***Converting Returns:***

***Effective rates, APR’s and***

***Continuously Compounded rates***

**Question 1:** A stock was bought for $10 and sold one month later for $10.50.

a) What is the effective **monthly** rate of return?

$$V\_{0}=\frac{V\_{t}}{\left(1+r\_{eff}\right)^{t}}$$

b) What is the **APR** compounding per **month**?

$$r\_{APR, comp monthly}=$$

c) What is the effective **annual** rate of return?

$$r\_{eff, annual}=$$

d) What is the continuously compounded **monthly** rate of return?

$$r\_{cc, monthly}=$$

e) What is the continuously compounded **annual** rate of return?

$$r\_{cc, annual}=$$

**Question 2:** A credit card advertises an interest rate of 24%.

Note that credit cards are paid monthly so the interest rate is quoted as an Annualised Percentage Rate (APR) compounding per month.

a) Find the effective monthly rate.

$$r\_{eff, monthly}=$$

b) Find the effective annual rate.

$$r\_{eff, annual}=$$

c) Find the effective 6 month rate.

$$r\_{eff, 6mth}=$$

d) Find the effective quarterly rate.

$$r\_{eff, qtrly}=$$

e) Find the Annualised Percentage Rate (APR), compounding every 6 months ($r\_{APR, comp per 6mths}$).

$$r\_{APR, comp per 6mths}=$$

f) Find the APR compounding per day ($r\_{APR, comp daily}$). Assume 30 days in a month and 360 days in a year.

$$r\_{APR, comp daily}=$$

g) Find the continuously compounded rate per year ($r\_{cc annual}$). Assume 30 days in a month and 360 days in a year.

h) Find the continuously compounded rate per month ($r\_{cc monthly}$). Assume 30 days in a month and 360 days in a year.

i) Find the continuously compounded rate per day ($r\_{cc daily}$). Assume 30 days in a month and 360 days in a year.

**Question 3:** A bond is advertised with a coupon rate of 7%, paid semi-annually. The yield of the bond is 6%.

Note that the bond pays semi-annual coupons so the yield is quoted as an Annualised Percentage Rate (APR) compounding every 6 months.

a) Find the effective six-month rate.

$$r\_{eff, 6mth}=$$

b) Find the effective annual rate.

$$r\_{eff, annual}=$$

c) Find the effective monthly rate.

$$r\_{eff, monthly}=$$

d) Find the effective quarterly rate.

$$r\_{eff, qtrly}=$$

e) Find the Annualised Percentage Rate (APR), compounding every week. Assume 52 weeks per year. ($r\_{APR, comp weekly}$).

$$r\_{APR, comp weekly}=$$

f) Find the APR compounding per day. Assume 30 days in a month and 360 days in a year.

$$r\_{APR, comp daily}=$$

g) Find the continuously compounded rate per year ($r\_{cc annual}$). Assume 30 days in a month and 360 days in a year.

h) Find the continuously compounded rate per month ($r\_{cc monthly}$). Assume 30 days in a month and 360 days in a year.

i) Find the continuously compounded rate per day ($r\_{cc daily}$). Assume 30 days in a month and 360 days in a year.