BECA / Huson / 11.1 IB Math SL Name:
11 December 2017

Homework: Interest rates, exponential functions, and review

Answer separately on lined paper unless otherwise instructed.

Financial models with exponential growth

1. In New York State, the minimum wage has grown exponentially. In 1966, the minimum wage was \$1.25 an hour and in 2015, it was \$8.75. Algebraically determine the rate of growth to the nearest percent.

2. Jim is looking to buy a vacation home for $\$172,600$ near his favorite southern beach. The formula to compute a mortgage payment, M, is $M = P \times \frac{r(1+r)^N}{(1+r)^N - 1}$ where P is the principal amount of the loan, r is the monthly interest rate, and N is the number of monthly payments. Jim's bank offers monthly interest rate of 0.305% for a 15-year loan.
(a) With no down payment, determine Jim's mortgage payment, rounded to the nearest dollar.
(b) Algebraically determine and state the down payment, rounded to the nearest dollar, that Jim needs to make in order for his mortgage payment to be \$1100

Exponent problems

3. $\sqrt[3]{x^{-9}y^6}$

4. $\left(xy^{\frac{1}{4}}\right)^2$

Logarithms

5. $\log_6 4 + \log_6 9$

6. $\log 200 - \log 2$

Function inverse

7. Given $f(x) = x^2 + 4$ find $f^{-1}(x)$

8. Given $g(x) = x^2 - 3$ find $g^{-1}(x)$

Substitute to find each answer

9. Given $f(x) = x^2 + 3$ find $f(3)$