

Graded quiz on Tangent Lines to Functions, Exponents and Logarithms

Оценка последней работы: 100%

1. Convert  $\frac{1}{49}$  to exponential form, using 7 as the factor. 1 / 1 балл

- ☐  $49^{-1}$
- ☒  $7^{-2}$
- ☐  $\frac{7}{7^3}$
- ☐  $(7^2)$

Правильно  
The rule for a factor to a Negative exponent is to divide by the same factor to a positive exponent with the same absolute value.

2. A light-year (the distance light travels in a vacuum in one year) is 9,460 trillion meters. Express in scientific notation. 1 / 1 балл

- ☐  $0.946 \times 10^{16}$
- ☒  $9.46 \times 10^{15}$  meters.
- ☐  $9.46 \times 10^{15}$  kilometers
- ☐  $9460 \times 10^{12}$  meters

Правильно  
9,460 is  $(9.4 \times 10^3)$  meters and one trillion meters is  $10^{12}$  meters.  $(9.4 \times 10^3)(10^{12})=9.4 \times 10^{15}$ . A kilometer is 1000 meters.

3. Simplify  $(x^8)(y^3)(x^{-10})(y^{-2})$  1 / 1 балл

- ☒  $(x^{-2})(y)$
- ☐  $(x)(y^{-2})$
- ☐  $(x^2)(y)$
- ☐  $(x^{-80})(y^{-6})$

Правильно  
By the Division and Negative Powers Rule, this is  $(x^{(8-10)})(y^{(3-2)})$

4. Simplify  $\left[(x^4)(y^{-6})\right]^{-1}$  1 / 1 балл

- ☒  $(x^{-4})(y^6)$
- ☐  $\frac{(x^4)}{(y^{-6})}$
- ☐  $(x^3)(y^{-7})$
- ☐  $\frac{(x^{-4})}{(y^6)}$

Правильно  
By the Power to a Power Rule, each of the exponents is multiplied by  $(-1)$

5. Solve for x: 1 / 1 балл

$\log_2(39x) - \log_2(x - 5) = 4$

- ☐  $\frac{80}{38}$
- ☐  $\frac{23}{80}$
- ☐  $\frac{39}{23}$
- ☒  $\frac{-80}{23}$

Правильно  
 $\log_2 \frac{39x}{(x - 5)} = 4$  by the Quotient Rule.  
Since both sides are equal, we can use them as exponents in an equation.

$2^{\log_2 \frac{39x}{(x - 5)}} = 2^4$

$\frac{39x}{(x - 5)} = 16$

$39x = 16 \times (x - 5)$

$39x = 16x - 80$

$23x = -80$

$x = \frac{-80}{23}$

6. Simplify this expression: 1 / 1 балл

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

Правильно  
We use the Power to a Power Rule -- multiply exponents:  
 $x^{\frac{1}{2} \times \frac{-3}{2}} = x^{\frac{-3}{4}}$

7. Simplify  $\log_2 8 - \log_2 4 - (\log_3 4.5 + \log_3 2)$  1 / 1 балл

- ☐ 2
- ☒ -1
- ☐ 1
- ☐ 0

Правильно  
This is equivalent to:  
 $\log_2(\frac{8}{4}) - \log_3(4.5 \times 2) = 1 - 2 = -1$

8. If  $\log_3 19 = 2.680$ , what is  $\log_9 19$ ? 1 / 1 балл

- ☐ 0.4347
- ☒ 1.304
- ☐ 5.216
- ☐ 0.8934

Правильно  
To convert from  $\log_3$  to  $\log_9$ , divide by  $\log_3 9$ . Which is equal to 2, so the answer is 1.34

9. If  $\log_{10} b = 1.8$  and  $\log_a b = 2.5752$ , what is  $a$ ? 1 / 1 балл

- ☐ 6
- ☐ 4
- ☐ 3
- ☒ 5

Правильно  
To solve for  $a$  in the formula;  
 $\log_a b = \frac{\log_x b}{\log_x a}$   
 $\log_a b = 2.5752$  and  $\log_{10} b = 1.8$   
Therefore,  $\log_{10} a$  must equal to  $\frac{1.8}{2.5752} = 0.69897$   
Treating both sides of equation  $\log_{10} a = 0.69897$  as exponents of 10 gives  $a = 10^{0.69897} = 5$

10. An investment of 1,600 is worth 7,400 after 8.5 years. What is the continuously compounded rate of return of this investment? 1 / 1 балл

- ☐ 20.01
- ☒ 18.02%
- ☐ 19.01%
- ☐ 17.01%

Правильно  
 $\frac{\ln \frac{7400}{1600}}{8.5} = 0.18017$

11. A pearl grows in an oyster at a continuously compounded rate of .24 per year. If a 25-year old pearl weighs 1 gram, what did it weigh when it began to form? 1 / 1 балл

- ☐ 0.0002478
- ☐ 0.2478
- ☐ 0.02478
- ☒ 0.002478

Правильно  
 $e^{(0.24 \times 25)} = \frac{1}{x}$   
 $x = \frac{1}{(e^{0.24 \times 25})}$   
 $x = \frac{1}{403.4288}$   
 $x = 0.002478$

12.  $\log_2 z = 6.754$ . What is  $\log_{10}(z)$ ? 1 / 1 балл

- ☐ 0.49185
- ☐ 0.82956
- ☐ 1.3508
- ☒ 2.03316

Правильно  
 $\frac{\log_2 z}{\log_2 10} =$   
 $(\log_{10} z) \times (\log_2 10) = 3.321928$   
Therefore,  $\log_{10} z = \frac{6.754}{3.321928} = 2.03316$

13. Suppose that  $g : \mathbb{R} \rightarrow \mathbb{R}$  is a function, and that  $g(1) = 10$ . Suppose that  $g'(a)$  is negative for every single value of  $a$ . Which of the following could possibly be  $g(1.5)$ ? 1 / 1 балл

- ☐  $g(1.5) = 103.4$
- ☐  $g(1.5) = 11$
- ☒  $g(1.5) = 9.7$
- ☐  $g(1.5) = 10.1$

Правильно  
Since the slope of the tangent line to the graph of  $g$  is negative everywhere on the graph, we know that  $g$  is decreasing function! And therefore we must have  $g(1.5) < g(1)$ . That is the case here, so this value is at least possible.