

**MATH 373**  
**Quiz 2**  
**Spring 2018**  
February 6, 2018

1. David, Max, and Andrew enter into a financial agreement. Under this agreement, David will pay Max 1000 today. David will also pay Andrew 800 at the end of one year. Max will pay Andrew 1100 at the end of one year. Finally, Andrew will pay David 2000 at the end of two years.

Calculate the yield rate that David will receive under this financial arrangement.

**Solution:**

David's cash flows are a payment of 1000 at time 0, a payment of 800 at time 1, and receipt of a payment of 2000 at time 2.

To find the yield rate, we can use our calculator:

$$CF0 \leftarrow -1000; C01 \leftarrow -800; C02 \leftarrow 2000; \boxed{IRR}; \boxed{CPT} \implies 6.9694\%$$

*Or:*

$$1000(1+i)^2 + 800(1+i) = 2000 \quad \text{Let } x = 1+i$$

$$1000x^2 + 800x - 2000 = 0$$

$$1+i = x = \frac{-800 \pm \sqrt{(800)^2 - (4)(1000)(-2000)}}{(2)(1000)} = 1.069694 \implies i = 6.9694\%$$

2. Lizzie borrows 10,000 from Brinkers Bank which will be repaid with payments of 6000 at the end of two years and 7000 at the end of four years.

Payments made by Lizzie will be reinvested by Brinkers Bank at an interest rate of 9%

Calculate the annual effective yield rate for Brinkers Bank taking into account reinvestment.

**Solution:**

$$10,000(1+i)^4 = 6000(1.09)^2 + 7000 = 14,128.60$$

$$(1+i)^4 = 1.412860$$

$$i = (1.412860)^{1/4} - 1 = 0.09025$$

3. Bri borrows 5000 which will be repaid with a payment of  $P$  at the end of one year and  $2P$  at the end of three years. The annual effective interest rate on this loan is 6%

Determine  $P$  .

**Solutions:**

$$5000 = P(1.06)^{-1} + 2P(1.06)^{-3}$$

$$P = \frac{5000}{(1.06)^{-1} + 2(1.06)^{-3}} = 1906.48$$

*OR*

$$5000(1.06)^3 = P(1.06)^2 + 2P$$

$$P = \frac{5000(1.06)^3}{(1.06)^2 + 2} = 1906.48$$

David's cash flows are a payment of 1000 at time 0, a payment of 1800 at time 1, and receipt of a payment of 3100 at time 2.

To find the yield rate, we can use our calculator:

$$CF0 \leftarrow -1000; CF1 \leftarrow -1800; CF2 \leftarrow 3100; \boxed{IRR}; \boxed{CPT} \implies 7.7372\%$$

*Or:*

$$1000(1+i)^2 + 1800(1+i) = 3100 \quad \text{Let } x = 1+i$$

$$1000x^2 + 1800x - 3100 = 0$$

$$1+i = x = \frac{-1800 \pm \sqrt{(1800)^2 - (4)(1000)(-3100)}}{(2)(1000)} = 1.077372 \implies i = 7.7372\%$$