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NOTE

100 %

Practice quiz on Exponents and Logarithms

TOTAL DES POINTS 12

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

1 / 1 point

- ☒ $(2^4)(7^2)$
- ☐ $(16^4)(49^2)$
- ☐ $(2 \times 7)^6$
- ☐ $(2^6)(7^6)$

✓ **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

- ☐ (x^2)
- ☒ 1
- ☐ $(x^2) - 5$
- ☐ -4

✓ **Correct**

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

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

1 / 1 point

- ☐ $(x - 5)^{-5}$
- ☐ $(x - 5)$
- ☐ $(x - 5)^{-1}$
- ☒ $(x - 5)^{-6}$

✓ **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 $\left(\frac{8^2}{8^7}\right)^2$

1 / 1 point

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

✓ 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
☐ 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 $x = 3$
☐ $x = 3$
☐ $x = 2$
☒ $x = -2$ or $x = -3$

✓ Correct

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

Use both sides as exponent for 2.

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

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

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

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

$$x = -3 \text{ OR}$$

$$x = -2$$

7. Simplify $\log_2 72 - \log_2 9$

1 / 1 point

- ☐ $\log_2 4$
- ☐ 4
- ☐ $\log_2 63$
- ☒ 3

✓ Correct

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

8. Simplify $\log_3 9 - \log_3 3 + \log_3 5$

1 / 1 point

- ☐ 15
- ☐ $\log_3 8$
- ☐ 8
- ☒ $\log_3 15$

✓ Correct

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

9. Simplify $\log_2 (3^8 \times 5^7)$

1 / 1 point

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

✓ 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

- ☐ 301.03
- ☐ 20
- ☒ 332.19

☐ 500

✓ Correct

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 point

- ☐ 12.41%
- ☐ 11.41%
- ☐ 10.41%
- ☒ 13.41%

✓ Correct

$\ln\left(\frac{15}{3}\right) = 1.6094$
 $\frac{1.6094}{12} = 0.1341$

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
- ☐ 0.875 days
- ☒ 8.75 days
- ☐ 87.5 days

✓ Correct

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

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

$t = \frac{35.00878}{4} = 8.752195$