



Subject: Financial Mathematics

Chapter: Unit 1

Category: Practice questions 1

1. CT1 September 2018 Q9

Describe the cash flows which are paid and received in respect of an index-linked security. [2]

2. CT1 September 2016 Q3

Describe the characteristics of a repayment loan (or repayment mortgage). [3]

3. CT1 September 2015 Q8

State the characteristics of an equity. [4]

4. CT1 September 2013 Q4

Describe the characteristics of the cash flows that are paid and received in respect of:

- (i) an index-linked security. [2]
- (ii) an equity. [3]

[Total 5]

5. CT1 September 2018 Q2

The effective rate of discount per annum is 5%.

Calculate:

- (i) the equivalent force of interest; [1]
- (ii) the equivalent rate of interest per annum convertible monthly; [2]
- (iii) the equivalent rate of discount per annum convertible monthly. [1]

[Total 4]

6. CT1 September 2017 Q1

(i) Calculate the time in days for £6,000 to accumulate to £7,600 at:

- (a) a simple rate of interest of 3% per annum.
- (b) a compound rate of interest of 3% per annum effective.
- (c) a force of interest of 3% per annum. [6]

Note: You should assume there are 365 days in a year.

(ii) Calculate the effective rate of interest per half year which is equivalent to a force of interest of 3% per annum. [1]

[Total 7]

7. CT1 April 2017 Q1

Calculate the nominal rate of discount per annum convertible monthly which is equivalent to:

- (i) an effective rate of interest of 1% per quarter. [2]
- (ii) a force of interest of 5% per annum. [2]
- (iii) a nominal rate of discount of 4% per annum convertible every three months. [2]

[Total 6]

8. CT1 September 2016 Q1

The nominal rate of interest per annum convertible quarterly is 5%. Calculate, giving all the answers as a percentage to three decimal places:

- (i) the equivalent annual force of interest. [1]
- (ii) the equivalent effective rate of interest per annum. [1]
- (iii) the equivalent nominal rate of discount per annum convertible monthly. [2]

[Total 4]

9. CT1 September 2015 Q2

The nominal rate of discount per annum convertible monthly is 5.5%.

- (i) Calculate, giving all your answers as a percentage to three decimal places:

- (a) the equivalent force of interest.
- (b) the equivalent effective rate of interest per annum.
- (c) the equivalent nominal rate of interest per annum convertible monthly. [3]

- (ii) Explain why the nominal rate of interest per annum convertible monthly calculated in part (i)(c) is less than the equivalent annual effective rate of interest calculated in part (i)(b) [1]

- (iii) Calculate, as a percentage to three decimal places, the effective annual rate of discount offered by an investment that pays £159 in eight years' time in return for £100 invested now. [1]

- (iv) Calculate, as a percentage to three decimal places, the effective annual rate of interest from an investment that pays 12% interest at the end of each two-year period. [1]

[Total 6]

10. CT1 April 2015 Q2

Calculate the time in days for £3,000 to accumulate to £3,800 at:

- (a) a simple rate of interest of 4% per annum.

(b) a compound rate of interest of 4% per annum effective. [4]

11. CT1 September 2013 Q1

The rate of interest is 4.5% per annum effective. (i) Calculate:

- (a) the annual effective rate of discount.
- (b) the nominal rate of discount per annum convertible monthly.
- (c) the nominal rate of interest per annum convertible quarterly.
- (d) the effective rate of interest over a five year period. [5]

(ii) Explain why your answer to part (i)(b) is higher than your answer to part (i)(a). [2]

[Total 7]

12. CT1 October 2012 Q.1

An investor is considering two investments. One is a 91-day deposit which pays a rate of interest of 4% per annum effective. The second is a treasury bill.

Calculate the annual simple rate of discount from the treasury bill if both investments are to provide the same effective rate of return. [3]

13. CT1 October 2012 Q.2

The nominal rate of discount per annum convertible quarterly is 8%.

- (i) Calculate the equivalent force of interest. [1]
- (ii) Calculate the equivalent effective rate of interest per annum. [1]
- (iii) Calculate the equivalent nominal rate of discount per annum convertible monthly. [2]

[Total 4]

14. CT1 September 2011 Q.1

A 91-day treasury bill is issued by the government at a simple rate of discount of 8% per annum.

Calculate the annual effective rate of return obtained by an investor who purchases the bill at issue. [3]

15. CT1 April 2009 Q.2

Describe the characteristics of:

- (a) an interest-only loan (or mortgage); and
- (b) a repayment loan (or mortgage).

[Total 4]

16. CT1 September 2009 Q.1

A 182-day government bill, redeemable at £100, was purchased for £96 at the time of issue and was later sold to another investor for £97.89. The rate of return received by the initial purchaser was 5% per annum effective.

- (a) Calculate the length of time in days for which the initial purchaser held the bill.
- (b) Calculate the annual simple rate of return achieved by the second investor. [Total 4]



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