

Last Name: A. Zito
 First Name: Answer Key

Date: _____
 Grade 9
 Term 1 Practice Test 4

Exponents

1) Add.

<p>a)</p> $\begin{array}{r} -3x^5 - 2x^3 - 4x \\ + -7x^5 - 3x^3 + 4x \\ \hline -10x^5 - 5x^3 + 0x \end{array}$ <p>Answer: $-10x^5 - 5x^3$</p>	<p>b)</p> $\begin{array}{r} -3x^5 + 2x^3 + 6 \\ + -2x^5 + 3x^4 - 7 \\ \hline -3x^5 + 0x^4 + 2x^3 + 6 \\ + -2x^5 + 3x^4 + 0x^3 - 7 \\ \hline -5x^5 + 3x^4 + 2x^3 - 1 \end{array}$ <p style="color: red; font-size: small;">NOT LIKE TERMS</p>
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2) Subtract.

<p>a)</p> $\begin{array}{r} -3x^5 - 2x^3 - 4x \\ -1(-7x^5 - 3x^3 + 4x) \\ \hline -3x^5 - 2x^3 - 4x \\ + 7x^5 + 3x^3 - 4x \\ \hline 4x^5 + 1x^3 - 8x \end{array}$	<p>b)</p> $\begin{array}{r} -3x^5 + 2x^3 + 6 \\ - (-2x^5 + 3x^4 - 7) \\ \hline -3x^5 + 0x^3 + 2x^3 + 6 \\ + 2x^5 - 3x^4 + 0x^3 + 7 \\ \hline -1x^5 - 3x^4 + 2x^3 + 13 \end{array}$
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3) TRUE or FALSE. Are all of the following irrational numbers? $\sqrt{13}, \sqrt{117}, \pi$

Answer: TRUE

4) TRUE or FALSE. Are all of the following numbers integers? $-17, \frac{24}{7}, -9, \sqrt{32}$

Answer: FALSE

5) Write each of the following as a power of 10.

a. $100\,000\,000 = 10^8$

b. $0.000\,000\,1 = 10^{-7}$

6) Simplify the following algebraic expressions. Place your final answer in the space provided.

a)	$\boxed{5x^3} + \boxed{2x^2} + \boxed{6x^3} - 2x$ $11x^3 + 2x^2 - 2x$	<p>Answer</p> $11x^3 + 2x^2 - 2x$
b)	$\boxed{5ab^2} + \boxed{2ab} - \boxed{4ab^2} + 9b^2 - \boxed{3ab} + a$ $1ab^2 - 1ab + 9b^2 + 1a$	<p>Answer</p> $ab^2 - 1ab + 9b^2 + a$
c)	$3(x^2 + 5x) - 4(2x - 4)$ $3x^2 + 15x - 8x + 16$ $3x^2 + 7x + 16$	<p>Answer</p> $3x^2 + 7x + 16$
d)	$2(6x^4 - x^2 + 2x) - 4(2x^3 - 4)$ $12x^4 - 2x^2 + 4x - 8x^3 + 16$	<p>Answer</p> $12x^4 - 8x^3 - 2x^2 + 4x + 16$

7) Simplify the following expressions (all exponents must be positive).

a) $(12x^{-2}y^{-3})^2 = 12^2 x^{-4} y^{-6} = \frac{144}{x^4 y^6}$

b) $(7a^5x^8)^2 = 7^2 a^{10} x^{16} = 49a^{10} x^{16}$

c) $(8y^{-1})^3 = 8^3 y^{-3} = \frac{512}{y^3}$

d) $(5^{-1}xy)^{-3} = 5^3 x^{-3} y^{-3} = \frac{125}{x^3 y^3}$

8) Solve for the unknown variables (no decimals).

<p>a) $4x - 13 = 2x - 75$ $4x - 2x = -75 + 13$ $2x = -62$ $\frac{2x}{2} = \frac{-62}{2}$ $x = -31$</p> <p>Answer: <u>$x = -31$</u></p>	<p>b) $-19 - 6x = 2 - 4x$ $-6x + 4x = 2 + 19$ $-2x = 21$ $\frac{-2x}{-2} = \frac{21}{-2}$ $x = -\frac{21}{2}$</p> <p>Answer: <u>$x = -\frac{21}{2}$</u></p>
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9) Write the following in exponential form and in standard form.

a)	$\sqrt[2]{49} = 49^{1/2} = 7$
b)	$\sqrt[3]{27} = 27^{1/3} = 3$

10) Simplify. All exponents need to be positive. No decimals.

a)	$(9x^{-1})^2 = 9^2 x^{-2}$ $= \frac{81}{x^2}$	b)	$(3^{-1}x^4)^{-3} = 3^3 x^{-12}$ $= \frac{27}{x^{12}}$
c)	$\left(\frac{8x^{-6}}{13y^{-8}}\right)^2 = \frac{8^2 x^{-12}}{13^2 y^{-16}}$ $= \frac{64 y^{16}}{169 x^{12}}$	d)	$\left(\frac{14x^8 b}{y^{-3} z^5}\right)^{-1} = \frac{14^{-1} x^{-8} b^{-1}}{\frac{y^3 z^{-5}}{z^5}}$ $= \frac{1}{14 b x^8 y^3}$

11) Complete the following chart (do not use decimals)

Exponential Expression	Base	Exponent	Factored Form	Standard Form
$(2x)^4$	$2x$	4	$(2x)(2x)(2x)(2x)$	$16x^4$
7^{-2}	7	-2	$\left(\frac{1}{7 \cdot 7}\right)$	$\frac{1}{49}$

12) Determine if the following statements are **true** or **false**. The entire word must be written.

a.	$\mathbb{Z} \subseteq \mathbb{Q} \subseteq \mathbb{R}$ TRUE	b.	$-4.984 \in \mathbb{Z}$ FALSE
c.	$\mathbb{Q}' \cup \mathbb{Q} \neq \mathbb{R}$ FALSE	d.	$\sqrt[3]{33} \in \mathbb{Q}'$ TRUE

13) Complete the following chart.

(a)	$-3 < x \leq -2$		$]-3, -2]$
(b)	$2 \leq x < 4$		$[2, 4[$
(c)	$x \geq 2$		$[2, +\infty[$

14) Matching Question

Match the three definitions listed on the left to the example on the right by writing the letter in the space provided. Each definition matches to only one example.

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|------------------|---|----|-------------------------------|
| 1. | Law of Multiplication: When a power is raised to a power, we multiply the exponents | A) | $c^a + c^b = c^{a+b}$ |
| <u> D </u> | | | |
| 2. | Law of Addition: When multiplying two like terms, we add the exponents. | B) | $\frac{c^a}{c^b} = c^{a-b}$ |
| <u> C </u> | | | |
| 3. | Law of Subtraction: When dividing two like terms we subtract the exponents | C) | $(c^a)(c^b) = c^{a+b}$ |
| <u> B </u> | | | |
| | | D) | $(c^a)^b = c^{a \times b}$ |
| | | E) | $\frac{c^a}{c^b} = c^a - c^b$ |