BECA / Huson / 11.1 IB Math SL Name:
9 January 2019
Homework: Regents exponent problems

1.

When $b > 0$ and d is a positive integer, the expression $(3b)^{\frac{2}{d}}$ is equivalent to

(1) $\dfrac{1}{\left(\sqrt[d]{3b}\right)^2}$ (3) $\dfrac{1}{\sqrt{3b^d}}$

(2) $\left(\sqrt{3b}\right)^d$ (4) $\left(\sqrt[d]{3b}\right)^2$

2.

The expression $\left(\dfrac{m^2}{m^{\frac{1}{3}}}\right)^{-\frac{1}{2}}$ is equivalent to

(1) $-\sqrt[6]{m^5}$ (3) $-m\sqrt[5]{m}$

(2) $\dfrac{1}{\sqrt[6]{m^5}}$ (4) $\dfrac{1}{m\sqrt[5]{m}}$

3.

Which function represents exponential decay?

(1) $y = 2^{0.3t}$ (3) $y = \left(\dfrac{1}{2}\right)^{-t}$

(2) $y = 1.2^{3t}$ (4) $y = 5^{-t}$

4.

Jasmine decides to put \$100 in a savings account each month. The account pays 3% annual interest, compounded monthly. How much money, S, will Jasmine have after one year?

(1) $S = 100(1.03)^{12}$ (3) $S = 100(1.0025)^{12}$

(2) $S = \dfrac{100 - 100\left(1.0025\right)^{12}}{1 - 1.0025}$ (4) $S = \dfrac{100 - 100\left(1.03\right)^{12}}{1 - 1.03}$

5. (hint: Graph both functions and solve for the intersection.
Absolute value is under Option>Num>Abs)

If $f(x) = 3|x| - 1$ and $g(x) = 0.03x^3 - x + 1$, an approximate solution for the equation $f(x) = g(x)$ is

(1) 1.96 (3) $(-0.99, 1.96)$

(2) 11.29 (4) $(11.29, 32.87)$

6.

A student studying public policy created a model for the population of Detroit, where the population decreased 25% over a decade. He used the model $P = 714(0.75)^d$, where P is the population, in thousands, d decades after 2010. Another student, Suzanne, wants to use a model that would predict the population after y years. Suzanne's model is best represented by

(1) $P = 714(0.6500)^y$ (3) $P = 714(0.9716)^y$

(2) $P = 714(0.8500)^y$ (4) $P = 714(0.9750)^y$

7.

Last year, the total revenue for Home Style, a national restaurant chain, increased 5.25% over the previous year. If this trend were to continue, which expression could the company's chief financial officer use to approximate their monthly percent increase in revenue? [Let m represent months.]

(1) $(1.0525)^m$ (3) $(1.00427)^m$

(2) $(1.0525)^{\frac{12}{m}}$ (4) $(1.00427)^{\frac{m}{12}}$

8.

Given $f^{-1}(x) = -\frac{3}{4}x + 2$, which equation represents $f(x)$?

(1) $f(x) = \frac{4}{3}x - \frac{8}{3}$ (3) $f(x) = \frac{3}{4}x - 2$

(2) $f(x) = -\frac{4}{3}x + \frac{8}{3}$ (4) $f(x) = -\frac{3}{4}x + 2$

9.

When $g(x) = \frac{2}{x+2}$ and $h(x) = \log(x + 1) + 3$ are graphed on the same set of axes, which coordinates best approximate their point of intersection?

(1) $(-0.9,1.8)$ (3) $(1.4,3.3)$

(2) $(-0.9,1.9)$ (4) $(1.4,3.4)$

10.

The solution to the equation $4x^2 + 98 = 0$ is

(1) ± 7 (3) $\pm\frac{7\sqrt{2}}{2}$

(2) $\pm 7i$ (4) $\pm\frac{7i\sqrt{2}}{2}$

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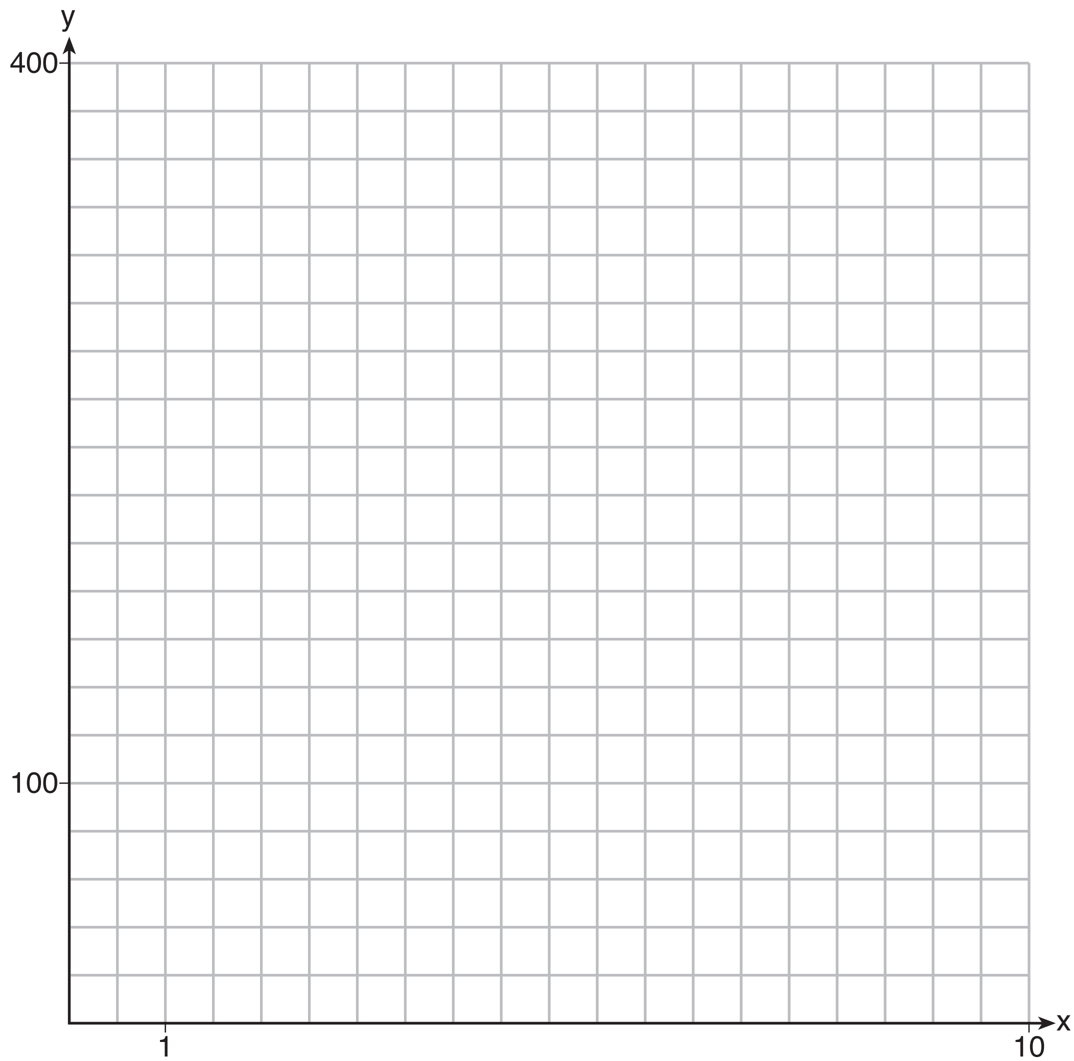
16.

Graph $y = 400(.85)^{2x} - 6$ on the set of axes below.



17.

Using the formula below, determine the monthly payment on a 5-year car loan with a monthly percentage rate of 0.625% for a car with an original cost of $21,000 and a $1000 down payment, to the *nearest cent*.

$$P_n = PMT\left(\frac{1-(1+i)^{-n}}{i}\right)$$

P_n = present amount borrowed

n = number of monthly pay periods

PMT = monthly payment

i = interest rate per month

The affordable monthly payment is $300 for the same time period. Determine an appropriate down payment, to the *nearest dollar*.

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18.

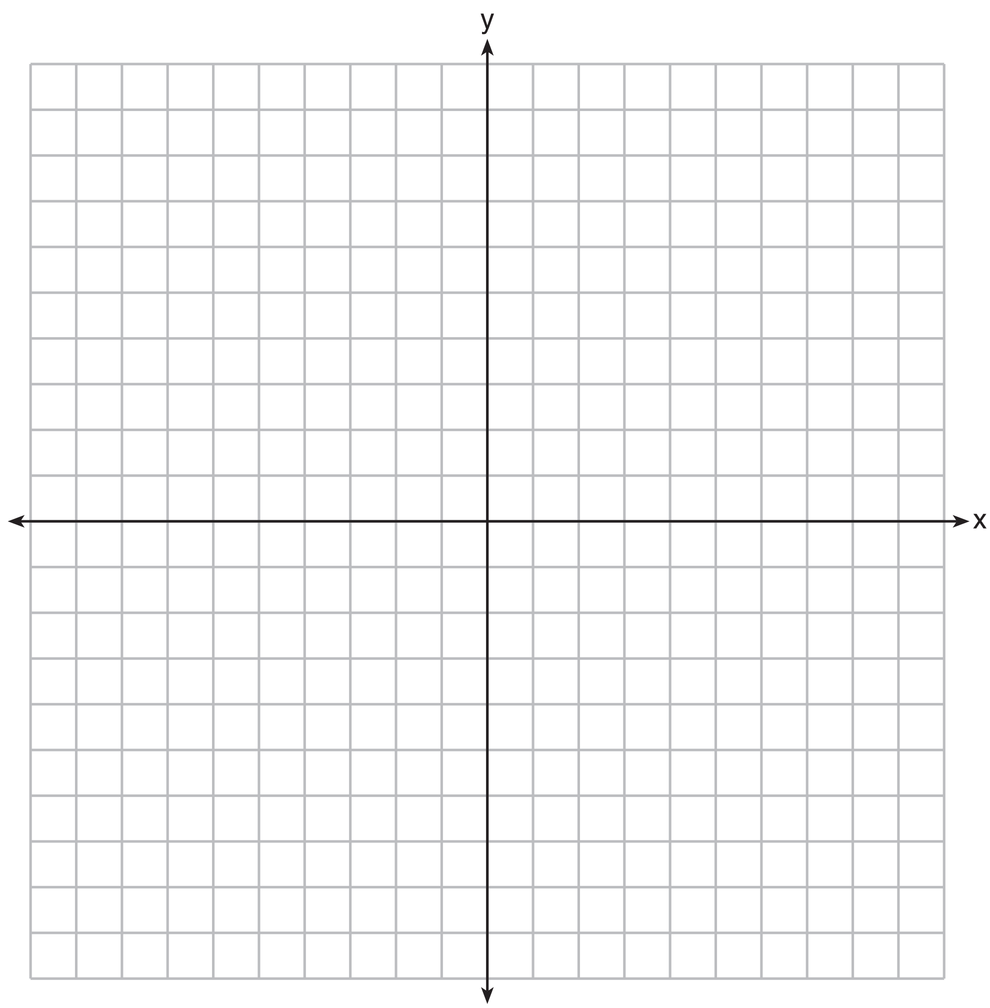
Jim is looking to buy a vacation home for \$172,600 near his favorite southern beach. The formula to compute a mortgage payment, M, is $M = P \bullet \frac{r(1 + r)^N}{(1 + r)^N - 1}$ where P is the principal amount of the loan, r is the monthly interest rate, and N is the number of monthly payments. Jim's bank offers 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*.

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.

19.

Graph $y = \log_2(x + 3) - 5$ on the set of axes below. Use an appropriate scale to include *both* intercepts.



Describe the behavior of the given function as x approaches -3 and as x approaches positive infinity.