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Practice quiz on Exponents and Logarithms

PUNTOS TOTALES DE 12

1. Re write the number $784 = 2 \times 2 \times 2 \times 2 \times 7 \times 7$ using exponents. **1 / 1 puntos**

- ○ $(2 \times 7)^6$
- ○ $(2^6)(7^6)$
- ◉ $(2^4)(7^2)$
- ○ $(16^4)(49^2)$

✓ **Correcto**
For this type of problem, count the number of times each relevant factor appears in the product. That number is the exponent for that factor.

2. What is $(x^2 - 5)^0$? **1 / 1 puntos**

- ○ (x^2)
- ○ $(x^2) - 5$
- ○ -4
- ◉ 1

✓ **Correcto**
Any real number (except zero) raised to the"zeroith" power $= 1$.

3. Simplify $((x-5)^2)^{-3}$ **1 / 1 puntos**

- ○ $(x-5)^{-5}$
- ○ $(x-5)$
- ○ $(x-5)^{-1}$
- ◉ $(x-5)^{-6}$

✓ **Correcto**
By Rule 2, "Power to a Power," multiply the exponents and get:

$$(x-5)^{(2\times -3)} = (x-5)^{-6}$$

By the definition of negative exponents, this is equal to $\frac{1}{(x-5)^6}$

4. Simplify $(\frac{8^2}{8^7})^2$ 1 / 1 puntos

- 8^{-1}
- 8^{-10}
- 8^{-4}
- 8^{-5}

Correcto

We can first simplify what is inside the parenthesis to 8^{-5} using the Division and Negative Powers Rule.

Then apply division and negative powers-- the result is the same.

$\frac{8^4}{8^{14}} = 8^{-10}$

5. $\log 35 = \log 7 + \log x$ 1 / 1 puntos

Solve for x

- 5
- 4
- 28
- 7

Correcto

$\log(x) = \log 35 - \log 7$

$\log(x) = \log(\frac{35}{7})$

By the Quotient Rule $\log x = \log 5$

6. $\log_2(x^2 + 5x + 7) = 0$ 1 / 1 puntos

Solve for x

- $x = 3$
- $x = 2$
- $x = 2$ or $x = 3$
- $x = -2$ or $x = -3$

✓ **Correcto**

We use the property that $b^{\log_b a} = a$

Use both sides as exponent for 2.

$2^{\log_2 x^2+5x+7} = 2^0$

$x^2 + 5x + 7 = 1$

$x^2 + 5x + 6 = 0$

$(x + 3)(x + 2) = 0$

$x = -3$ OR

$x = -2$

7. Simplify $\log_2 72 - \log_2 9$ **1 / 1 puntos**

- ○ 4
- ◉ 3
- ○ $\log_2 63$
- ○ $\log_2 4$

✓ **Correcto**

By the quotient rule, this is $\log_2 \frac{72}{9} = \log_2 2^3 = 3$

8. Simplify $\log_3 9 - \log_3 3 + \log_3 5$ **1 / 1 puntos**

- ○ 8
- ◉ $\log_3 15$
- ○ 15
- ○ $\log_3 8$

✓ **Correcto**

By the Quotient and Product Rules, this is $\log_3 \frac{9 \times 5}{3} = \log_3 15$

9. Simplify $\log_2(3^8 \times 5^7)$ **1 / 1 puntos**

- ○ $(5 \times \log_2 3) + (8 \times \log_2 5)$
- ○ $15 \times \log_2 56$
- ○ $56 \times \log_2 15$
- ◉ $(8 \times \log_2 3) + (7 \times \log_2 5)$

10. If $\log_{10} y = 100$, what is $\log_2 y = ?$ **0 / 1 puntos**

- 332.19
- 20
- 500
- 301.03

Incorrecto

Use the change of base formula, $\log_a b = \frac{\log_x b}{\log_x a}$

Where the "old" base is x and the "new" base is a.

So $\frac{100}{\log_{10}(2)} = \frac{100}{0.30103} = 332.19$

11. A tree is growing taller at a continuous rate. In the past 12 years it has grown from 3 meters to 15 meters. What is its rate of growth per year? **1 / 1 puntos**

- 10.41%
- 11.41%
- 12.41%
- 13.41%

Correcto

$$\frac{\ln \frac{15}{3}}{12} = 0.1341$$

12. Bacteria can reproduce exponentially if not constrained. Assume a colony grows at a continually compounded rate of 400% per day. How many days before a colony with initial mass of 6.25×10^{-10} grams weights 1000 Kilograms? **1 / 1 puntos**

- 0.875 days
- 875 days
- 8.75 days
- 87.5 days

Correcto

$$6.25 \times 10^{-10} \times e^{4t} = 10^6$$

$$4t = \ln\frac{10^6}{6.25 \times 10^{-10}}) = 35.00878$$

$$t = \ln\frac{10^6}{25 \times 10^{-10}} = 8.752195$$