Name your program **hw4.cpp**. Program must be able to compile or you will get at most 1 out 3 points for the assignment.

**Due: Wednesday November 8, 2017 by 11:59 PM**

Write **one single** complete C++ program to do all 3 sections below:

**Part A: (Rule of 72)**

This question is inspired by the following video from Khan Academy.

[(63) The rule of 72 for compound interest (video) | Khan Academy](https://www.khanacademy.org)

Watch the video and then display the following table. Use one of the function in `<cmath>` library to help in getting the data in the second column. Some sample code can be found at the end of this document.

<table>
<thead>
<tr>
<th>Rate</th>
<th>Actual</th>
<th>Rule_of_72</th>
<th>Diff.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1%</td>
<td>69.66</td>
<td>72.00</td>
<td>-2.34</td>
</tr>
<tr>
<td>2%</td>
<td>35.00</td>
<td>36.00</td>
<td>-1.00</td>
</tr>
<tr>
<td>3%</td>
<td>23.45</td>
<td>24.00</td>
<td>-0.55</td>
</tr>
<tr>
<td>4%</td>
<td>17.67</td>
<td>18.00</td>
<td>-0.33</td>
</tr>
<tr>
<td>5%</td>
<td>14.21</td>
<td>14.40</td>
<td>-0.19</td>
</tr>
<tr>
<td>6%</td>
<td>11.90</td>
<td>12.00</td>
<td>-0.10</td>
</tr>
<tr>
<td>7%</td>
<td>10.24</td>
<td>10.29</td>
<td>-0.04</td>
</tr>
<tr>
<td>8%</td>
<td>9.01</td>
<td>9.00</td>
<td>0.01</td>
</tr>
<tr>
<td>9%</td>
<td>8.04</td>
<td>8.00</td>
<td>0.04</td>
</tr>
<tr>
<td>10%</td>
<td>7.27</td>
<td>7.20</td>
<td>0.07</td>
</tr>
<tr>
<td>11%</td>
<td>6.64</td>
<td>6.55</td>
<td>0.10</td>
</tr>
<tr>
<td>12%</td>
<td>6.12</td>
<td>6.00</td>
<td>0.12</td>
</tr>
<tr>
<td>13%</td>
<td>5.67</td>
<td>5.54</td>
<td>0.13</td>
</tr>
<tr>
<td>14%</td>
<td>5.29</td>
<td>5.14</td>
<td>0.15</td>
</tr>
<tr>
<td>15%</td>
<td>4.96</td>
<td>4.80</td>
<td>0.16</td>
</tr>
<tr>
<td>16%</td>
<td>4.67</td>
<td>4.50</td>
<td>0.17</td>
</tr>
<tr>
<td>17%</td>
<td>4.41</td>
<td>4.24</td>
<td>0.18</td>
</tr>
<tr>
<td>18%</td>
<td>4.19</td>
<td>4.00</td>
<td>0.19</td>
</tr>
<tr>
<td>19%</td>
<td>3.98</td>
<td>3.79</td>
<td>0.20</td>
</tr>
<tr>
<td>20%</td>
<td>3.80</td>
<td>3.60</td>
<td>0.20</td>
</tr>
</tbody>
</table>

**Column 1:** The interest rate from 1% to 20%

**Column 2:** Use the formula described in the video to get the actual value

**Column 3:** Use the rule of 72 to calculate the result

**Column 4:** Find out the difference between column 2 and column 3
Part B: (from professor Yang)
Write the following 3 functions.
(a) A function called largerThan11 that checks whether the integer parameter is larger than 11, return true if it is, return false otherwise.

(b) A function called rollDice that returns a random dice value (1-6).

(c) A function called emphasis which print a string parameter 3 times to screen.(use loop).

In your main function.
1. Use function roll dice three times, to generate 3 dice values. Print each number to screen.
2. Add previous dice values together to a variable called sum. Print out the sum to screen.
3. Use function largerThan11, to check whether the sum is greater than 11.
4. Repeat step 1, 2, 3 until the sum is larger than 11.
5. Use function emphasis, to print out string "Yes! Finally." 3 times to screen.

Output should look similar to example below:
Part B:
Roll dice: 2 2 5 Sum = 9
Roll dice: 4 6 5 Sum = 15
Yes! Finally.Yes! Finally.Yes! Finally.
**Part C: (Passed by reference)**

Write two functions.
(a) A function called computeRectangle that calculates the area and perimeter of a rectangle. It has four inputs and two of them are passed by reference. The function will use void as return type.

(b) A function called swap that exchanges the value between two variables. (straight from professor Ryba’s lecture)

**Use following main function to test for Part C:**

```cpp
int main(){
    cout << "Part A:\n";
    cout << "Compound Interest - How long does it take to double my money?\n\n";
    cout << fixed << setprecision(2);
    cout << "Rate\t" << "Actual\t" << "Rule_of_72\t" << "Diff.\n";
    cout << setfill('-') << setw(37) << "-" << endl;
    cout << setfill(' ');
    //The rest of part A code to display the table
    cout << "\nPart B:\n";
    //Part B code

double len = 2.5, wid = 5, area = 0, perimeter = 0;
computeRectangle(len, wid, area, perimeter);
    cout << "Area of Rectangle = " << area
         << " and its Perimeter = " << perimeter << endl;
swap(area, perimeter);
    cout << "Values in area and perimeter are swapped: "
         << area << " " << perimeter << endl;

    return 0;
}
```