LOVE MATHS

name: ....

date: ....

INDEX LAWS

AIM & OBJECTIVES:

To be able to simplify expressions using the laws of indices.

OBJECTIVE:

I can apply the laws of indices to simple multiplication problems such as $n^7 \times n^3$

I can apply the laws of indices to simple division problems such as $n^7 \div n^3$

I can apply the laws of indices to powers of powers such as $(n^7)^3$

I can apply the laws of indices to more complex multiplication problems such as $2n^7 \times 4n^3$

I can apply the laws of indices to more complex division problems such as $8n^7 \div 4n^3$

I can apply the laws of indices to more complex powers problems such as $(2n^7)^3$

I can apply the laws of indices to simple fractional problems

I can apply the laws of indices to more complex fractional problems

KEY WORDS...

index notation, power, exponent, coefficient, integer, multiply, divide, brackets, fraction

WHILE YOU WAIT...

State the value of n in each question

TICK TOCK

1. $2 \times 2 \times 2 \times 2 = 2^n$ n= _ _ _

2. $5 \times 5 \times 5 \times 5 \times 5 \times 5 = 5^n$ n= _ _ _

3. $a \times a \times a = a^n$ n= _ _ _

4. $y \times y \times y \times y \times y = y^n$ n= _ _ _

5. $v = v^n$ n= _ _ _

6. $6 = 6^n$ n= _ _ _

7. $1 = 8^n$ n= _ _ _

7. $1 = y^n$ n= _ _ _

Extension:

1. $2n \times 2n \times 2n = (2n)^n$ n= _ _ _

2. $3ab \times 3ab \times 3ab \times 3ab = (3ab)^n$ n= _ _ _

SECTION A

Simplify the following

1. $3^5 \times 3^7 =$ 2. $6^4 \times 6^3 =$ 3. $a^9 \times a^2 =$

4. $n^4 \times n =$ 5. $y^{12} \times y^2 =$ 6. $10^5 \times 10^4 =$

SECTION A EVALUATION OF LEARNING:

HOW DID YOU DO?

Now circle how many questions you got right
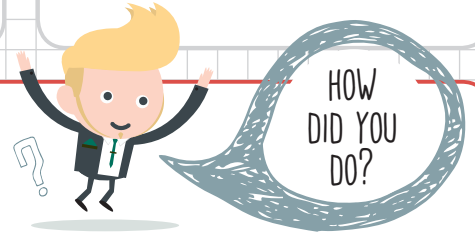
1   2   3   4   5   6

move on to extension 1   move on to extension 2

SECTION A EXTENSION 1:

Simplify the following

1. $4^{10} \times 4^5 =$ 2. $7^9 \times 7 =$

3. $p^5 \times p^3 =$ 4. $t^8 \times t =$

SECTION A EXTENSION 2:

Calculate the value of n

1. $a^4 \times a^n = a^6$ 2. $b^5 \times b^n = b^6$

   $n =$ $n =$

SECTION B

Simplify the following

1. $4^9 \div 4^3 =$ 2. $11^7 \div 11^2 =$ 3. $p^8 \div p^3 =$

4. $y^3 \div y =$ 5. $n^5 \div n^2 =$ 6. $8^7 \div 8^3 =$

SECTION B EVALUATION OF LEARNING:

HOW DID YOU DO?

Now circle how many questions you got right
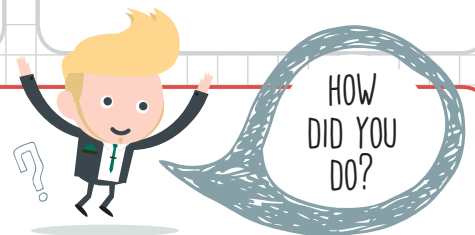
1   2   3   4   5   6

move on to extension 1   move on to extension 2

SECTION B EXTENSION 1:

Simplify the following

$1. 10^9 \div 10^3 =$ $2. 8^5 \div 8 =$

$3. n^7 \div n^3 =$ $4. t^6 \div t =$

SECTION B EXTENSION 2:

Simplify the following

$1. c^7 \div c^n = c^2$ $2. y^n \div y = y^8$

   $n =$ $n =$

SECTION C

Simplify the following

$1. (a^3)^2 =$ $2. (b^2)^4 =$ $3. (n^5)^3 =$

$4. (y^4)^5 =$ $5. (t^6)^4 =$ $6. (d^3)^7 =$

USE THIS SPACE FOR YOUR NOTES:

SECTION C EVALUATION OF LEARNING:

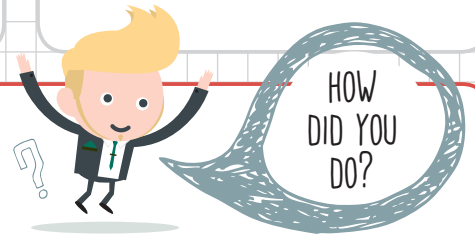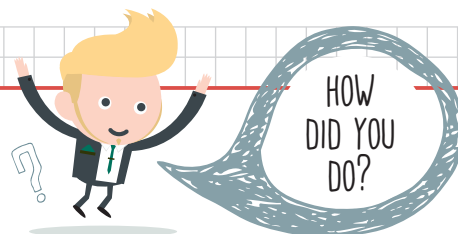Now circle how many questions you got right

1   2   3   4   5   6

move on to extension 1   move on to extension 2

HOW DID YOU DO?

SECTION C EXTENSION 1:

Simplify the following

$1. (n^4)^3 =$ $2. (a^5)^6 =$

$3. (e^7)^4 =$ $4. (d^4)^8 =$

SECTION C EXTENSION 2:

Simplify the following

$1. (a^n)^3 = a^{15}$ $2. (b^4)^n = b^{32}$

   $n =$ $n =$

SECTION D

Simplify the following

$1. 2a^5 \times a^6 =$ $2. 4n^3 \times 2n^4 =$ $3. 3y^4 \times 5y =$

$4. 5p^2 \times 4p^6 =$ $5. 8n \times 3n^6 =$ $6. 4a^5 \times 6a^9 =$

USE THIS SPACE FOR YOUR NOTES:

SECTION D EXTENSION 1:

Simplify the following

1. $3n^5 \times 6^n =$ 2. $2a^4 \times 3a^8 =$

3. $7n^6 \times 2n^3 =$ 4. $4y^2 \times 5y =$

SECTION D EXTENSION 2:

Simplify the following

1. $5n^3 \times \boxed{} = 15n^5$

2. $2y^4 \times \boxed{} = 8y^5$

SECTION E

Simplify the following

1. $12a^4 \div 3a =$ 2. $42n^8 \div 7n^5 =$ 3. $30y^5 \div 6y^2 =$

4. $72b^8 \div 9b^3 =$ 5. $64e^7 \div 8e =$ 6. $55c^{12} \div 5c^4 =$

USE THIS SPACE FOR YOUR NOTES:
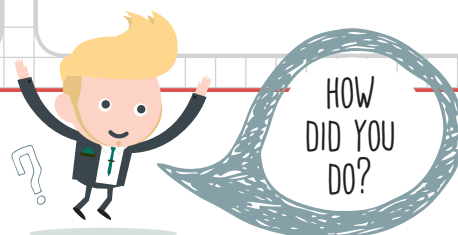
SECTION E EXTENSION 1:

Simplify the following

1. $20n^5 \div 4n =$ 2. $33y^{10} \div 3y^6 =$

3. $48a^7 \div 4a =$ 4. $54b^{11} \div 6b^4 =$

SECTION E EXTENSION 2:

Simplify the following

1. $72n^5 \div \boxed{} = 9n^2$

2. $44n^6 \div \boxed{} = 4n^5$

SECTION F

Simplify the following

1. $(2a^4)^3 =$
2. $(3n^5)^2 =$
3. $(4b^3)^3 =$

4. $(5p^8)^4 =$
5. $(2y^6)^5 =$
6. $(2c^4)^7 =$

SECTION F EVALUATION OF LEARNING:

Now circle how many questions you got right

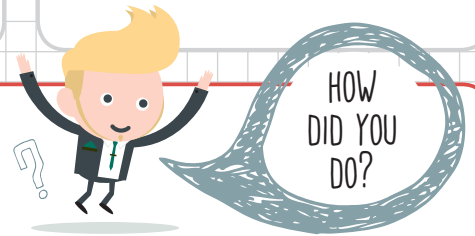1   2   3   4   5   6

move on to extension 1   move on to extension 2

HOW DID YOU DO?

SECTION F EXTENSION 1:

Simplify the following

1. $(5n^4)^3 =$
2. $(6n^8)^2 =$

3. $(2n^4)^6 =$
4. $(3n^5)^3 =$

SECTION F EXTENSION 2:

Simplify the following

1. $(2a^4)^n = 32a^{20}$

   $n =$

2. $(4a^3)^n = 256a^{12}$

   $n =$

SECTION G

Simplify the following

1. $\dfrac{3^{10} \times 3^4}{3^2 \times 3} =$
2. $\dfrac{a^7 \times a^2}{a^4 \times a} =$
3. $\dfrac{4n^4 \times 3n^5}{n \times 2n} =$

4. $\dfrac{5n^7 \times 4n^8}{2n^2 \times 5n^3} =$
5. $\dfrac{3e^4 \times 8e^7}{6e^9 \times e} =$
6. $\dfrac{6d^8 \times 8d^9}{4d^7 \times 2d^2} =$

SECTION G EVALUATION OF LEARNING:

Now circle how many questions you got right

1   2   3   4   5   6

move on to extension 1   move on to extension 2

HOW DID YOU DO?
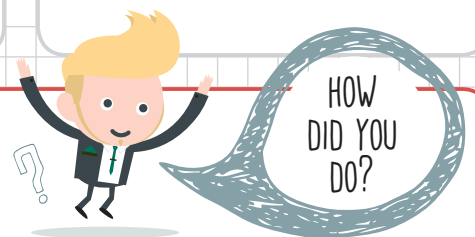
SECTION G EXTENSION 1:

Simplify the following

1. $\dfrac{n^9 \times n^3}{n^2 \times n^5} =$ 2. $\dfrac{3n^4 \times 6n^5}{9n^2 \times n} =$

3. $\dfrac{5n^8 \times 8n^6}{2n^2 \times 4n^3} =$ 4. $\dfrac{6n^9 \times 4n}{4n^2 \times 3n^4} =$

SECTION G EXTENSION 2:

Simplify the following

1. $\dfrac{(2n^3)^5 \times (2n^2)^2}{(2n^3)^3 \times (2n)^3}$ 2. $\dfrac{(3n^2)^3 \times (3n^5)^2}{(3n)^2 \times (3n^2)^2}$

SECTION H

Simplify the following

1. $\dfrac{n^5 \times n^4}{n^{11} \times n^3} =$ 2. $\dfrac{c^7 \times c^8}{c^{10} \times c^{12}} =$ 3. $\dfrac{3a^4 \times 4a^7}{12a^7 \times 2a^3} =$

4. $\dfrac{5y^4 \times 4y^2}{10y^7 \times 3y^4} =$ 5. $\dfrac{6a^9 \times 3a^2}{9a^4 \times 8a} =$ 6. $\dfrac{5n^3 \times 3n}{2n^9 \times 5n^{11}} =$

USE THIS SPACE FOR YOUR NOTES:

SECTION H EVALUATION OF LEARNING:

Now circle how many questions you got right

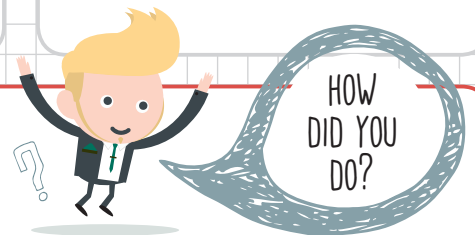1   2   3   4   5   6

move on to extension 1   move on to extension 2

SECTION H EXTENSION 1:

Simplify the following

1. $\dfrac{n^4 \times n^5}{n^{11} \times n^9} =$ 2. $\dfrac{4n^3 \times 5n^2}{6n^7 \times 8n^5} =$

3. $\dfrac{3n^2 \times 4n^6}{2n^9 \times 2n^2} =$ 4. $\dfrac{2n^3 \times 24n^5}{12n^6 \times 3n^9} =$

SECTION H EXTENSION 2:

Simplify the following

1. $\dfrac{(5n^2)^2 \times (2n^2)^2}{(n^2)^3 \times (10n^2)^3}$ 2. $\dfrac{(2n^2)^3 \times (5n^2)^2}{(10n^2)^3 \times (2n^3)^2}$

L♥VE INDEX LAWS?

WWW:
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EBI:
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REVISION CHECK

To remember this you need to review it at the following intervals:

◯ Same day   ◯ 1 day   ◯ 1 week   ◯ 1 month   ◯ 3 months