

Name Key Date \_\_\_\_\_

Expressions  
Properties of Exponents  
Independent Practice

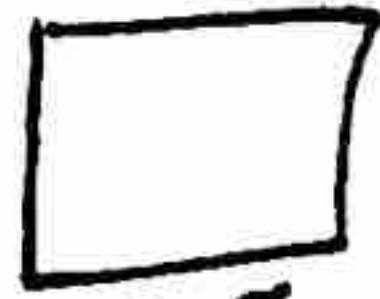
1. Simplify the following expressions:

Part A:  $\frac{2x^3y^3}{4y^2} = \frac{2}{4} \cdot x^3 \cdot \frac{y^3}{y^2} = \frac{1}{2}x^3y$

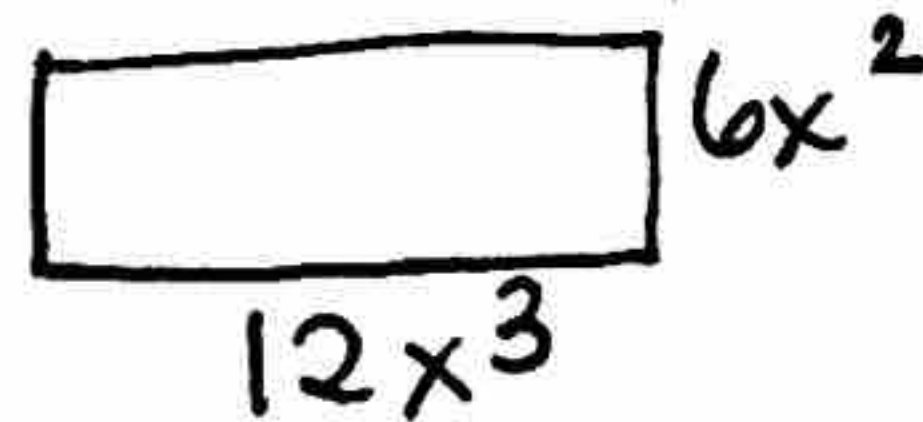
Part B:  $\left(\frac{x^{-8}}{y^{11}}\right)^{-2} = \frac{x^{16}}{y^{-22}} = x^{16}y^{22}$

Part C:  $\frac{(2x^3)(x^4)^2}{8x^{11}} = \frac{2x^3x^8}{8x^{11}} = \frac{2x^{11}}{8x^{11}} = \frac{2}{8} \cdot \frac{x^{11}}{x^{11}} = \frac{1}{4}x^0 = \frac{1}{4} \cdot 1 = \frac{1}{4}$

2. Your neighbor has a square-shaped pool with side lengths of  $3a^5$ . What is the area of the pool?

$3a^5$    $3a^5$   
 $3a^5 \cdot 3a^5 = 9a^{10}$   
or  $(3a^5)^2$

3. Bojangles has a rectangular-shaped roof with a width of  $6x^2$  feet and a length  $12x^3$ . What is the area of the roof?



$(6x^2)(12x^3)$

$6 \cdot x^2 \cdot 12 \cdot x^3$

$72x^5$

4. Consider each equation. Find the value of  $m$  in each equation below. Justify your answer.

$(x^m \cdot x^2)^3(k^3)^5 = x^{21}k^{15}$

$x^{3 \cdot m} \cdot x^6 = x^{21}$

$3m + 6 = 21$

$m = 5$

$x^3 \cdot y^2 \left(\frac{x^2 \cdot y^3 \cdot z^m}{z^{-5}}\right) = x^5y^5z$

$\frac{z^m}{z^{-5}} = z^1 \quad m - (-5) = 1$

$m = -4$

$\left(\frac{x^8}{yz^5}\right)^m = 1$

$m = 0$

5. John buys a water tank from a company that likes to use exponents as dimensions. The tank he buys has the dimensions  $b^2$  by  $b^4$  by  $4c^3$ . Which of the following expressions represent the volume of the water tank?

- A  $4b^8c^3$
- B  $4b^6c^3$
- C  $12b^8c^3$
- D  $2b^6c^3$

$V = S \cdot S \cdot S$

$V = (b^2)(b^4)(4c^3)$

$b^2 \cdot b^4 \cdot 4 \cdot c^3$

$4b^6c^3$



6. The dimensions of Peyton and Parker's sandbox are  $t^2$  m by  $t^5$  m by  $3v^2$  m. One cubic meter of the sandbox contains  $3s^{21}$  grains of sand. Which of the following expressions represent the amount of grains of sand in the sandbox?

- A  $27t^{10}v^2s^{21}$   
 B  $t^{10}v^2s^{21}$   
 C  $3t^7v^2s^{21}$   
 D  $9t^7v^2s^{21}$

$$V = s \cdot s \cdot s$$

$$t^2 \cdot t^5 \cdot 3v^2$$

$$(3t^7v^2) 3s^{21}$$

$$9t^7v^2s^{21}$$

7. Consider the equation  $a^{-3} = \left(\frac{1}{a}\right)^5$ .

What value(s) of  $a$  make the equation true?

$$a = 1$$

8. Harry, Louis and Niall are working with exponents. Harry claims  $4^2 \cdot 4^5 = 4^{10}$ . Louis claims  $4^2 \cdot 4^5 = 4^7$ . Niall claims  $4^2 \cdot 4^5 = 16^7$ . Which student has the correct answer? Explain why.

Louis, because when multiplying powers with the same base you add the exponents.

9. Raymond and Rose were working with exponents.

Part A: Raymond claims that  $5^5 \cdot 5^2 = 5^3$ . Rose argues that  $5^5 \cdot 5^2 = 5^7$ . Which one of them is correct? Use the properties of exponents to justify your answer.

Rose, she added the exponents

Part B: Raymond claims that  $7^9/7^5 = 7^4$ . Rose argues that  $7^9/7^5 = 7^{45}$ . Which one of them is correct? Use the properties of exponents to justify your answer.

Raymond, when dividing powers with the same base you subtract the exponents.

