Real and nominal interest rates

Recall that the **inflation rate**, i, is the rate at which prices rise. The **nominal interest rate**, n, is the interest rate in terms of dollars. The **real interest rate**, r, is the interest rate in terms of purchasing power. These are related by

$$1 + r = \frac{1+n}{1+i}.$$

When the inflation rate is small, we can approximate this as

$$r \approx n - i.$$

Assume that the nominal interest rate is 10% per year and that the rate of inflation is 5% per year. Round all your answers as appropriate.

1. You put $100 in the bank today. How much will be in your account after 10 years?

2. You can buy an apple fritter (a type of donut) for $1 today. The price of donuts goes up at the rate of inflation. How much will an apple fritter cost after 10 years?

3. Calculate x, the number of apple fritters you could buy for $100 today. Then calculate y, the number of apple fritters you could buy after ten years if you put that $100 in the bank. Then calculate the percentage by which has your ability to buy apple fritters increased. (You can calculate this as $z = 100 \cdot \frac{y-x}{x}$. The deal with z is that you can say, "If I put my money in the bank, then after ten years I will be able to buy z% more apple fritters.")

4. Given the nominal interest rate and inflation rate above, calculate the real interest rate to two significant digits (e.g., "3.81%"). Check your answer with the "rule of thumb" approximation.

5. Calculate how much money you'd have after 10 years if you put $100 in the bank today *at the real interest rate you calculated in the previous question* (4). Compare your answer here with the result from question 3.