BECA / Dr. Huson / IB Math Name:

Pre-test: Mock Regents (multiple choice problems due tomorrow)

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1. The expression $9^{\frac{3}{2}} \bullet 27^{\frac{1}{2}}$ is equivalent to

   (1) 3^2 (2) $3^{\frac{9}{2}}$ (3) 243^2 (4) $243^{\frac{3}{4}}$

2. If $p(x) = ab^x$ and $r(x) = cd^x$, then $p(x) \bullet r(x)$ equals

   (1) $ac(b+d)^x$ (2) $ac(b+d)^{2x}$ (3) $ac(bd)^x$ (4) $ac(bd)^{x^2}$

3. What is the product of $(\frac{2a^3}{5b})(\frac{3a^2}{7b})$?

   (1) $\frac{5a^5}{12b^2}$ (2) $\frac{5a^6}{12b}$ (3) $\frac{6a^5}{35b^2}$ (4) $\frac{6a^6}{35b}$

4. Which expression is equivalent to $(3x^2)^{-1}$?

   (1) $\frac{1}{3x^2}$ (2) $-3x^2$ (3) $\frac{1}{9x^2}$ (4) $-9x^2$

5. If $3 = 10^{0.4771}$, then the value of $10^{(8.4771-10)}$ is

   (1) 30 (2) 300 (3) 0.03 (4) 0.3

6. The solution of $8^{1-p} = 16^{2p-1}$ is

   (1) $\frac{7}{11}$ (2) $\frac{3}{5}$ (3) $\frac{4}{9}$ (4) $\frac{2}{5}$

7. Which value of *k* satisfies the equation $8^{3k+4} = 4^{2k-1}$?

   (1) –1 (2) $-\frac{9}{4}$ (3) –2 (4) $-\frac{14}{5}$

8. What is the value of *x* in the equation $9^{3x+1} = 27^{x+2}$?

   (1) 1 (2) $\frac{1}{3}$ (3) $\frac{1}{2}$ (4) $\frac{4}{3}$

9. The solution set of the equation $4^{x^2+4x} = 2^{-6}$ is

   (1) $\{1, 3\}$ (2) $\{-1, 3\}$ (3) $\{-1, -3\}$ (4) $\{1, -3\}$

10. The graph of the equation $y = m^x$ passes through the point

    (1) (1,*m*) (2) (0,*m*) (3) (*m*,0) (4) (*m*,1)

11. Iridium - 192 is an isotope of iridium and has a half-life of 73.83 days. If a laboratory experiment begins with 100 grams of Iridium-192, the number of grams, *A*, of Iridium-192 present after *t* days would be $A = 100(\frac{1}{2})^{\frac{t}{73.83}}$. Which equation approximates the amount of Iridium-192 present after *t* days?

    (1) $A = 100(\frac{73.83}{2})^t$ (2) $A = 100(\frac{1}{147.66})^t$
    (3) $A = 100(0.990656)^t$ (4) $A = 100(0.116381)^t$

12. If $x = u^2v$, which expression is equivalent to log *x*?

    (1) 2 log *u* + log *v* (2) log 2*u* + log *v*
    (3) $\frac{2 \log u}{\log v}$ (4) 2 log *u* log *v*

13. If $\log a = x$ and $\log b = y$, then $\log(ab^2)$ equals

    (1) $\frac{1}{2}(x+y)$ (2) $x + \frac{1}{2}y$ (3) $x + 2y$ (4) $2x + 2y$

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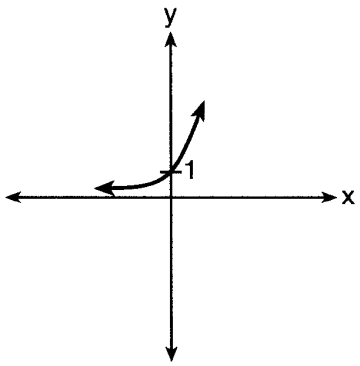
14. Which sketch shows the inverse of $y = a^x$, where $a > 1$?

(1)



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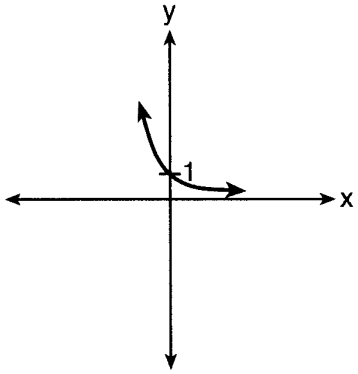

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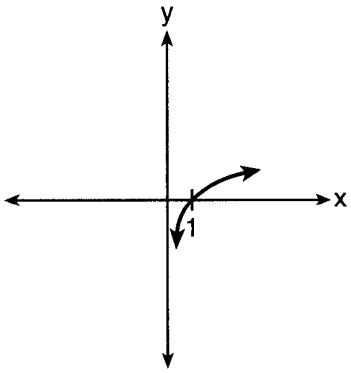

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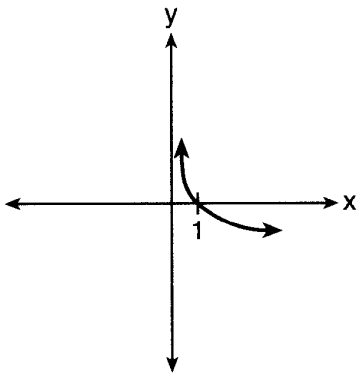
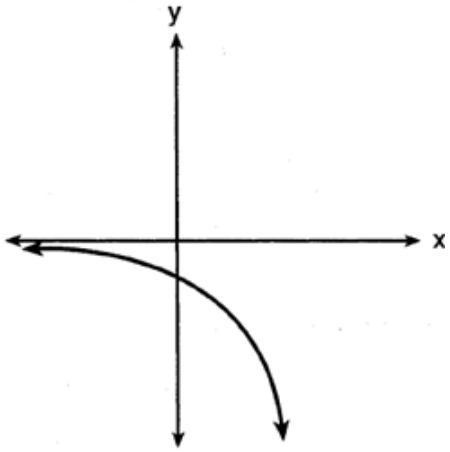


15. Which equation is represented by the accompanying graph?



(1) $y = 2^x$ (2) $y = -2^x$ (3) $y = 2^{-x}$ (4) $y = x^2 - 2$

16. If $x = (8^2)(\sqrt{5})$, which expression is equivalent to log *x*?

(1) $2\log 8 + 2\log 5$ (2) $2(\log 8 + \frac{1}{2}\log 5)$

(3) $2\log 8 + \frac{1}{2}\log 5$ (4) $(2\log 8)(\frac{1}{3}\log 5)$

17. Which expression could be used to determine the value of *y* in the equation $\log_x 8 = y$?

(1) $\frac{\log 8}{x}$ (2) $\frac{\log 8}{\log x}$ (3) $\frac{8}{\log x}$ (4) $\frac{\log x}{\log 8}$

18. The expression $2\log a - \log b$ is equivalent to

    (1) $\frac{2\log a}{\log b}$

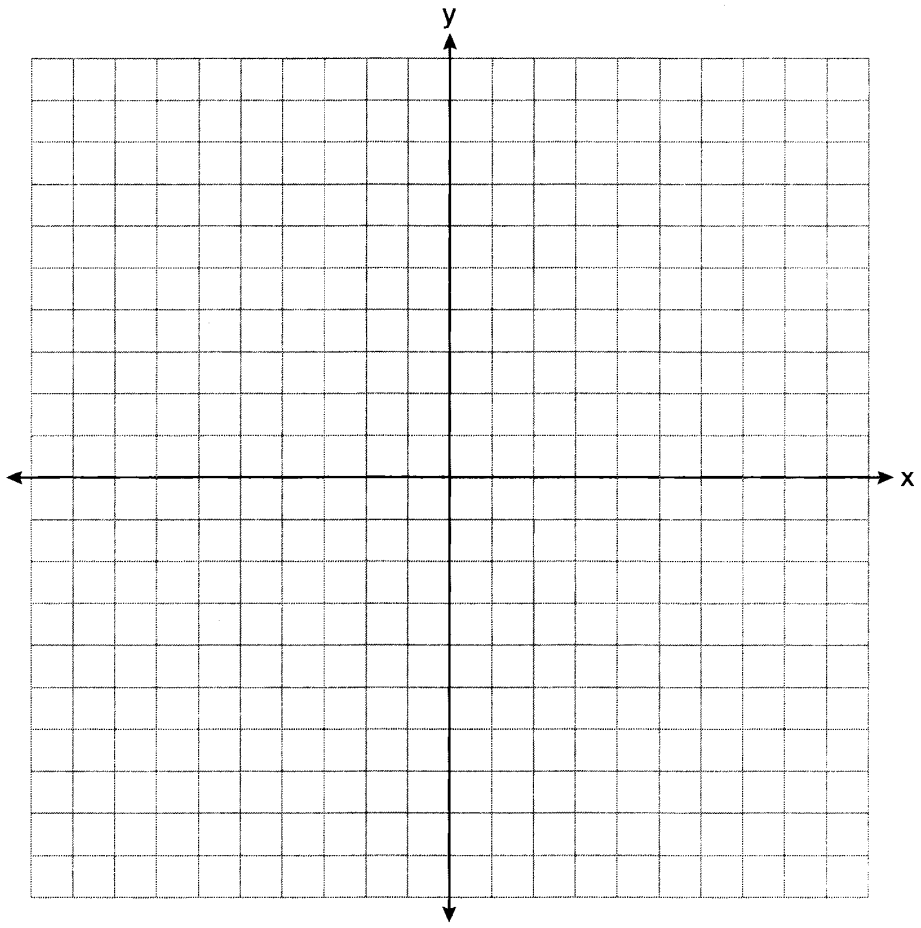
    (2) $\log\left(\frac{a}{b}\right)^2$

    (3) $\log(a^2 - b)$

    (4) $\log\frac{a^2}{b}$

19. Explain how $(-8)^{\frac{4}{3}}$ can be evaluated using properties of rational exponents to result in an integer answer.

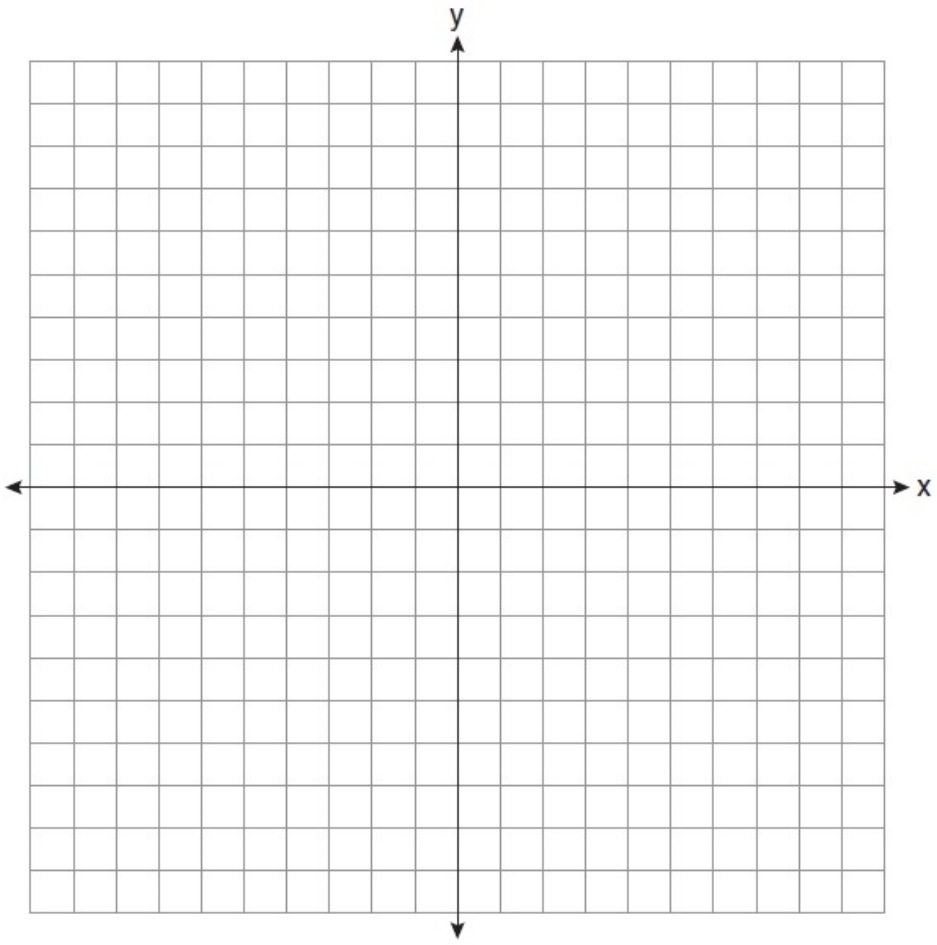
20. On the axes below, for $-2 \leq x \leq 2$, graph $y = 2^{x+1} - 3$



21. The number of bacteria that grow in a petri dish is approximated by the function $G(t) = 500e^{0.216t}$, where *t* is time, in minutes. Use this model to approximate, to the *nearest integer*, the number of bacteria present after one half-hour.

22. Solve for *p* algebraically: $\log_{16}(p^2 - p + 4) - \log_{16}(2p + 11) = \frac{3}{4}$

23. The graph of the equation $y = \left(\frac{1}{2}\right)^x$ has an asymptote. On the grid below, sketch the graph of $y = \left(\frac{1}{2}\right)^x$ and write the equation of this asymptote.



24. Solve algebraically for all values of x:

$\log_{(x+3)}(2x+3) + \log_{(x+3)}(x+5) = 2$

25. Solve algebraically for the *exact* value of x:

$\log_8 16 = x + 1$

26. Seth's parents gave him $5000 to invest for his 16th birthday. He is considering two investment options. Option *A* will pay him 4.5% interest compounded annually. Option *B* will pay him 4.6% compounded quarterly.

Write a function of option *A* and option *B* that calculates the value of each account after *n* years.

Seth plans to use the money after he graduates from college in 6 years. Determine how much more money option *B* will earn than option *A* to the *nearest cent*.

Algebraically determine, to the *nearest tenth of a year*, how long it would take for option *B* to double Seth's initial investment.