Assessment Title: Grade 8 Module 1 Mid-Module Assessment

Express the following in exponential notation.

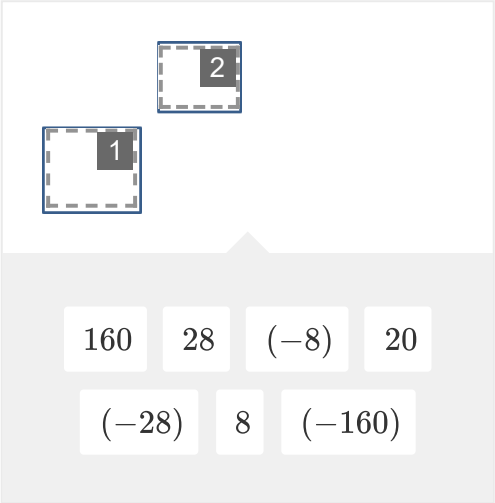
$$\underbrace{bb \cdots b}_{10 \text{ times}}$$

- b
- b^{10}
- b^{13}
- b^{30}

Express the following in exponential notation.

$$\underbrace{(-8) \times \cdots \times (-8)}_{\text{20 times}}$$

Drag the correct numbers into the base and exponent positions.



Select the two expressions that are equivalent to $3^8 \times 27$.

- [ ] 3^5
- [ ] 3^{11}
- [ ] 3^{24}
- [ ] $3^8 \times 3^3$
- [ ] $3^{11} \times 27$

Jackson has three cartons of gumballs. There are 100 boxes in each carton. There are 100 gumballs in each box. The number of gumballs Jackson has can be expressed in the form $a \cdot 10^b$, where a is a prime number and b is whole number. What are the values of a and b?

$a =$ _____

$b =$ _____

Which expression is equivalent to $(3^5 x^2)^4$?

- $3^9 x^6$
- $3x^{28}$
- $3^{20} x^6$
- $3^{20} x^8$

Select the two expressions that are equivalent to $\left(7^3 x^4\right)^0$.

- [ ] $7^0 x^0$
- [ ] $7^3 x^4$
- [ ] $7^3 x^0$
- [ ] $7^0 x^4$
- [ ] 1

Maria drops a ball from a height of 8 feet. With each bounce, the ball reaches a height of $\frac{1}{2}$ its previous height. The table shows the height the ball reaches after each bounce. The last column shows the height written in exponential form.

Drag expressions to correctly complete the table.

Bounce	Height (feet)	Equivalent Height (feet)
0	8	2^3
1	4	2^2
2		2^1
3	1	
4		
5		
6		

$\frac{1}{2}$ 2 2^0 2^{-2} 2^{-3} $\frac{1}{8}$ $\frac{1}{6}$ 2^{-1} $\frac{1}{4}$

Provide reasons that show why $\left(\frac{1}{5}\right)^2\left(\frac{1}{5}\right)^4$ is equivalent to 5^{-6}.

Match the correct reason with each expression to justify the equivalence.

$\left(\frac{1}{5}\right)^2 \cdot \left(\frac{1}{5}\right)^4 = \left(\frac{1}{5}\right)^6$	
$\left(\frac{1}{5}\right)^6 = \frac{1^6}{5^6}$	
$\frac{1}{5^6} = 5^{-6}$	

$\frac{x^m}{x^n} = x^{m-n}$

$x^m \cdot x^n = x^{m+n}$

$(xy)^n = x^n y^n$

$(x^m)^n = x^{mn}$

$\left(\frac{x}{y}\right)^n = \frac{x^n}{y^n}$

$\frac{1}{x^b} = x^{-b}$

Consider the equation shown.

$$\frac{4^3 \cdot 8^2}{2^n} = 2^4$$

What is the value of n?

Which expression is equivalent to $2 \cdot 5^{-1} \cdot \left(\frac{2}{5^3}\right)^{10}$?

- $\frac{2^{10}}{5^{13}}$
- $\frac{2^{11}}{5^{14}}$
- $\frac{2^{11}}{5^{29}}$
- $\frac{2^{11}}{5^{31}}$

Consider the equation shown.

$\frac{3^{12}}{3^p} = 3^4$

Which equation shows how to determine the value of p?

- $12 \div p = 4$
- $p - 12 = 4$
- $12 - p = 4$
- $p \div 12 = 4$