

Compound Interest - Worksheet

MCR3U

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SOLUTIONS

1) Marvin deposits \$100 into an account that pays interest at 5% per year, compounded annually.

a) Write an equation that can be used to calculate the amount in his account in the form $A = P(1 + i)^n$.

$$A = 100(1.05)^n$$

b) Complete the following table...

Number of Compounding Periods (years)	Amount (\$)
0	100
1	105
2	110.25
3	115.76
4	121.55

2) Sadia deposits a \$2000 inheritance into an account that earns 4% per year, compounded annually. Find the amount in the account after each time.

a) 3 years

$$\begin{aligned} A &= 2000(1.04)^n \\ &= 2000(1.04)^3 \\ &= \$2249.73 \end{aligned}$$

b) 8 years

$$\begin{aligned} A &= 2000(1.04)^8 \\ &= \$2737.14 \end{aligned}$$

3) Soda invests \$500 in an account that earns 7% per year, compounded annually. How long does Soda need to leave her investment in the account in order to double her money?

$$\begin{aligned} A &= 500(1.07)^n \\ 1000 &= 500(1.07)^n \\ \log 2 &= \log 1.07^n \\ \log 2 &= n \cdot \log 1.07 \end{aligned}$$

$$\begin{aligned} n &= \frac{\log 2}{\log 1.07} \\ n &= 10.24 \text{ years} \end{aligned}$$

4) Art Vandelay deposited some money into an account that pays 3% per year, compounded annually. Today the account balance is \$660. How much was in the account...

a) 1 year ago

$$660 = P(1.03)^1$$

$$P = \frac{660}{1.03}$$

$$P = \$640.78$$

b) 5 years ago?

$$660 = P(1.03)^5$$

$$P = \frac{660}{(1.03)^5}$$

$$P = \$569.32$$

5) Elaine wants to invest some money that will grow to \$1000 in 6 years. If her account pays 4.5% interest, compounded annually, how much should Lydia invest today?

$$1000 = (1.045)^6$$
$$= \frac{1000}{(1.045)^6} = \$767.90$$

6) To buy a new guitar, Phoebe borrows \$650, which she plans to repay in 5 years. The bank charges 12% per annum, compounded annually.

a) Determine the amount that Phoebe must repay.

$$A = 650(1.12)^5$$

$$A = \$1145.52$$

b) How much would she have to pay if the interest was compounded semi-annually instead of annually? (Hint: twice as many compounding periods but the interest rate will need to be cut in half)

$$A = ?$$

$$P = 650$$

$$i = 0.12 \div 2 = 0.06$$

$$n = 5 \times 2 = 10$$

$$A = 650(1.06)^{10}$$

$$A = \$1164.05$$

c) How much would she have to pay if the interest was compounded monthly?

$$A = ?$$

$$P = 650$$

$$i = 0.12 \div 12 = 0.01$$

$$n = 5 \times 12 = 60$$

$$A = 650(1.01)^{60}$$

$$A = \$1180.85$$

Answers

() a) $A = P(1.05)^n$ b)

Number of Compounding Periods (years)	Amount (\$)
0	100
1	105
2	110.25
3	115.76
4	121.55

2) a) \$2249.73 b) \$2737.14

3) 10.24 years

4) a) \$640.78 b) \$569.32

5) \$767.90

6) a) \$1145.52 b) \$1164.05 c) \$1180.85

