

**Maths Concepts
Practice Quiz 3
2009**

Question 1

In each case an investment grows from an initial value P to a final value S over T years. Give both the annual ordinary compound growth rate and the annual continuously compounded growth rate

- (a) P=100, S=17000 T=34
- (b) P=3.84 S=7.38 T=3
- (c) P=13.35 S=425.6 T=45

Question 2

Consider the following two equations

$$S = P(1 + r)^T \quad (1)$$

and

$$S = Pe^{rt} \quad (2)$$

- (a)
 - a. If a contract specifies a continuously compounding rate of 5% p.a. how long until the investment increases by 80%?
Increases by 80% means that the growth factor $S/P=1.8$
 - b. If the contract specifies an ordinary compounding rate of 5% p.a. how long until the investment increases by 80%?
- (b)
 - a. If contract specifies a continuously compounding rate and you wish your investment to double within 10 years, what annual rate do you require?
 - b. Do the same for a contract which specifies ordinary compounding.
- (c) You have the choice of the following three investments
 - a. 1.5% per quarter, continuously compounding
 - b. 0.55% per month ordinary compounding
 - c. 3.2% semi annually ordinary compounding

Which investment would you choose to maximize your return?

Question 3

Give an equation of the form $y=mx+b$.

- (a) When $x=0$, $y=2$. For each increase in x , y decreases by 2.
- (b) When $x=3$, $y=0$ while when $x=0$, $y=4$
- (c) When $x=2$ $y=5$ and when $x=9$ $y=5$
- (d) When $y=0$ $x=4$ and for each 2 unit increase in x y decreases by 1 unit
- (e) When price x equals the unit cost 8 the quantity y supplied is 0. For each 50 cents above this price, the quantity supplied increases by 3 units.

Question 4

- (a) Suppose the demand function is given by $Q=200-10P$ and the supply function is $S=5P-25$. Find the equilibrium price and quantity.
- (b) Suppose that demand decreases by 5 units for every increase in price of \$2, and that when price equals \$60 the demand is zero. Suppose further that the quantity supplied is zero for the price is less than or equal to \$20 and that for each \$1 increase in price the quantity supplied increases by 4 units. Find the equilibrium quantity and price.