1. 0/1 points

If $f(x) = x + \sqrt{8 - x}$ and $g(u) = u + \sqrt{8 - u}$, is it true that $f = g$?

2. 0/1 points

If

$$f(x) = \frac{x^2 - 8x}{x - 8} \quad \text{and} \quad g(x) = x$$

is it true that $f = g$?

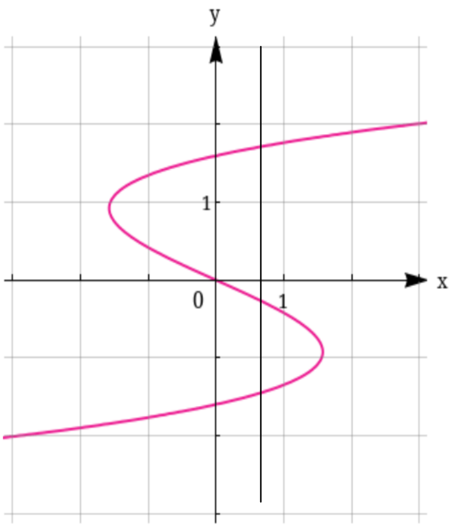
No.

Why not?

Because they have different domains.

3. 0/3 points

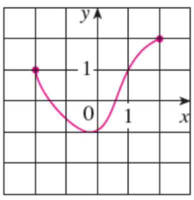
Consider the following graph.



Determine whether the curve is the graph of a function of x.

4. 0/3 points

Consider the following graph.



Determine whether the curve is the graph of a function of x.

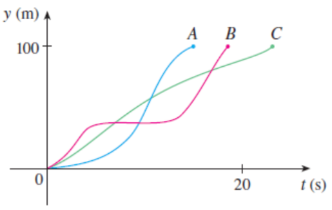
If it is, state the domain and range of the function. (Enter your answers using interval notation. If it DNE in all blanks.)

domain ✗ $[-2, 2]$

range ✗ $[-1, 2]$

5. 0/2 points SCalc8 1.1.014. [3354633]

Three runners compete in a 100-meter race. The graph depicts the distance run as a function of time for each runner. Describe in words what the graph tells you about this race.



Who won the race?

Did each runner finish the race?

6. 0/1 points

Evaluate the difference quotient for the given function. Simplify your answer.

$f(x) = 4 + 4x - x^2, \quad \frac{f(5+h) - f(5)}{h}$

7. 0/1 points

Evaluate the difference quotient for the given function. Simplify your answer.

$f(x) = -x^3, \quad \frac{f(a+h) - f(a)}{h}$

$f(5+h) = 4 + 4(5+h) - (5+h)^2$

$= 4 + 20 + 4h - (25 + 10h + h^2)$

$= 24 + 4h - 25 - 10h - h^2$

$= -1 - 6h - h^2 = f(5+h)$

$f(5) = 4 + 4(5) - 5^2 = -1$

(6) $\frac{f(5+h) - f(5)}{h}$

$= \frac{-1 - 6h - h^2 - (-1)}{h}$

$= \frac{-6h - h^2}{h}$

$= \frac{h(-6-h)}{h}$

$= -6 - h$ ($h \to 0 \Rightarrow -6$ says slope is -6 @ $x=5$)
WebAssign's not asking that.

$g(x) = -x^3$ find $\frac{g(a+h) - g(a)}{h} = \frac{-(a+h)^3 - (-a^3)}{h}$

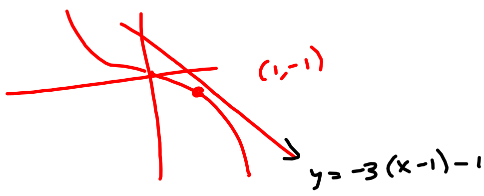
$= \frac{-(a^3 + 3a^2h + 3ah^2 + h^3) + a^3}{h}$

$= \frac{-a^3 - 3a^2h - 3ah^2 - h^3 + a^3}{h}$

$= \frac{h(-3a^2 - 3ah - h^2)}{h}$

$= -3a^2 - 3ah - h^2$

1
1 1
1 2 1
1 3 3 1
1 4 6 4 1
1 5 10 10 5 1



$f(x) = -x^3 \Rightarrow$
$f'(x) = -3x^2$

8. 0/1 points

Find the domain of the function. (Enter your answer using interval notation.)

$$f(x) = \frac{x+4}{x^2-36}$$

$(-\infty, -6) \cup (-6, 6) \cup (6, \infty)$

$x^2 - 36 \neq 0$

$(x-6)(x+6) \neq 0$

$x \neq 6, -6$

$\mathbb{R} \setminus \{-6, 6\}$ written

$(-\infty, -6) \cup (-6, 6) \cup (6, \infty)$ web

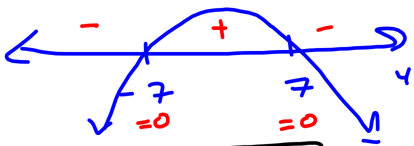
0/3 points

Find the domain and range of the function. (Enter your answers using interval notation.)

$$h(x) = \sqrt{49 - x^2}$$

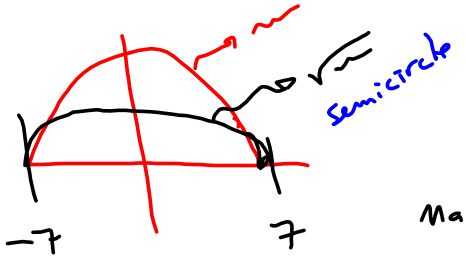
$49 - x^2 = (7-x)(7+x)$ NEED ≥ 0

(≥ 0)



$\Rightarrow \boxed{\mathcal{D} = [-7, 7]}$

Sketch the graph.



Max @ x-coord. of the vertex of $49 - x^2$

So $\sqrt{49 - 0^2} = 7 \Rightarrow$

$\boxed{\mathcal{R}(h) = [0, 7]}$

17. 0/7 points SCalc9 1.8.063. [4708622]

Prove, without graphing, that the graph of the function has at least two x-intercepts in the specified interval.

$y = \sin(x^3)$, $(1, 2)$

Let $f(x) = \sin(x^3)$. Then f is [continuous] ✗ continuous on the interval $[1, 2]$ since f is the composite of the sine function and the cubing function, both of which are [continuous] ✗ continuous on $\mathbb{R}$. The zeros of $\sin(x)$ are at $x =$ [ ] ✗ πn for n in $\mathbb{Z}$, so we note that $0 < 1 < \pi < \frac{3}{2}\pi < 2\pi < 8 < 3\pi$.

Applying the intermediate value theorem and taking the pertinent cube roots of these values in the inequality, we have the following.

- ○ $1 < \sqrt[3]{\frac{3}{2}\pi}$ [call this value A] $< \sqrt[3]{2}$
- ○ $1 < \sqrt[3]{\frac{3}{2}\pi}$ [call this value A] < 2
- ○ $1 < \sqrt[3]{3\pi}$ [call this value A] $< \sqrt[3]{2}$
- ○ $1 < \sqrt[3]{3\pi}$ [call this value A] < 2

✗

$0 < 1 < \pi < \frac{3\pi}{2} < 2\pi < 8 < 3\pi$

sin (x) has 2 roots between 1 & 8

bc $0 < 1 < \pi < \frac{3\pi}{2} < 2\pi < 8 < 3\pi$

$0 < 1 < \sqrt[3]{\pi} < \sqrt[3]{\frac{3\pi}{2}} < \sqrt[3]{2\pi} < \sqrt[3]{8} = 2$

$\sin(x^3)$ is 0 zero @

$\sqrt[3]{\pi}$, $\sqrt[3]{2\pi}$

$0 < 1 < \frac{\pi}{2} < \pi < \frac{3\pi}{2} < 2\pi < \frac{5\pi}{2} < 8$

$\sin(\frac{\pi}{2}) = 1$ ← zero in here

$\sin(\frac{3\pi}{2}) = -1$ ←

$\sin(\frac{5\pi}{2}) = 1$

$2\pi + \frac{\pi}{2}$

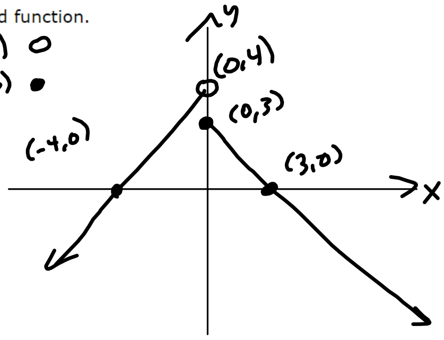
$= \frac{5\pi}{2}$

10. 0/4 points

Evaluate $f(-7)$, $f(0)$, and $f(6)$ for the piecewise defined function.

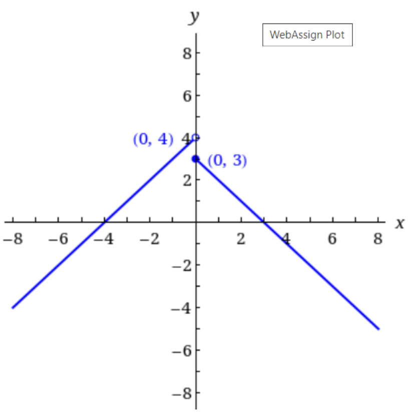
$$f(x) = \begin{cases} x + 4 & \text{if } x < 0 \\ 3 - x & \text{if } x \geq 0 \end{cases}$$

$0+4=4 \rightsquigarrow (0,4)$ o
$3-0=3 \rightsquigarrow (0,3)$ •



Sketch the graph of the function.

$f(-7) = -7 + 4 = -3$, $f(0) = 3 - 0 = 3$, and $f(6) = 3 - 6 = -3$.



11. 0/2 points SCalc8 1.1.051. [335

Find an expression for the function whose graph is the given curve. (Assume that the points are in the form $(x, f(x))$.)

The line segment joining the points $(3, -2)$, and $(7, 8)$

$f(x) =$ ✗ $\frac{5}{2}x - \frac{19}{2}$

Find the domain of the function. (Enter your answer using interval notation.)

✗ $[3, 7]$

12. 0/1 points

Find an expression for the function whose graph is the given curve.

The top half of the circle $x^2 + (y - 1)^2 = 4$

Solve for 'y.'

$(y-1)^2 = 4-x^2$

$\sqrt{\quad} = \sqrt{\quad}$

$|y-1| = \sqrt{4-x^2}$

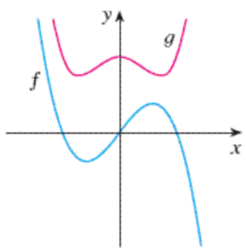
$y-1 = \pm\sqrt{4-x^2} \Rightarrow$

$y = 1 \pm \sqrt{4-x^2} \Rightarrow$

$y = 1 + \sqrt{4-x^2}$ is TOP.

13. 0/4 points

Graphs of f and g are shown.



Is f even, odd, or neither?

Explain your reasoning.

Is g even, odd, or neither?

Explain your reasoning.

14. 0/2 points

(a) If the point (2, 3) is on the graph of an even function, what other point must also be on the graph?

$(x, y) = (\quad)$ ✗ $\boxed{-2, 3}$

Formally, $f(-x) = f(x)$ x^{2n} sums, $\cos(x)$

(b) If the point (2, 3) is on the graph of an odd function, what other point must also be on the graph?

$(x, y) = (\quad)$ ✗ $\boxed{-2, -3}$

$f(-x) = -f(x)$

odd powers, sums of odd powers

$\sin(x)$, $\tan(x)$

$\sqrt[2n+1]{x}$

15. 0/1 points SCalc8 1.1

Determine whether f is even, odd, or neither. If you have a graphing calculator, use it to check your answer visual

$$f(x) = \frac{x}{x^2 + 5} = \frac{-}{+} = - \quad \text{odd}$$

17. 0/1 points

Find the domain of the function.

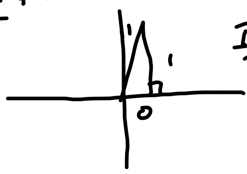
$$f(x) = \frac{6\cos(x)}{1 - \sin(x)}$$

- $\left\{x \mid x \neq \frac{\pi}{4} + 2n\pi, n \text{ an integer}\right\}$
- $\left\{x \mid x \neq \pi + 2n\pi, n \text{ an integer}\right\}$
- $\left\{x \mid x \neq \frac{\pi}{2} + 2n\pi, n \text{ an integer}\right\}$
- $\left\{x \mid x \neq \frac{\pi}{2} + n\pi, n \text{ an integer}\right\}$
- $\left\{x \mid x \neq \frac{\pi}{4} + n\pi, n \text{ an integer}\right\}$

✗

$\sin(x) \neq 1$

$x = \frac{\pi}{2} + 2n\pi \quad \forall\, n \in \mathbb{Z}$

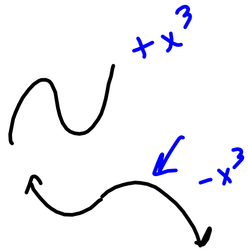


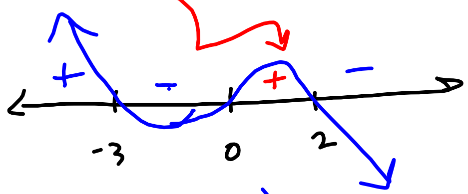
$\frac{\pi}{2}$ crappy pic.

18. 0/1 points SCalc8 1.2.011.MI. [3354628]

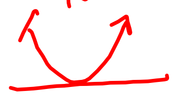
Find an expression for a cubic function f if $f(1) = 16$ and $f(-3) = f(0) = f(2) = 0$.

$f(x) =$ ✗ $-4x(x+3)(x-2)$





None o' that.



$-a(x+3)x(x-2)$

Find a : $f(1) = -a(4)(1)(-1) = 4a = 16$

$a = 4$

19. 0/6 points SCalc8 1.2.018. [33546

The manager of a furniture factory finds that it costs $2600 to manufacture 50 chairs in one day and $4800 to produce 250 chairs in one day.

(a) Express the cost C (in dollars) as a function of the number of chairs x produced, assuming that it is linear.

$C =$ ✗ $11x + 2050$

x = # of chairs produced in one day

y = cost of producing those chairs.

Sketch the graph. $(50, 2600)$ $(250, 4800)$

What is the slope? What does the function represent? What is the y-intercept of the graph?

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{4800 - 2600}{250 - 50} = \frac{2200}{200} = 11$$

$$y = 11(x - 50) + 2600 = m(x - x_1) + y_1$$

$$= 11x - 550 + 2600$$

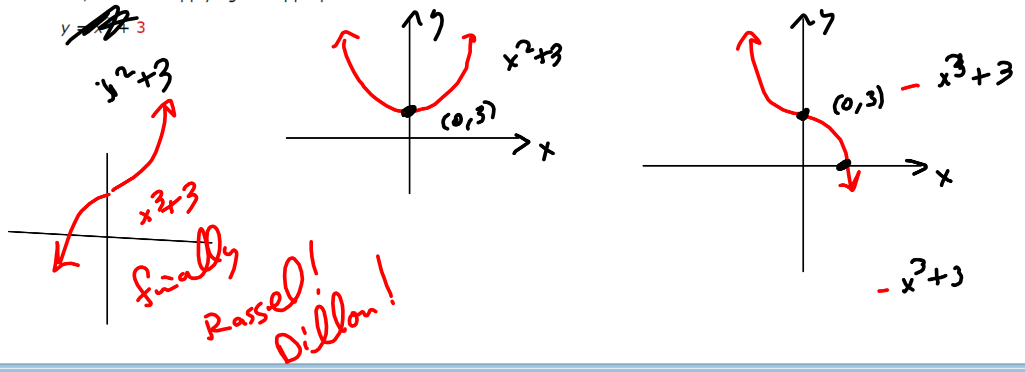
$$y = 11x + 2050$$

$m = 11$ says the cost of producing each additional chair is $11/chair

20. 0/1 points SCalc8 1.3.011. [3354

Graph the function by hand, not by plotting points, but by starting with the graph of one of the standard functions given in Section 1.2, and then applying the appropriate transformations.

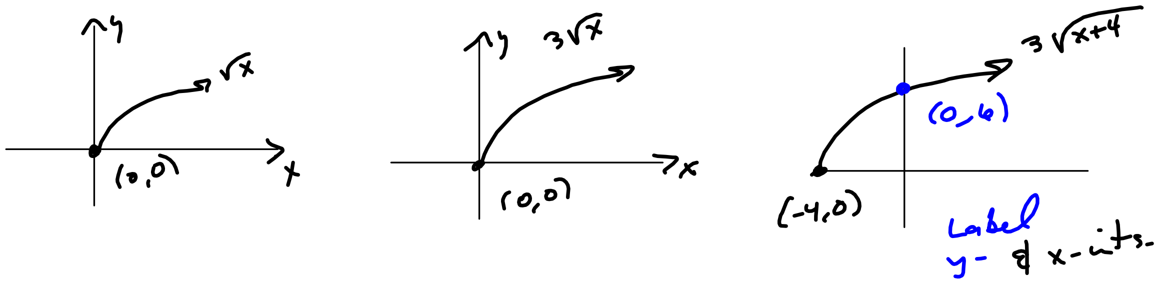
$y =$ [illegible] $+ 3$



21. 0/1 points SCalc8 1.3.014. [3354

Graph the function by hand, not by plotting points, but by starting with the graph of one of the standard functions given in Section 1.2, and then applying the appropriate transformations.

$y = 3\sqrt{x + 4}$



22. 0/1 points SCalc8 1.3.015. [3354

Graph the function by hand, not by plotting points, but by starting with the graph of one of the standard functions given in Section 1.2, and then applying the appropriate transformations.

$y = x^2 - 6x + 12$

$= x^2 - 6x + 3^2 - 9 + 12 = (x-3)^2 + 3$

$\frac{6}{2} = 3 \rightsquigarrow 3^2$

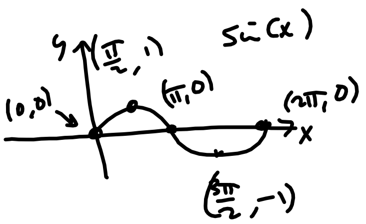
RIGHT 3

up 3

23. 0/1 points SCalc8 1.3.019. [3354

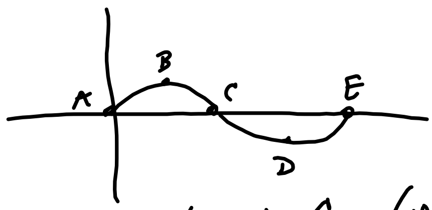
Graph the function by hand, not by plotting points, but by starting with the graph of one of the standard functions given in Section 1.2, and then applying the appropriate transformations.

$y = \sin\left(\frac{1}{5}x\right)$



$\sin(\frac{1}{5}x)$

$x \mapsto 5x$



$A = (0,0)$ $\quad (5\pi, 0) = C$ $\quad (10\pi, 0)$

$B = (\frac{5\pi}{2}, 1)$ $\quad (\frac{15\pi}{2}, -1) = D$

24. 0/1 points SCalc8 1.3.042.

Find $f \circ g \circ h$.

$f(x) = \tan(x), \; g(x) = \frac{x}{x-4}, \; h(x) = \sqrt[3]{x}$

$\tan\left(\frac{\sqrt[3]{x}}{\sqrt[3]{x} - 4}\right)$

25. 0/1 points SCalc8 1.3.0

Express the function in the form $f \circ g$. (Use non-identity functions for f and g.)

$F(x) = (5x + x^2)^4$

$(f(x), g(x)) = \left(\quad \right)$ ✗ $x^4, 5x + x^2$

26. 0/6 points SCalc8 1.3.052. [335463

Use the table to evaluate each expression.

x	1	2	3	4	5	6
$f(x)$	3	5	2	4	1	1
$g(x)$	1	2	5	4	6	1

(a) $f(g(1))$

✗ 3

$f(g(1)) = f(1) = 3$

(b) $g(f(1))$

✗ 5

$g(f(1)) = g(3) = 5$

(c) $f(f(1))$

✗ 2

$f(f(1)) = f(3) = 2$

(d) $g(g(1))$

(e) $(g \circ f)(3)$

✗ 2

$(g \circ f)(3) = g(f(3)) = g(2) = 2$

(f) $(f \circ g)(6)$

✗ 3

27. 0/6 points SCalc8 1.6.

(e) $\lim_{x \to 2} \frac{g(x)}{h(x)}$

✗ DNE

(f) $\lim_{x \to 2} \frac{g(x)h(x)}{f(x)}$

✗ 0

28. 0/2 points SCalc8 1.6.010. [3354381]

(a) What is wrong with the following equation?

$$\frac{x^2 + x - 12}{x - 3} = x + 4$$

- $(x - 3)(x + 4) \neq x^2 + x - 12$
- The left-hand side is not defined for $x = 0$, but the right-hand side is.
- The left-hand side is not defined for $x = 3$, but the right-hand side is.
- None of these — the equation is correct.

(b) In view of part (a), explain why the equation

$$\lim_{x \to 3} \frac{x^2 + x - 12}{x - 3} = \lim_{x \to 3} (x + 4)$$

is correct.

- Since $\frac{x^2 + x - 12}{x - 3}$ and $x + 4$ are both continuous, the equation follows.
- Since the equation holds for all $x \neq 3$, it follows that both sides of the equation approach the same limit as $x \to 3$.
- This equation follows from the fact that the equation in part (a) is correct.
- None of these — the equation is not correct.

29. 0/1 points SCalc8 1.6.01

Evaluate the limit, if it exists. (If an answer does not exist, enter DNE.)

$$\lim_{x \to 5} \frac{x^2 - 8x + 15}{x - 5}$$

2

30. 0/1 points SCalc8 1.6.01

Evaluate the limit, if it exists. (If an answer does not exist, enter DNE.)

$$\lim_{h \to 0} \frac{(-4 + h)^2 - 16}{h}$$

-8

Solution or Explanation

$$\lim_{h \to 0} \frac{(-4 + h)^2 - 16}{h} = \lim_{h \to 0} \frac{(16 - 8h + h^2) - 16}{h} = \lim_{h \to 0} \frac{-8h + h^2}{h} = \lim_{h \to 0} \frac{h(-8 + h)}{h} = \lim_{h \to 0} (-8 + h) = -8$$

31. 0/1 points SCalc8 1.6.019. [3

Evaluate the limit, if it exists. (If an answer does not exist, enter DNE.)

$$\lim_{x \to -3} \frac{x+3}{x^3+27}$$

1/27

Solution or Explanation

By the formula for the sum of cubes, we have

$$\lim_{x \to -3} \frac{x+3}{x^3+27} = \lim_{x \to -3} \frac{x+3}{(x+3)(x^2-3x+9)} = \lim_{x \to -3} \frac{1}{x^2-3x+9}$$
$$= \frac{1}{9+9+9} = 1/27.$$

32. 0/1 points SCalc8 1.6.021. [3354274]

Evaluate the limit, if it exists. (If an answer does not exist, enter DNE.)

$$\lim_{h \to 0} \frac{\sqrt{16+h}-4}{h}$$

1/8

Solution or Explanation

$$\lim_{h \to 0} \frac{\sqrt{16+h}-4}{h} = \lim_{h \to 0} \frac{\sqrt{16+h}-4}{h} \cdot \frac{\sqrt{16+h}+4}{\sqrt{16+h}+4} = \lim_{h \to 0} \frac{\left(\sqrt{16+h}\right)^2-4^2}{h\left(\sqrt{16+h}+4\right)} = \lim_{h \to 0} \frac{(16+h)-16}{h\left(\sqrt{16+h}+4\right)}$$
$$= \lim_{h \to 0} \frac{h}{h\left(\sqrt{16+h}+4\right)} = \lim_{h \to 0} \frac{1}{\sqrt{16+h}+4} = \frac{1}{4+4} = \frac{1}{8}$$

33. 0/1 points SCalc8 1.6.02

Evaluate the limit, if it exists. (If an answer does not exist, enter DNE.)

$$\lim_{t \to 0} \left(\frac{3}{t} - \frac{3}{t^2 + t} \right)$$

3

34. 0/1 points SCalc8 1.6.037. [33544

If $2x - 1 \leq f(x) \leq x^2 - 2x + 3$ for $x \geq 0$, find $\lim_{x \to 2} f(x)$.

3

35. 0/1 points SCalc8 1.6.039. [33

Evaluate the limit, if it exists. (If an answer does not exist, enter DNE.)

$$\lim_{x \to 0} x^2 \cos\left(\frac{5}{x}\right)$$

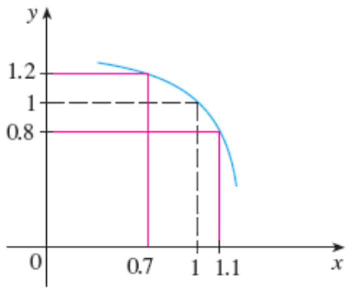
0

36. 0/1 points SCalc8 1.7.001. [3354476]

Use the given graph of f to find a number δ such that

if $|x - 1| < \delta$ then $|f(x) - 1| < 0.2$

$\delta =$ 0.1



Solution or Explanation

If $|f(x) - 1| < 0.2$, then $0.2 < f(x) - 1 < 0.2 \Rightarrow 0.8 < f(x) < 1.2$. From the graph, we see that the last inequality is true if $0.7 < x < 1.1$, so we can choose $\delta = \min\{1 - 0.7, 1.1 - 1\} = \min\{0.3, 0.1\} = 0.1$ (or any smaller positive number).

37. 0/9 points SCalc8 1.7.011. [3354240]

A machinist is required to manufacture a circular metal disk with area 1000 cm^2.

(a) What radius produces such a disk? (Round your answer to four decimal places.)

17.8412 cm

(b) If the machinist is allowed an error tolerance of ± 6 cm^2 in the area of the disk, how close to the ideal radius in part (a) must the machinist control the radius? (Round your answers to four decimal places.)

17.7876 cm $< r <$ 17.8947 cm

(c) In terms of the ε, δ definition of $\lim_{x \to a} f(x) = L$, what is x?

- area
- target radius
- radius
- target area
- tolerance in the area

What is $f(x)$?

- area
- target radius
- radius
- target area
- tolerance in the area

What is L?

- area
- target radius
- radius
- target area
- tolerance in the area

What value of ε is given?

6 cm^2

What is the corresponding value of δ? (Round your answer to four decimal places.)

0.0534 cm

38. 0/4 points SCalc8 1.7.019. [335

Prove the statement using the ε, δ definition of a limit.

$$\lim_{x \to 1} \frac{5 + 3x}{4} = 2$$

Given $\varepsilon > 0$, we need δ ---Select--- > 0 such that if $0 < |x - 1| < \delta$, then

$\left|\frac{5 + 3x}{4} - 2\right|$ ---Select--- $< \varepsilon$. But

$\left|\frac{5 + 3x}{4} - 2\right| < \varepsilon \Leftrightarrow \left|\frac{3x - 3}{4}\right| < \varepsilon \Leftrightarrow \left|\frac{3}{4}\right||x - 1| < \varepsilon \Leftrightarrow |x - 1| <$ ---Select--- $(4/3)\varepsilon$. So if we choose

$\delta =$ ---Select--- $(4/3)\varepsilon$, then $0 < |x - 1| < \delta \Rightarrow \left|\left(\frac{5 + 3x}{4}\right) - 2\right| < \varepsilon$. Thus, $\lim_{x \to 1} \left(\frac{5 + 3x}{4}\right) = 2$ by the definition of a limit.