Question 1

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

(a) $P=4.5$, $S=7.2$, $T=4$ years.

(b) $P=100$, $S=140$, $T=32$ months.

(c) If contract specifies a continuously compounding rate and you wish your investment to triple within 20 years, what annual continuously compounding rate do you require?

(d) If contract specifies a ordinary compounding rate and you wish your investment to increase by 50% within 5 years, what annual ordinary compounding rate do you require?

(e) You have the choice of the following three investments
   a. 1.6% per quarter ordinary compounding
   b. 0.52% per month continuous compounding
   c. 6.5% for 1 year ordinary compounding.

Which investment would you choose to maximize your return?
Question 2

Give an equation of the form \( y = mx + b \)

(a) When \( y = 0 \) \( x = 15 \) and for each 5 unit increase in \( x \), \( y \) decreases by 2 units.

(b) When \( x = -6 \), \( y = 0 \) while when \( x = 0 \), \( y = 3 \)

(c) Suppose that demand decreases by 1000 units for every increase in price of $1, and that when price equals $70 the demand is zero. Write down the quantity demanded, \( Q_D \), as a function of price, \( P \), i.e. write an equation of the form \( Q_D = m + bP \). You may assume the relationship between quantity demanded and price is linear.

(d) Suppose that the quantity supplied is zero if the price is less than $10 and that for every $2 increase in price the amount supplied increases by 1000 units. Write down quantity supplied, \( Q_S \) as a function of price, i.e. write an equation of the form \( Q_S = m + bP \). You may assume the relationship between quantity supplied and price is linear.

(e) A market is said to be in equilibrium if \( Q_D = Q_S \). Using your answers to parts (c) and (d) find the equilibrium price and quantity.