x)$							

a. –0.4286
b. 0.5714
c. –2.3333
d. –1.3333
e. –3.3333

___ 30. Find the limit.

$$\lim_{x \to 11} \cos\left(\frac{\pi x}{6}\right)$$

a. $\dfrac{1}{2}$
b. 0
c. $-\dfrac{1}{2}$
d. $\dfrac{\sqrt{3}}{2}$
e. $-\dfrac{\sqrt{3}}{2}$