Name: Answer Key

Group: _____ Date: _____

Objective 4.1 To understand integral exponents

4

1. Given $2^5 = 32$,

a) What is the base? 2

b) What is the solution? 32

c) What is the exponent? 5

2. Given $10^3 = 1000$,

a) What is the power? 1000

b) What is the exponent? 3

c) What is the base? 10

3. Determine the value of the following powers.

a) $6^3 =$ 216 *b)* $8^2 =$ 64 *c)* $3^2 =$ 9

d) $4^1 =$ 4 *e)* $7^2 =$ 49 *f)* $5^3 =$ 125

g) $10^2 =$ 100 *h)* $2^3 =$ 8 *i)* $2^5 =$ 32

j) $4^4 =$ 256 *k)* $9^3 =$ 729 *l)* $0^4 =$ 0

4. Find the missing exponent.

a) $10^{\blacksquare} = 10\,000$ $\blacksquare =$ 4 *b)* $5^{\blacksquare} = 625$ $\blacksquare =$ 4 *c)* $3^{\blacksquare} = 27$ $\blacksquare =$ 3

d) $2^{\blacksquare} = 128$ $\blacksquare =$ 7 *e)* $7^{\blacksquare} = 1$ $\blacksquare =$ 0 *f)* $10^{\blacksquare} = 10$ $\blacksquare =$ 1

g) $4^{\blacksquare} = 64$ $\blacksquare =$ 3 *h)* $13^{\blacksquare} = 169$ $\blacksquare =$ 2 *i)* $2^{\blacksquare} = 1$ $\blacksquare =$ 0

j) $6^{\blacksquare} = 1296$ $\blacksquare =$ 4 *k)* $20^{\blacksquare} = 400$ $\blacksquare =$ 2 *l)* $8^{\blacksquare} = 512$ $\blacksquare =$ 3

5. Determine the base.

a) 1 $^{10} = 1$ *b)* 5 $^{3} = 125$ *c)* 14 $^{2} = 196$

d) 08 $^{2} = 64$ *e)* 4 $^{3} = 64$ *f)* 2 $^{6} = 64$

g) 10 $^{5} = 100\,000$ *h)* 3 $^{4} = 81$ *i)* 24 $^{1} = 24$

j) 2 $^{4} = 16$ *k)* 3 $^{5} = 243$ *l)* 10 $^{2} = 100$

6. Write in expanded factor form.

a) $3^4 =$ 3x3x3x3 *b)* $7^2 =$ 7x7

c) $m^5 =$ m x m x m x m x m *d)* $a^3 =$ a·a·a

e) $5^2 =$ 5x5 *f)* $b^1 =$ b

7. Write each of the following numbers in exponential form.

a) $49 = 7^2$ ***b)*** $125 = 5^3$ ***c)*** $216 = 6^3$

d) $32 = 2^5$ ***e)*** $27 = 3^3$ ***f)*** $169 = 13^2$

8. Express each word as power of 10.

a) A thousand. 10^3 ***b)*** A hundred thousand. 10^5 ***c)*** One. 10^0

d) One million. 10^6 ***e)*** One tenth. 10^{-1} ***f)*** One thousandth. 10^{-3}

9. Complete the property of the exponents.

1. Given a base m and an integer exponent $a > 1$,

$m^a =$ $m \cdot m \cdot m \ldots \cdot m$ (a times).

2. Given a base m and the exponent 1,

$m^1 = m$.

3. Given a base $m \neq 0$ and the exponent 0,

$m^{-a} = m^0 = 1$.

4. Given a base $m \neq 0$ and an integer exponent $a > 0$,

$m^{-a} = \frac{1}{m^a}$.

5. Given a base $m > 0$ and the exponent 1/2,

$m^{1/2} = \sqrt{m}$.

10. Determine the power of the following expressions.

a) $3^2 = 9$ ***b)*** $5^1 = 5$ ***c)*** $8^0 = 1$

d) $6^{-2} = \frac{1}{36}$ ***e)*** $9^{1/2} = 3$ ***f)*** $7^3 = 343$

g) $2^1 = 2$ ***h)*** $5^0 = 1$ ***i)*** $10^{-1} = \frac{1}{10}$

j) $16^{1/2} = 4$ ***k)*** $2^4 = 16$ ***l)*** $6^1 = 6$

m) $3^0 = 1$ ***n)*** $2^{-1} = \frac{1}{2}$ ***o)*** $100^{1/2} = 10$

11. Determine the power of the following expressions.

a) $(-3)^2 = 9$ ***b)*** $(-3)^4 = 81$ ***c)*** $(-3)^6 = 729$

d) $(-3)^1 = -3$ ***e)*** $(-3)^3 = -27$ ***f)*** $(-3)^5 = -243$

12. What can you conclude from the results obtained in 11?

Negative base with an even exponent gives a positive power.
Negative base with an odd exponent gives a negative power.