235 Quiz 1 Name: * key *

September 7, 2012

You have 30 minutes to complete this quiz. You may use your Notebook, provided that it contains no loose papers and everything in it was written by you personally. When you are finished you may leave or you can stay to ask questions.

1. Fill each blank with "positive," "negative," or "zero."

a) If (x, y) is the point where the terminal edge of the angle $-\frac{7\pi}{3}$ meets the unit circle, then x is POSITIVE and y is NEGATIVE.

b) $\cos(\frac{11\pi}{3}) - \cos(-\frac{\pi}{3})$ is ZERO and $\ln(3^{-2})$ is NEGATIVE.

$\frac{11\pi}{3} = 2\pi + \frac{5\pi}{3}$ Same as $-\frac{\pi}{3}$

$\ln(\frac{1}{3^2}) = \ln(\frac{1}{9})$ neg.

2. The function $f(x) = x^3 + 1$ is:

A) an even function

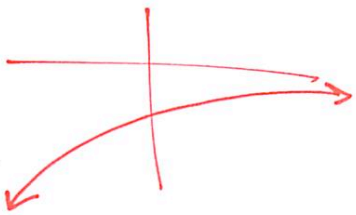
B) both even and odd

C) neither even nor odd

D) an odd function

$f(-x) = (-x)^3 + 1 = -x^3 + 1$
$\neq f(x)$
$\neq -f(x)$

3. Sketch the graph of a function with domain $\mathbb{R}$ that is concave down everywhere, increasing everywhere, and negative everywhere.

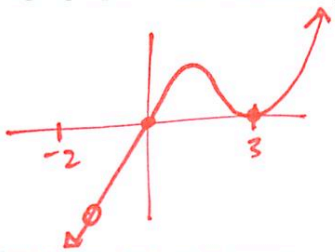


(e.g. $f(x) = -e^{-x}$)

4. Sketch a rough graph of the function $f(x) = \dfrac{(x^2+2x)(x-3)^2}{x+2}$ =

$\dfrac{x(x+2)(x-3)^2}{(x+2)}$ root at $x=0$, double root at $x=3$, hole at $x=-2$

upwards cubic



5. Argue algebraically that the function $f(x) = 1 + 2x$ is one-to-one.
(Use the definition, not a picture.)

$f(a) = f(b) \Rightarrow 1 + 2a = 1 + 2b$

$\Rightarrow 2a = 2b$

$\Rightarrow a = b$. Q.E.D.