✓ **Congratulations! You passed!**

TO PASS 75% or higher

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GRADE 100%

Practice quiz on Exponents and Logarithms

TOTAL POINTS 12

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

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

✓ **Correct**

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 point**

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

✓ **Correct**

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

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

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

✓ **Correct**

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 point

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

✓ **Correct**

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 point**

Solve for x

- 4
- 28
- 5 (selected)
- 7

Correct

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

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

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

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

Solve for x

- $x = 2$ or $x = 3$
- $x = 2$
- $x = 3$
- $x = -2$ or $x = -3$ (selected)

Correct

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 point**

- $\log_2 4$
- $\log_2 63$
- 4
- (selected) 3

Correct

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 point**

- $\log_3 8$
- 15
- (selected) $\log_3 15$
- 8

Correct

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 point

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

✓ **Correct**

We first apply the Product Rule to convert to the sum: $\log_2(3^8) + \log_2(5^7)$. Then apply the power and root rule.

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

- 20
- 500
- 301.03
- (selected) 332.19

✓ **Correct**

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

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

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

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 point

- 10.41%
- 12.41%
- 11.41%
- (selected) 13.41%

✓ **Correct**

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

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 point

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

✓ **Correct**

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

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

$$t = \ln \frac{10^6}{6.25 \times 10^{-10}} = 8.752195$$