
ALGEBRA: INDEX LAWS**Best Guess Mastery Worksheet (Target Grade 5/6)****I Do**

Evaluate the following index expressions:

(a) Find the value of k when $5^k = 1$.

$k =$

$$\frac{27}{3^8} = 3^m$$

(b) Find the value of m .

$m =$

(c) $(7^{-4})^3 \times 7^5 = 7^p$

Find the value of p .

$p =$

We Do

Solve the following:

(a) Find the value of a when $8^a = 1$.

$a =$

$$\frac{25}{5^6} = 5^b$$

(b) Find the value of b .

$b =$

(c) $(2^3)^{-2} \times 2^4 = 2^c$

Find the value of c .

$c =$

ALGEBRA: INDEX LAWS**Best Guess Mastery Worksheet (Target Grade 5/6)****You Do 1**

Complete the following problems:

(a) Find the value of x when $12^x = 1$.

$x =$

$$\frac{16}{2^9} = 2^y$$

(b) Find the value of y .

$y =$

(c) $(5^{-2})^4 \times 5^3 = 5^z$

Find the value of z .

$z =$

You Do 2

Simplify these expressions:

(a) Find the value of p when $4^p = 1$.

$p =$

$$\frac{125}{5^7} = 5^q$$

(b) Find the value of q .

$q =$

(c) $(3^4)^{-3} \times 3^{10} = 3^r$

Find the value of r .

$r =$

ALGEBRA: INDEX LAWS**Best Guess Mastery Worksheet (Target Grade 6/7)****Challenge 1**

Work out the following:

(a) Find the value of n when $2^n = \frac{1}{8}$.

$$n = \dots\dots\dots$$

$$\frac{9^2}{3^5} = 3^m$$

(b) Find the value of m .

$$m = \dots\dots\dots$$

$$\frac{6^4 \times 6^{-2}}{6^5} = 6^k$$

(c) Find the value of k .

$$k = \dots\dots\dots$$

Challenge 2

Work out the following complex indices:

(a) Find the value of w when $16^w = 4$.

$$w = \dots\dots\dots$$

(b) $8 \times 2^4 = 2^x$

Find the value of x .

$$x = \dots\dots\dots$$

$$\frac{(10^3)^{-2} \times 10^8}{10^{-2}} = 10^y$$

(c) Find the value of y .

$$y = \dots\dots\dots$$

Answers & Worked Solutions

I Do:

(a) Any non-zero number to the power of 0 is 1. (a) $p = 0$

$$k = 0$$

(b) 27 can be written as 3^3 .

$$3^3 \div 3^8 = 3^{(3-8)} = 3^{-5}$$

$$m = -5$$

(c) $(7^{-4})^3 = 7^{-12}$

$$7^{-12} \times 7^5 = 7^{(-12+5)} = 7^{-7}$$

$$p = -7$$

We Do:

(a) $8^0 = 1$. $a = 0$

(b) $25 = 5^2$. $5^2 \div 5^6 = 5^{(2-6)} = 5^{-4}$

$$b = -4$$

(c) $(2^3)^{-2} = 2^{-6}$. $2^{-6} \times 2^4 = 2^{-2}$

$$c = -2$$

You Do 1:

(a) $x = 0$

(b) $16 = 2^4$. $2^4 \div 2^9 = 2^{-5}$

$$y = -5$$

(c) $(5^{-2})^4 = 5^{-8}$. $5^{-8} \times 5^3 = 5^{-5}$

$$z = -5$$

You Do 2:

(b) $125 = 5^3$. $5^3 \div 5^7 = 5^{-4}$

$$q = -4$$

(c) $(3^4)^{-3} = 3^{-12}$. $3^{-12} \times 3^{10} = 3^{-2}$

$$r = -2$$

Challenge 1:

(a) $1/8 = 1/(2^3) = 2^{-3}$. $n = -3$

(b) $9^2 = (3^2)^2 = 3^4$

$$3^4 \div 3^5 = 3^{-1}$$
. $m = -1$

(c) Numerator: $6^4 \times 6^{-2} = 6^2$

$$6^2 \div 6^5 = 6^{-3}$$
. $k = -3$

Challenge 2:

(a) $16^{1/2} = \sqrt{16} = 4$. $w = 1/2$ (or 0.5)

(b) $8 = 2^3$. $2^3 \times 2^4 = 2^7$. $x = 7$

(c) Numerator: $10^{-6} \times 10^8 = 10^2$

$$10^2 \div 10^{-2} = 10^{(2-(-2))} = 10^4$$

$$y = 4$$