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Graded quiz on Tangent Lines to Functions, Exponents and Logarithms

CALIFICACIÓN DEL ÚLTIMO ENVÍO

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

1 / 1 puntos

☒ 7^{-2}

☐ 49^{-1}

☐ (7^2)

☐ $\frac{7}{7^3}$

**Correct**

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 9,460trillion meters. Express in scientific notation.

1 / 1 puntos

☐ 9460×10^{12} meters

☒ 9.46×10^{15} meters.

☐ 0.946×10^{16}

☐ 9.46×10^{15} kilometers

**Correct**

9,460 is (9.4×10^3) 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 puntos

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

**Correct**

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

4. Simplify $[(x^4)(y^{-6})]^{-1}$

1 / 1 puntos

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

**Correct**

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

5. Solve for x :

1 / 1 puntos

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

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



Correct

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

$$\left(x^{\frac{1}{2}}\right)^{\frac{-3}{2}}$$

☐ $x^{\frac{4}{3}}$

☐ $x^{\frac{1}{3}}$

☐ x^{-1}

☒ $x^{\frac{-3}{4}}$

**Correct**

We use the Power to a Power Rule -- multiply exponents:

$$x^{\frac{1}{2} \times \frac{-3}{2}} = x^{\frac{-3}{4}}$$

7. Simplify $\log_{10} 1000 + \log_{10} \frac{1}{10000}$

1 / 1 puntos

☐ $\frac{1}{10}$

☐ $\log_{10} -10$

☒ -1

☐ 1

**Correct**

By the Product Rule, this is:

$$\log_{10}\left(\frac{1000}{10000}\right) = \log_{10}\left(\frac{1}{10}\right) = -1$$

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

1 / 1 puntos

☐ 0.4347

☐ 5.216

☒ 1.304

☐ 0.8934

✓ Correct

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 puntos

☐ 6

☐ 4

☒ 5

☐ 3

✓ Correct

To solve for a in the formula;

$$\log_a b = \frac{\log_x b}{\log_x a}$$

$$\log_a b = 2.5752 \text{ and } \log_{10} b = 1.8$$

Therefore, $\log_{10} a$ must equal to

$$\frac{1.8}{2.5752} = 0.69897$$

Treating both sides of equation

$$\log_{10} a = 0.69897 \text{ as exponents of 10 gives}$$

$$a = 10^{0.69897} = 5$$

10.

1 / 1 puntos

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

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

✓ Correct

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

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 puntos

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

✓ Correct

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

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

$$x = \frac{1}{403.4288}$$

$$x = 0.002478$$

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

1 / 1 puntos

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



Correct

$$\frac{\log_2 z}{\log_2 10} =$$

$$(\log_{10} z) \times (\log_2 10) = 3.321928$$

$$\text{Therefore, } \log_{10} z = \frac{6.754}{3.321928} = 2.03316$$

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 pun

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



Correct

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.