BECA / IB Math 5 Exponential functions Name:
2 March 2022

5.6 Exit Note: Compound Interest

I can calculate compound interest CCSS.HSF.LE.A.2

$FV = PV \times \left(1 + \frac{r}{100k}\right)^{kn}$ where FV is the future value,

PV is the present value, n is the number of years,
k is the number of compounding periods per year,
r% is the nominal annual rate of interest

1. Do Now: Louis invests \$8,500 in an account with an annual interest rate of 4.15%. What is the balance after 4 years?

2. A three year loan for \$17,500 compounds monthly with an annual interest rate of 7.25%.

   (a) How many compounding periods are there per year?

   $k =$

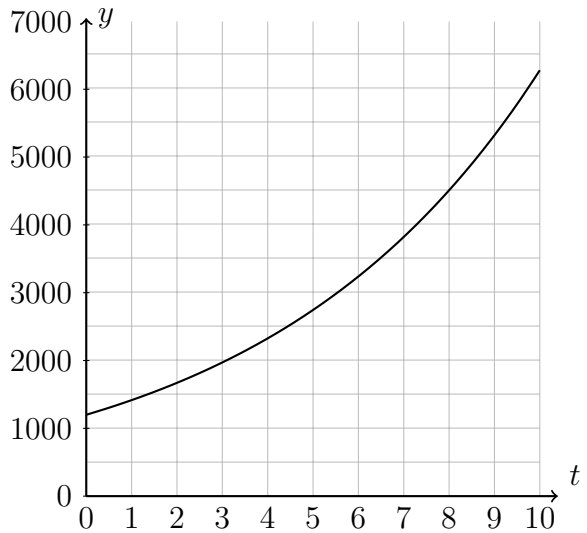
   (b) Find the final balance of principal and interest after three years.

3. The graph shows the exponential function $f(t) = 1200 \times (1 + 0.18)^t$ representing 18% annual growth rate over t years.

   (a) Write down the initial value of the function.

   (b) Find $f(8)$

   (c) Find t such that $y = 2000$



5.6 Exit Note: Simple interest rates

4. Radioactive elements decay over time, with one half of the atoms decaying over a fixed period of time, the "half life." The half life of plutonium-238 is about 90 years. Use the formula $y = A \times \left(\frac{1}{2}\right)^{t/90}$.

   (a) Find the percentage of plutonium that would remain after 1000 years.

   (b) Find the number of years required for 99 percent of the plutonium to decay.

5. Carlos puts \$9,800 into an investment account with an annual interest rate of 2.75%. What is the balance after 3 years, rounded to the nearest cent?

6. The graph shows the exponential function $FV = 1,100 \times \left(1 + \frac{6.125}{100}\right)^t$ representing the balance of an investment account earning a fixed rate of interest over t in years.

   (a) Write down the initial deposit in the account.

   (b) What is the annual interest rate?

   (c) Approximately how much will the account hold at the end of ten years?

   (d) When will the balance be \$1,400?