Name: Key Date: January 23, 2020 Class Time: _____

Analytic Geometry & Calculus I | Tulsa Community College

Quiz #1: Limits Numerically and Graphically

Remember to get full credit, you need to show all work, clearly and neatly. Remember, this isn't just about you getting the answer, but you *showing someone else* how you got the answer.

You may use a calculator on this assessment

1. Use your calculator to complete the table. Then make an educated guess for the following limits.

(a) $\lim_{x\to 0} \dfrac{2\sqrt{1+x}-2+x}{x^2}$ dne,

b/c $\lim_{x\to 0^-} \dfrac{2\sqrt{1+x}-2+x}{x^2} = -\infty$

& $\lim_{x\to 0^+} \dfrac{2\sqrt{1+x}-2+x}{x^2} = \infty$

(& $\lim_{x\to 0^-} f(x) \neq \lim_{x\to 0^+} f(x)$).

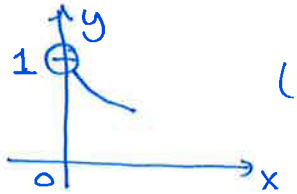
x	$f(x) = \dfrac{2\sqrt{1+x}-2+x}{x^2}$
-0.1	≈ -20.263
-0.01	≈ -200.251
-0.001	≈ -2000.250
0	Undefined
0.001	≈ 1999.750
0.01	≈ 199.751
0.1	≈ 19.762

(b) $\lim_{x\to 0^+} (\sin x)^x = 1$

x	$f(x) = (\sin x)^x$
0	Undefined
0.001	≈ 0.993
0.01	≈ 0.955
0.1	≈ 0.794

2. Describe what the results of 1(b) tell us about the graph of the function $f(x) = (\sin x)^x$. What does the graph look like near $x = 0$?

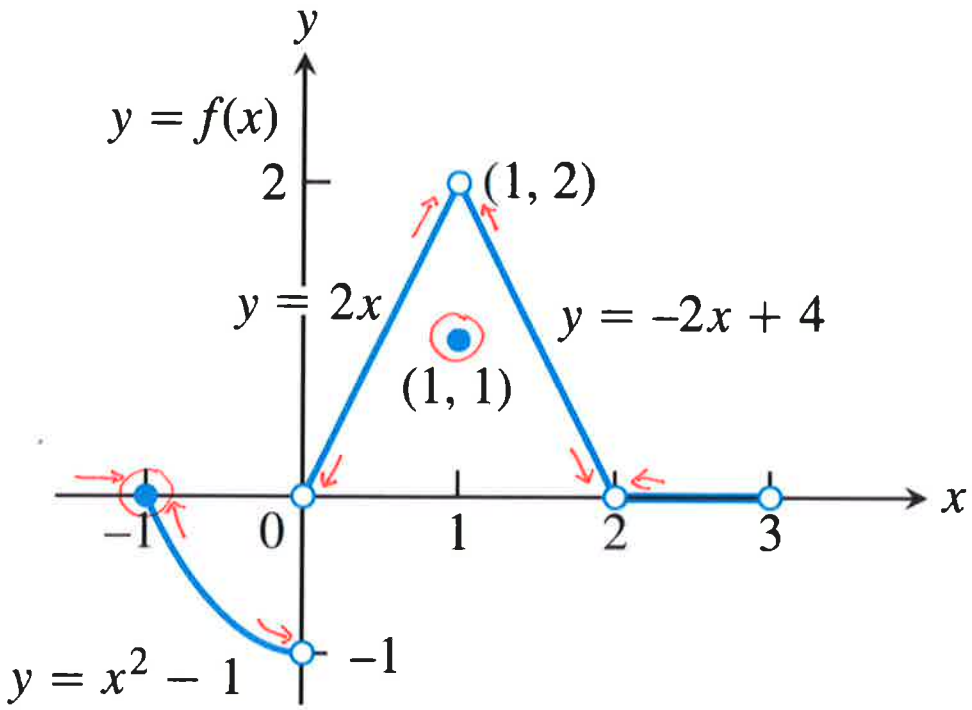
As x approaches 0 from the right, the values of $y = (\sin x)^x$ approach 1.



(Not to scale)

Skill #: L2
Score:

2. For the function f whose graph is given below, state the values of the given quantity, if it exists. If it does not exist, explain why.



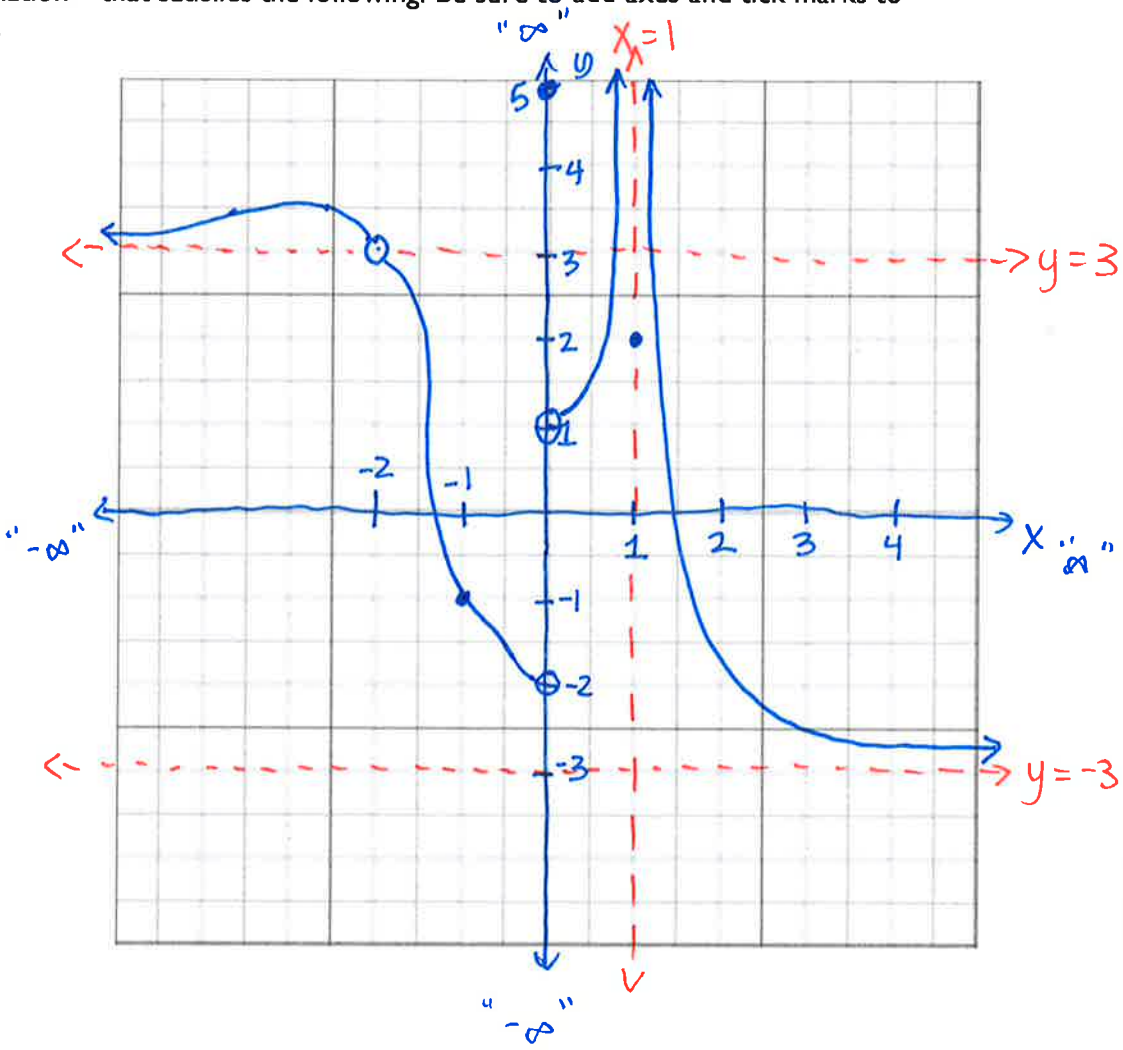
(a) $\lim_{x\to -1^-} f(x)$ d.n.e.	(e) $\lim_{x\to 0^-} f(x) = -1$	(i) $\lim_{x\to 1^-} f(x) = 2$
(b) $\lim_{x\to -1^+} f(x) = 0$	(f) $\lim_{x\to 0^+} f(x) = 0$	(j) $\lim_{x\to 1^+} f(x) = 2$
(c) $f(-1) = 0$	(g) $\lim_{x\to 0} f(x)$ d.n.e.	(k) $\lim_{x\to 1} f(x) = 2$
(d) $\lim_{x\to 2} f(x) = 0$	(h) $f(0)$ undefined	(l) $f(1) = 1$

b/c f is not defined for $x < -1$.

b/c $\lim_{x\to 0^-} f(x) \neq \lim_{x\to 0^+} f(x)$.

3. Sketch a function – not a relation – that satisfies the following. Be sure to add axes and tick marks to indicate the scale you're using.

- ✓ i. $f(-2)$ is undefined
- ✓ ii. $f(-1) = -1$
- ✓ iii. $f(1) = 2$
- ✓ iv. $f(0) = 5$
- ✓ v. $\lim_{x \to 1} f(x) = \infty$ VA
- ✓ vi. $\lim_{x \to 0^-} f(x) = -2$
- ✓ vii. $\lim_{x \to 0^+} f(x) = 1$
- ✓ viii. $\lim_{x \to -2} f(x) = 3$
- ✓ ix. $\lim_{x \to -\infty} f(x) = 3$ HA
- ✓ x. $\lim_{x \to \infty} f(x) = -3$ HA



INTEGRITY STATEMENT:

On my personal integrity, I have not given, nor received, nor witnessed any unauthorized assistance on this exam."

_____

(signature)

If you can't sign this in good conscience, please don't. Come speak to me.

Skill #: G1
Score:

Skill #: L3
Score: