

# Q1

- Suppose you are offered an investment that will allow you to double your money in 6 years. You have 10,000 to invest. What is the implied rate of interest?
- Answer:

$$r = \left( \frac{FV}{PV} \right)^{\frac{1}{t}} - 1 = \left( \frac{20,000}{10,000} \right)^{\frac{1}{6}} - 1 = 0.12246 \text{ or } 12.25\%$$

# Q2

- Suppose you have a 1-year old son and you want to provide \$75,000 in 17 years towards his college education. You currently have \$5,000 to invest. What interest rate must you earn to have the \$75,000 when you need it?
- Answer:

$$r = \left(\frac{FV}{PV}\right)^{\frac{1}{t}} - 1 = \left(\frac{75,000}{5,000}\right)^{\frac{1}{17}} - 1 = 0.172688 \text{ or } 17.27\%$$

# Q3

- Suppose you want to buy a new house. You currently have 15,000 and you figure you need to have a 10% down payment plus an additional 15% in closing costs. *Closing costs expressed as a percentage of total borrowing*
- If the type of house you want costs about 150,000 and you can earn 7.5% per year, how long will it be before you have enough money for the down payment and closing costs?
- How much do you need to have in the future?
- Answer:
  - Down payment =  $0.1 \times (150,000) = 15,000$
  - Total borrowing =  $150,000 - 15,000 = 135,000$
  - Closing costs =  $0.15 \times (150,000 - 15,000) = 20,250$
  - Total needed =  $15,000 + 20,250 = 35,250$

$$t = \ln(35,250 / 15,000) / \ln(1.075) = 11.81 \text{ years}$$

# Q4 Excel SpreadSheet Exercise

Present Value	Years	Interest Rate	Future Value
81550	17	12%	<u>=FV(12%,17,0,-81550)</u>
<u>=-PV(22%,14,0,886073)</u>	14	22%	886073
1000	5	<u>=RATE(5,0,-1000,2000)</u>	2000
221	4	<u>=RATE(4,0,-221,307)</u>	307
250	<u>=NPER(4%,0,-250,1105)</u>	4%	1105
1000	<u>=NPER(5%,0,-1000,2000)</u>	5%	2000
12000	10	10%	<u>=FV(0.1, 10, 10%,-12000)</u>
<u>=-PV(12%,10,0,1000)</u>	10	12%	1000