### Summary of Mathematical Formulas

Mathematical Formulas

Simple Interest  

Compound Interest  or 

Continuously Compounded

 or 

Savings Plans  or 

Loans  or 

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 2018 Tax Year | | | | |
| Marginal Tax Rate  On Taxable Income | Filing Single | Filing as Head of Household | Married filing Jointly | Married filing Separately |
| 10% | First $9,525 | First $13,600 | First $19,050 | First $9,525 |
| 12% | $9,525 – $38,700 | $13,600 – $51,800 | $19,050 – $77,400 | $9,525 – $38,700 |
| 22% | $38,700 – $82,500 | $51,800 – $82,500 | $77,400 – $165,000 | $38,700 – $82,500 |
| 24% | $82,500 – $157,500 | $82,500 – $157,500 | $165,000 – $315,000 | $82,500 – $157,500 |
| 32% | $157,500 – $200,000 | $157,500 – $200,000 | $315,000 – $400,000 | $157,500 – $200,000 |
| 35% | $200,000 – $500,000 | $200,000 – $500,000 | $400,000 – $600,000 | $200,000 – $300,000 |
| 37% | Over $500,000 | Over $500,000 | Over $600,000 | Over $300,000 |

#### Review Questions

**Simple Interest, Compound Interest and Continuous Compounded Interest**

1.  If you deposit $1525 in an account at 5.6% APR for fourteen years, how much will you have in the account and how much interest did you earn after 14 years if:

A) The interest is compounded using simple interest.

B) The interest is compounded quarterly.

C) The interest is compounded weekly.

D)  The interest is compounded continuously.

2.  Alicia takes out $2300 loan that charges 15% APR simple interest.  How much will she repaid if she has the loan for 3 years ?  How much interest did she pay?

3.  Devon invests $25,000 into an account for 15 years.  He earns 6.5% interest compounded quarterly.  What is the future value and how much interest did he earn?

4.  The current inflation rate is 2.92%.  If this continues for the next 10 years find the cost of the following items in the year 2029. \***Inflation is Continuous Compound Interest**

         A) Gas Average:  $3.49

         B)  Dozen Eggs:  $1.99

         C)  Bread:  $3.29

         D) Basic Monthly Cell Phone bill: $79.99

         E) Average cost of downloading a song:  $1.99

5. You are purchasing new furniture that costs $3500.  You are required to put $350.  The loan will be a simple interest at 13% APR and the length of the loan will be 28 months.  What is your monthly payment and how much did you pay back?

6. Tom has misplaced the sales contract for his car and cannot remember the amount he originally financed.  He does know that the interest rate was 9.6% APR for 60 months and the simple interest loan required a total of 60 payments at $ 254.23.

**Savings Plans**

7. For each find the Future Value, the total amount deposits, and the interest earned.

A) Regular Deposit $350, Compounded Monthly, 6.5% APR for 25 years

B) Regular Deposit $500, Compounded Quarterly, 6.5% APR for 15 years

C) Regular Deposit $75, Compounded Weekly, 4.5% APR for 30 years

**Loan Payments**

8.For each house find the monthly payment for a 30 year loan and 5% APR. Find the amount of interest you pay on each loan.

House 1: John’s Landing Townhouse:  $299,900

House 2: Gresham 4 bedroom House:  $389,900

**Budgeting :**

9.Find the net monthly cash flow (1 month = 4 weeks)

Income                                                                Expenses

Job Income: $475 per week                        Rent: $650 per month

                                                                     Groceries $55 per week

Loan $2500 per term. (10 weeks)               Tuition and fees $3000 per term.

                                                                     Books:  $255 per term

                                                                     Miscellaneous: $75 per week

10.  Pat loves painting. With tax, the total spent is about $46 each month on supplies.   Once a week (52 weeks per year) the art class cost Pat $15.75.   How much is Pat spending on painting in a year?

**Taxes**

1. If you are in the 12% tax bracket and can take a $1000 deduction, how much will your tax bill decrease by?
2. If you are in the 12% tax bracket and can take a $1000 credit, how much will your tax bill decrease by?
3. Amir’s made $43,000 in wages and $1000 in tips. He contributed $3000 into his IRA account.   
   a) Find Amir’s Gross Income:

b) Find Amir’s Adjusted Gross Income (AGI):

Amir has $9,540 he could take in itemized deductions. The standard deduction for a single filer is $12,000.   
c) Find Amir’s taxable income:

d) Use the 2018 tax table determine to determine how much Amir owes in taxes

Amir can take a $1200 education credit and has had $2700 withheld from his paychecks.

e) Determine the amount Amir will owe or be refunded.

### Answers

1. A)  The interest is $1195.6 and balance is $2720.6
2. or  
   =FV(0.056/4, 4\*14, 0, 1525)  
   The interest is $1796.97 and the balance is $3321.97

C)   
or =FV(0.056/52, 52\*14, 0, 1525)

The interest is $1821.15 and the balance is $3346.15

1. The interest is $1815.08 and the balance is $3340.08

=1525\*EXP(0.056\*14)

1. The interest is $1035 and the amount paid is $3335

  
  
 =FV(0.065/4, 4\*15, 0, 2300)

1. The interest is $40761.77 and the amount paid is $65761.77
2. A)  =3.49\*EXP(0.0292\*10) The cost of gas would be $4.67

B)  =1.99\*EXP(0.0292\*10) The cost of eggs would be $2.66

C)  =3.29\*EXP(0.0292\*10) The cost of Bread would be $4.41

D)  =79.99\*EXP(0.0292\*10) The cell phone bill would be $107.11

E)  =1.99\*EXP(0.0292\*10) The cost of a song download would be $2.66

**You would pay $4105.50 in 28 months with $146.63 as your monthly payments.

1. ** The amount borrowed was $10,306.62

A) **=FV(0.065/12, 12\*25, 350, 0)

The future value is $262,092.78 the interest earned is $157,092.78

B) **=FV(0.065/4, 4\*25, 500, 0)The future value is $50168.34 the interest earned is $20,168.34

C) **=FV(0.045/12, 52\*30, 75, 0)The future value is $247,448.43 the interest earned is $135,128.43

*8. House 1: *=PMT(0.5/12, 12\*30, 239920, 0)

Total Paid $463,658.40, Interest Paid $223,738.40  
House 2: **   
=PMT(0.5/12, 12\*30, 3119200, 0)   
Total Paid $602,803.45, Interest Paid $290,883.45

1. The net monthly cash flow is $428
2. Pat is spending $1371 a year painting
3. 1000(.12) = 120  Your tax bill will be decreased by $120.
4. Your tax bill will be decreased by $1000.
5. a) 43,000+1,000 = 44,000

Amir’s gross income is $44,000.

b) 44,000-3,000=41000   
Amir’s adjusted gross income is $41,000

c) 41,000-12,000= 29,000   
Amir’s taxable income is $29,000

d)  
=.1(9525)+.12(29000-9525)

=952.5+2337

=3289.5 Amir owes $3289.50 in taxes

e) 3289.5-1200-2700=-610.5 Amir will be refunded $610.50