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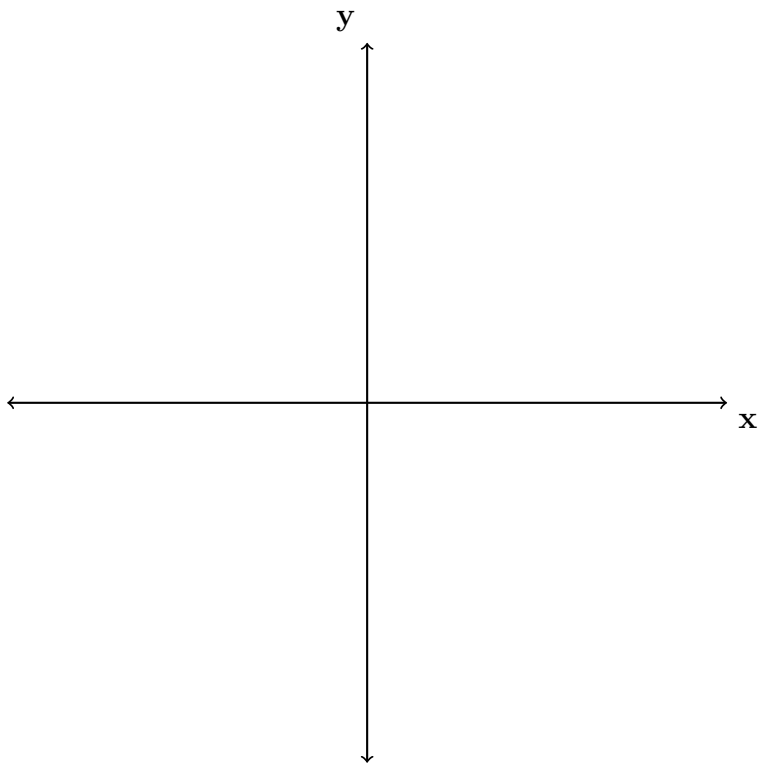
12 June 2019

Classwork: Regents problem practice

You may use a calculator, but for the first three problems you won't need one.

1. On the axes below, sketch a possible function $p(x) = (x-a)(x-b)(x+c)$, where a, b, and c are positive, $a > b$, and $p(x)$ has a positive y-intercept of d. Label all intercepts.



2. What does $\left(\frac{-54x^9}{y^4}\right)^{\frac{2}{3}}$ equal?

BECA / Dr. Huson / IB Math SL Name:
12 June 2019

3. Julia deposits \$2000 into a savings account that earns 4% interest per year. The exponential function that models this savings account is $y = 2000(1.04)^t$, where t is the time in years. Use the rules of exponents to explain why function that correctly represents the amount of money in her savings account in terms of the *monthly* growth rate is $y = 2000(1.0032737)^{12t}$.

4. 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 $M = P \cdot \dfrac{r(1+r)^N}{(1+r)^N - 1}$ 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 a monthly interest rate of 0.305% for a 15-year mortgage.

   With no down payment, determine Jim's mortgage payment, rounded to the nearest dollar.

5. What is the quotient when $x^3 - 13x - 12$ is divided by $x - 4$?

BECA / Dr. Huson / IB Math SL Name:
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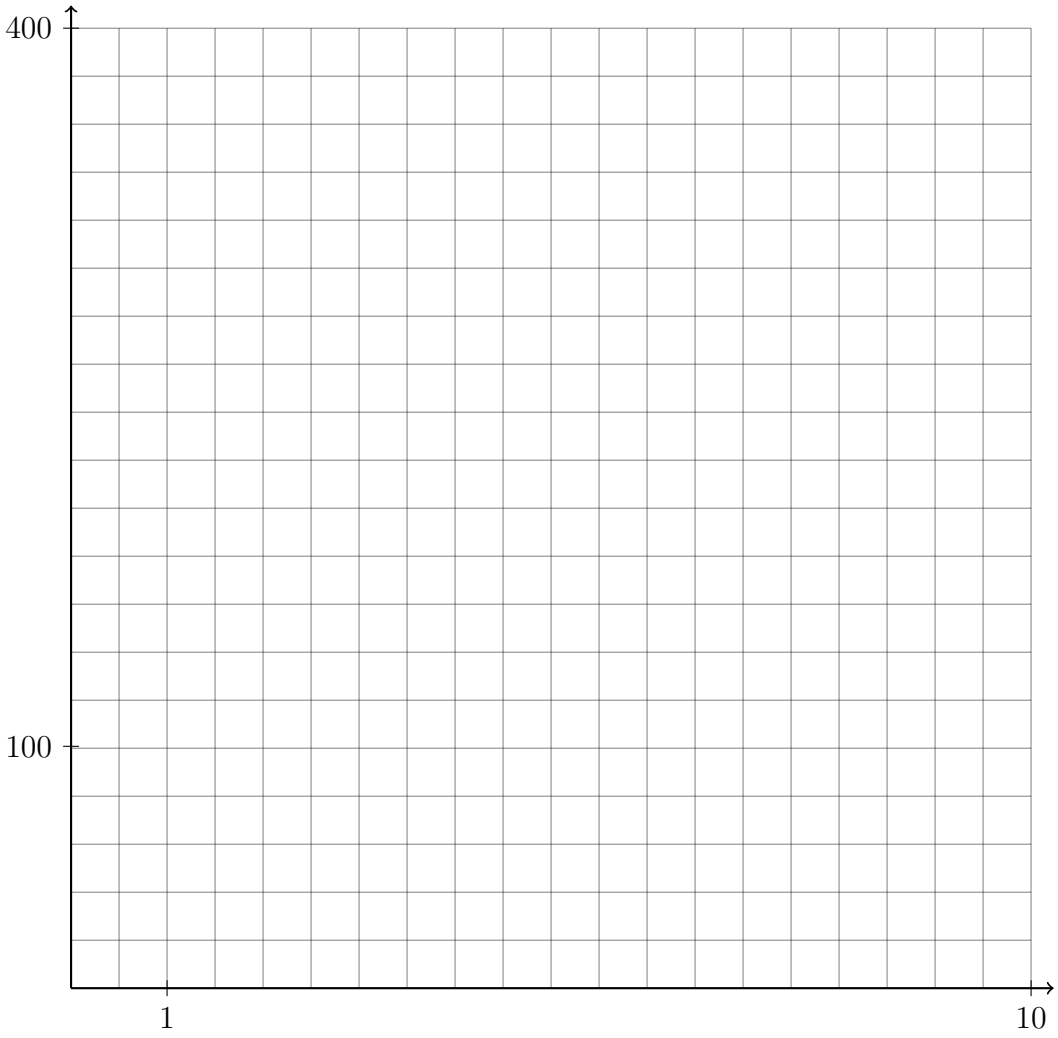
6. Graph $f(x) = 1.05^{12x} + 10$ on the set of axes below.



7. Use the exponent rules to rewrite the function in #1, $f(x)$, as exponential function with only x in the exponent. In other words, if $f(x) = b^x + 10$, what is b?