COMP 550
Algorithms and Analysis
Spring 2020
Pop Quiz 1

For each problem, fill in the blanks with T (true) or F (false) according to whether the statement is true for the specified functions f and g.

1. $f(x) = x^2 + 5, g(x) = 3x^2 + 4x$.
a) $f(x) = \Theta(g(x))$ __T__ b) $f(x) = O(g(x))$ __T__ c) $f(x) = o(g(x))$ __F__ d) $f(x) = \Omega(g(x))$ __T__
e) $f(x) = \omega(g(x))$ __F__

2. $f(x) = 2^x + 3x, g(x) = 3^x + 2x + 1$.
a) $f(x) = \Theta(g(x))$ __F__ b) $f(x) = O(g(x))$ __T__ c) $f(x) = o(g(x))$ __T__ d) $f(x) = \Omega(g(x))$ __F__
e) $f(x) = \omega(g(x))$ __F__

3. $f(x) = x^3 2^x + x^2, g(x) = x^2 3^x + x^3$.
a) $f(x) = \Theta(g(x))$ __F__ b) $f(x) = O(g(x))$ __T__ c) $f(x) = o(g(x))$ __T__ d) $f(x) = \Omega(g(x))$ __F__
e) $f(x) = \omega(g(x))$ __F__

4. $f(x) = x^3 \log x + 1, g(x) = 2x^2 \log^2 x + 3$.
a) $f(x) = \Theta(g(x))$ __F__ b) $f(x) = O(g(x))$ __F__ c) $f(x) = o(g(x))$ __F__ d) $f(x) = \Omega(g(x))$ __T__
e) $f(x) = \omega(g(x))$ __T__

5. $f(x) = 2x + 1, g(x) = 3 \log^2 x + 2$.
a) $f(x) = \Theta(g(x))$ __F__ b) $f(x) = O(g(x))$ __F__ c) $f(x) = o(g(x))$ __F__ d) $f(x) = \Omega(g(x))$ __T__
e) $f(x) = \omega(g(x))$ __T__

6. $f(x) = 2 \log_2 x, g(x) = \log_3(2x)$.
a) $f(x) = \Theta(g(x))$ __T__ b) $f(x) = O(g(x))$ __T__ c) $f(x) = o(g(x))$ __F__ d) $f(x) = \Omega(g(x))$ __T__
e) $f(x) = \omega(g(x))$ __F__

7. $f(x) = \sqrt{x}, g(x) = 4 \log x$.
a) $f(x) = \Theta(g(x))$ __F__ b) $f(x) = O(g(x))$ __F__ c) $f(x) = o(g(x))$ __F__ d) $f(x) = \Omega(g(x))$ __T__
e) $f(x) = \omega(g(x))$ __T__

8. $f(x) = x^2 + 1, g(x) = 3x - 2$.
a) $f(x) = \Theta(g(x))$ __F__ b) $f(x) = O(g(x))$ __F__ c) $f(x) = o(g(x))$ __F__ d) $f(x) = \Omega(g(x))$ __T__
e) $f(x) = \omega(g(x))$ __T__