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In our first example we saw that the amount of money owed on a loan after t years, in which we originally borrow 10000 with an annual interest rate of 6% compounded 12 times per year is given by:

• We saw that the amount of money owed on a loan after t years, in which we originally borrow P_o with an annual interest rate of r compounded n times per year is given by:

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In our first example we saw that the amount of money owed on a loan after t years, in which we originally borrow 10000 with an annual interest rate of 6% compounded 12 times per year is given by:

$$P(t) = 10000 \cdot \left(1 + \frac{6\%}{12}\right)^{12t}$$

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Furthermore, we noticed that as we increased the number of times per year that interest is compounded then the amount owed increases. Looking at different values of n:

If n=1: $P_1(1) = 10000 \cdot \left(1 + \frac{6\%}{1}\right)^{1 \cdot 1}$

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If n=1:
$$P_1(1) = 10000 \cdot \left(1 + \frac{6\%}{1}\right)^{1 \cdot 1} = 10600$$

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If n=12:

• We saw that the amount of money owed on a loan after t years, in which we originally borrow P_o with an annual interest rate of r compounded n times per year is given by:

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• We saw that the amount of money owed on a loan after t years, in which we originally borrow P_o with an annual interest rate of r compounded n times per year is given by:

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In our first example we saw that the amount of money owed on a loan after t years, in which we originally borrow 10000 with an annual interest rate of 6% compounded 12 times per year is given by:

$$P(t) = 10000 \cdot \left(1 + \frac{6\%}{12}\right)^{124}$$

Furthermore, we noticed that as we increased the number of times per year that interest is compounded then the amount owed increases. Looking at different values of n:

If n=1: $P_1(1) = 10000 \cdot \left(1 + \frac{6\%}{1}\right)^{1 \cdot 1} = 10600$ If n=12: $P_{12}(1) = 10000 \cdot \left(1 + \frac{6\%}{12}\right)^{12 \cdot 1}$

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$$P(t) = 10000 \cdot \left(1 + \frac{6\%}{12}\right)^{123}$$

Furthermore, we noticed that as we increased the number of times per year that interest is compounded then the amount owed increases. Looking at different values of n:

If n=1: $P_1(1) = 10000 \cdot \left(1 + \frac{6\%}{1}\right)^{1\cdot 1} = 10600$ If n=12: $P_{12}(1) = 10000 \cdot \left(1 + \frac{6\%}{12}\right)^{12\cdot 1} \approx 10616.78$ If n=365: $P_{365}(1) = 10000 \cdot \left(1 + \frac{6\%}{365}\right)^{365\cdot 1} \approx 10618.31$ If n=525600:

• We saw that the amount of money owed on a loan after t years, in which we originally borrow P_o with an annual interest rate of r compounded n times per year is given by:

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In our first example we saw that the amount of money owed on a loan after t years, in which we originally borrow 10000 with an annual interest rate of 6% compounded 12 times per year is given by:

$$P(t) = 10000 \cdot \left(1 + \frac{6\%}{12}\right)^{125}$$

Furthermore, we noticed that as we increased the number of times per year that interest is compounded then the amount owed increases. Looking at different values of n:

If n=1: $P_1(1) = 10000 \cdot \left(1 + \frac{6\%}{1}\right)^{1\cdot 1} = 10600$ If n=12: $P_{12}(1) = 10000 \cdot \left(1 + \frac{6\%}{12}\right)^{12\cdot 1} \approx 10616.78$ If n=365: $P_{365}(1) = 10000 \cdot \left(1 + \frac{6\%}{365}\right)^{365\cdot 1} \approx 10618.31$ If n=525600: $P_{525600}(1) =$

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 $P(t) = 10000e^{6\% \cdot 1}$

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In General:

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Because interest is compounded more and more (infinitely) often, we say that the interest is *compounded continuously*