BECA / IB Math 5 Exponential functions Name:
16 February 2022

5.3 Classwork: Exponential function bases

I can calculate simple interest CCSS.HSF.IF.C.7

1. Do Now: Simplify each expression to the base raised to a power.

   (a) $5^2 \times 5^4$

   (b) $\dfrac{11^7}{11^5}$

   (c) $a^5 \times a^3$

   (d) $\left(\dfrac{x^6}{x^4}\right)^3$

2. A bank account earns interest at an annual interest rate of 3.925%. The initial deposit is \$175. Which equation models the value of the balance?

   (a) $FV = 175 \cdot 3.925^t$

   (b) $FV = 175(1 + 0.03925)^t$

   (c) $FV = 175 \cdot \left(\dfrac{3.925}{100}\right)^t$

   (d) $FV = 175 \cdot e^{0.03925t}$

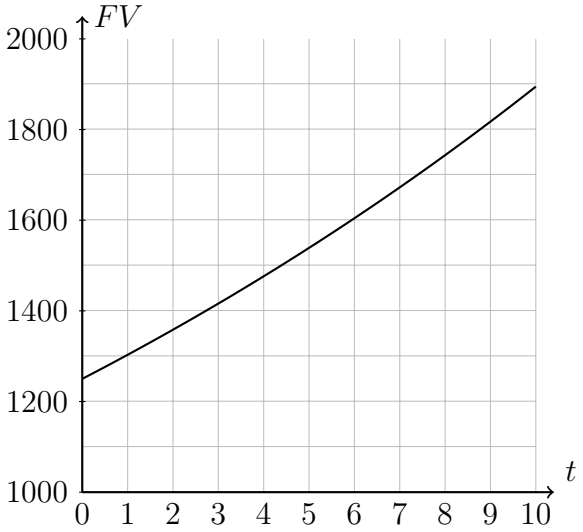
3. Carlos puts \$12,500 into an investment account with an annual interest rate of 3.15% what is the balance after 5 years?

4. The graph shows the exponential function $FV = 1,250 \times \left(1 + \dfrac{4.25}{100}\right)^t$ 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) How much will the account hold at the end of ten years, to the nearest \$000?

   (c) When will the balance be \$1,600?



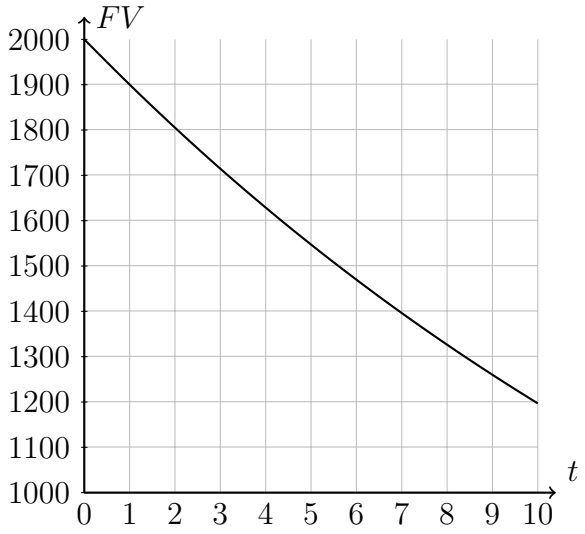
5.3 Exit Note: Simple interest rates

5. An asset depreciates at a constant percentage rate, losing 5% of its value each year. The asset's value is modeled by the exponential function $FV = 2,000 \times \left(1 - \frac{5}{100}\right)^t$, shown below, where t is the time in years.

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

   (b) How much will the asset be valued at the end of ten years, to the nearest $000?

   (c) When will the asset have lost one-quarter of its value?



6. Maria purchases an investment property for $100,000. Under a special benefit in the tax code, she is allowed to depreciate the asset at 10% annually.

   (a) How much can she deduct from her income for tax purposes the first year?

   (b) Write an algebraic expression to model the depreciated value of Maria's property.

   (c) If she holds it for three years, at what value will it be held on her books?

   (d) Make a sketch to represent the graph of the asset's depreciated value over ten years.

(e) She plans to sell the property when it is depreciated to one-half of the purchase value. Find the number of years she expects to hold the property and mark that point on your sketch.