

1. (2 pts each) True or False? Answer "True" only if the statement is always true.

a) Circle True or **False**: If  $f(x)$  is a second degree polynomial, then  $f(f(x))$  is also a second degree polynomial.

b) Circle True or **False**:  $e^{a+b} = e^a + e^b$

c) Circle True or **False**: If  $f(x)$  is an exponential function, then  $f(x) \rightarrow \infty$  as  $x \rightarrow \infty$ .

d) Circle **True** or **False**:  $\sin(\pi/3) + x^{\ln(e)} + 1$  is a linear function.

e) Circle True or **False**: The derivative of  $f(x)$  at a given point is the tangent line at that point.

f) Circle **True** or **False**: If  $a$  is positive, then the function  $a * \ln(x)$  is concave down.

g) Circle True or **False**: If  $f'(x)$  is an increasing function on an interval, then  $f(x)$  is also increasing on that interval.

2. (6 pts) Sketch a graph of a single continuous function  $G(z)$  satisfying all of the following conditions:

- $G'(z)$  is always negative.
- When  $z < 0$ ,  $G(z)$  is concave down
- When  $z > 0$ ,  $G(z)$  is concave up.

