

Indices



UNIT 2: Index laws—multiplication with indices

QUESTION 1 Simplify the following, writing your answers in index form.

- | | | |
|-------------------------------|---------------------------------|------------------------------------|
| a $3^4 \times 3^8 =$ _____ | b $6^3 \times 6^7 =$ _____ | c $7^2 \times 7^6 =$ _____ |
| d $5^7 \times 5^5 =$ _____ | e $2^4 \times 2^6 =$ _____ | f $6^8 \times 6^2 =$ _____ |
| g $10^3 \times 10^9 =$ _____ | h $11^5 \times 11^4 =$ _____ | i $7^7 \times 7^6 =$ _____ |
| j $6^8 \times 6^{10} =$ _____ | k $10^9 \times 10^{12} =$ _____ | l $13^{17} \times 13^{12} =$ _____ |

QUESTION 2 Simplify the following, writing your answers in index form.

- | | | |
|------------------------------|----------------------------|----------------------------|
| a $5 \times 5^2 =$ _____ | b $2^3 \times 2^2 =$ _____ | c $6 \times 6^3 =$ _____ |
| d $7^2 \times 7 =$ _____ | e $6^3 \times 6 =$ _____ | f $3^3 \times 3^4 =$ _____ |
| g $11^2 \times 11^2 =$ _____ | h $10^2 \times 10 =$ _____ | i $5 \times 5^4 =$ _____ |
| j $3^4 \times 3^2 =$ _____ | k $5^2 \times 5^5 =$ _____ | l $2^3 \times 2^5 =$ _____ |

QUESTION 3 Simplify the following.

- | | | |
|---------------------------------------|-------------------------------|---------------------------------------|
| a $5^3 \times 5^2 =$ _____ | b $6^5 \times 6^7 =$ _____ | c $6^2 \times 6^9 =$ _____ |
| d $3^8 \times 3^6 =$ _____ | e $5^3 \times 5^6 =$ _____ | f $10^9 \times 10^3 =$ _____ |
| g $2^7 \times 2^5 =$ _____ | h $11^4 \times 11^8 =$ _____ | i $3^3 \times 3^4 \times 3^7 =$ _____ |
| j $7^5 \times 7^2 \times 7^3 =$ _____ | k $3^9 \times 3^{12} =$ _____ | l $2^5 \times 2^{17} =$ _____ |

QUESTION 4 Simplify the following.

- | | | |
|-------------------------------------|------------------------------|------------------------------|
| a $13^4 \times 13^3 =$ _____ | b $2^5 \times 2^4 =$ _____ | c $2^8 \times 2^3 =$ _____ |
| d $6^9 \times 6^2 =$ _____ | e $3^7 \times 3^4 =$ _____ | f $6^3 \times 6^7 =$ _____ |
| g $3^3 5^5 \times 3^{25} 2 =$ _____ | h $11^5 \times 11^5 =$ _____ | i $7^3 \times 7^2 =$ _____ |
| j $7^2 \times 7^3 =$ _____ | k $5^5 \times 5^3 =$ _____ | l $10^4 \times 10^6 =$ _____ |

QUESTION 5 Simplify the following.

- | | | |
|----------------------------|---------------------------------------|---------------------------------------|
| a $6 \times 6^4 =$ _____ | b $10^7 \times 10 =$ _____ | c $2^2 \times 2^3 =$ _____ |
| d $5^6 \times 5 =$ _____ | e $6^3 \times 6^2 =$ _____ | f $7^4 \times 7^8 =$ _____ |
| g $2^5 \times 2^9 =$ _____ | h $3^7 \times 3^8 =$ _____ | i $6^5 \times 6^3 \times 6^2 =$ _____ |
| j $7 \times 7^3 =$ _____ | k $5^4 \times 5^3 \times 5^2 =$ _____ | l $11^9 \times 11^6 =$ _____ |

QUESTION 6 Find the missing term in each of the following.

- | | | |
|---------------------------------|------------------------------|---------------------------------|
| a $7^7 \times \square = 7^{10}$ | b $\square \times 6^6 = 6^9$ | c $5^4 \times \square = 5^{11}$ |
| d $9^3 \times \square = 9^5$ | e $3^5 \times \square = 3^8$ | f $4^4 \times \square = 4^5$ |
| g $8^2 \times \square = 8^9$ | h $\square \times 2^2 = 2^3$ | i $\square \times 3^2 = 3^6$ |
| j $4^2 \times \square = 4^8$ | k $\square \times 9^4 = 9^7$ | l $\square \times 2^2 = 2^4$ |

Indices

UNIT 3: Index laws—division with indices

QUESTION 1 Simplify the following, writing your answers in index form.

a $10^9 \div 10^5 =$ _____

b $6^8 \div 6^5 =$ _____

c $11^{16} \div 11^3 =$ _____

d $3^7 \div 3^4 =$ _____

e $5^{19} \div 5^6 =$ _____

f $13^{10} \div 13^5 =$ _____

g $2^{29} \div 2^6 =$ _____

h $3^{21} \div 3^6 =$ _____

i $7^{15} \div 7^4 =$ _____

j $5^{10} \div 5^3 =$ _____

k $2^{18} \div 2^{12} =$ _____

l $5^{14} \div 5^5 =$ _____

QUESTION 2 Simplify the following, leaving your answers in index form.

a $3^8 \div 3^3 =$ _____

b $11^9 \div 11^4 =$ _____

c $7^7 \div 7^3 =$ _____

d $6^{18} \div 6^{16} =$ _____

e $6^{12} \div 6^8 =$ _____

f $3^9 \div 3^2 =$ _____

g $5^{21} \div 5^{17} =$ _____

h $10^5 \div 10^2 =$ _____

i $5^9 \div 5^6 =$ _____

j $13^{15} \div 13^{13} =$ _____

k $5^{18} \div 5^{13} =$ _____

l $2^8 \div 2^4 =$ _____

QUESTION 3 Simplify the following, writing your answers in index form.

a $\frac{3^{15}}{3^8} =$ _____

b $\frac{10^{10}}{10^4} =$ _____

c $\frac{6^9}{6^5} =$ _____

d $\frac{5^{12}}{5^8} =$ _____

e $\frac{3^{40}}{3^7} =$ _____

f $\frac{7^{12}}{7^8} =$ _____

g $\frac{2^{43}}{2^{11}} =$ _____

h $\frac{2^9}{2^6} =$ _____

i $\frac{5^{32}}{5^9} =$ _____

j $\frac{7^{47}}{7^{13}} =$ _____

k $\frac{11^{18}}{11^6} =$ _____

l $\frac{3^{16}}{3^{13}} =$ _____

QUESTION 4 Simplify the following.

a $5^{10} \div 5^2 =$ _____

b $2^{11} \div 2^5 =$ _____

c $6^{21} \div 6^{16} =$ _____

d $6^8 \div 6^2 =$ _____

e $5^{12} \div 5^3 =$ _____

f $11^9 \div 11^3 =$ _____

g $10^{15} \div 10^7 =$ _____

h $3^{23} \div 3^8 =$ _____

i $13^{18} \div 13^6 =$ _____

j $3^{21} \div 3^{14} =$ _____

k $7^{32} \div 7^{18} =$ _____

l $2^{54} \div 2^{28} =$ _____

QUESTION 5 Simplify the following.

a $11^7 \div 11^4 =$ _____

b $6^9 \div 6^2 =$ _____

c $6^7 \div 6^6 =$ _____

d $6^8 \div 6^3 =$ _____

e $7^5 \div 7^2 =$ _____

f $10^8 \div 10^7 =$ _____

g $3^7 \div 3^4 =$ _____

h $2^9 \div 2^4 =$ _____

i $3^{10}5^8 \div 3^75^2 =$ _____

j $2^{10}5^7 \div 2^85^4 =$ _____

k $4^55^9 \div 4^35^4 =$ _____

l $2^{97}6 \div 2^{47}5^6 =$ _____

QUESTION 6 Find the missing term in each of the following.

a $6^9 \div \square = 6^4$

b $6^{14} \div \square = 6^8$

c $9^{12} \div \square = 9^7$

d $\square \div 8 = 8^5$

e $9^9 \div 9^6 = \square$

f $8^8 \div 8^5 = \square$

g $3^6 \div \square = 3^2$

h $\frac{\square}{4^2} = 4^7$

i $\frac{3^8}{\square} = 3^6$

j $3^44^4 \div \square = 3^34^2$

k $\square \div 2^2 = 2^6$

l $\frac{4^85^{12}}{\square} = 4^55^6$

Indices

UNIT 5: Index laws—the zero index



QUESTION 1 Simplify the following.

a $(48)^0 =$ _____

b $8^0 \times 3^0 =$ _____

c $x^0 y^0 =$ _____

d $(86)^0 =$ _____

e $(xy)^0 =$ _____

f $9y^0 =$ _____

g $x^0 y^0 =$ _____

h $8^4 p^0 =$ _____

i $(4^3)^0 =$ _____

j $(6xy)^0 =$ _____

k $(9ab)^0 =$ _____

l $16a^0 =$ _____

QUESTION 2 Use your calculator to verify true or false for the following.

a $9^0 = 1$ _____

b $93^0 = 1$ _____

c $\left(\frac{5}{8}\right)^0 = 1$ _____

d $(2.3)^0 = 1$ _____

e $-(6)^0 = -1$ _____

f $(6 \times 12)^0 = 1$ _____

g $-5 \times 7^0 = -5$ _____

h $-61^0 - 3^0 - 5^0 = -3$ _____

i $8 \times 6^0 = 8$ _____

j $21 \times (-5)^0 = 21$ _____

k $6 \times 4^0 \times (-9)^0 = 6$ _____

l $12 + 4^0 = 12$ _____

QUESTION 3 Simplify the following.

a $6 \times 2y^0 =$ _____

b $(8a^0)^2 =$ _____

c $7^0 + 8m^0 =$ _____

d $6 \times (6a)^0 =$ _____

e $9 \times 4x^0 =$ _____

f $(-15)^0 + 8 =$ _____

g $(ab)^0 \times 9 =$ _____

h $16^0 + 9^0 =$ _____

i $-9x^0 + 12 =$ _____

j $(8 + 8)^0 =$ _____

k $(5a^2)^0 + (3b^2)^0 =$ _____

l $9(y^2)^0 \times 8(x^7)^0 =$ _____

QUESTION 4 Simplify the following.

a $6x^0 + (6x)^0 =$ _____

b $\frac{10y^0}{(10y)^0} =$ _____

c $\frac{(6t)^0}{6t^0} =$ _____

d $-8^0 - (-8)^0 =$ _____

e $9(2a - 3b)^0 =$ _____

f $12a^4 b^0 =$ _____

g $28x^0 y^4 =$ _____

h $2ab^0 c^0 =$ _____

i $(8a^4)^0 =$ _____

j $\left(\frac{2}{3} \times 8\right)^0 =$ _____

k $(6xyz)^0 =$ _____

l $14 \times 7^0 =$ _____

QUESTION 5 Simplify the following, leaving your answers in index form.

a $2^8 \times 2^0 =$ _____

b $3^0 \times 3^6 =$ _____

c $4^8 \times 4^0 =$ _____

d $10^0 \times 10^8 =$ _____

e $8^8 \times 8^0 =$ _____

f $5^5 \times 5^0 =$ _____

g $8^0 \times 8^9 =$ _____

h $5^9 \times 5^0 =$ _____

i $6^9 \times 6^0 =$ _____

j $3^6 \times 3^4 \times 3^0 =$ _____

k $7^2 \times 7^0 \times 7^8 =$ _____

l $(-3)^0 \times -3^0 \times -3^0 =$ _____

QUESTION 6 Simplify the following.

a $(6y)^0 \times 6y^0 =$ _____

b $\frac{9b^0}{8a^0} =$ _____

c $\frac{(6x^2)^0 \times (xy)^0}{26x^0} =$ _____

d $\frac{6^4 \times 6^5}{6^9} =$ _____

e $\frac{5a^0 \times (2a^3)^0}{20a^0} =$ _____

f $(6y)^0 + 6y^0 =$ _____

g $\frac{9 \times (5x)^0}{8x^0} =$ _____

h $\frac{16p^0}{8n^0} =$ _____

i $\frac{(4p^3)^0 \times 2p^0}{32p^0} =$ _____

j $8y^0 \times (8y)^0 \div 4y^0 =$ _____

k $\frac{2a^9 \times (a^3 b^2)^0}{(2ab)^0} =$ _____

l $6x^0 \times (6x)^0 =$ _____