Week two-session 1

WALT multiplying numbers with exponents

Success criteria I know I can add powers when multiplying numbers with powers

Algebra In Action

Multiplying numbers with exponents

Warm-up activity DO Now use your calculator and say your answers

10 Use your calculator to evaluate the following. a 36 **b** 5⁷ **c** 4⁵

g 74 $f 10^3$

h 28 1 3.83

 $d 8^3$ i 64 e 98 11^{3}

k 1.64

m 4.5⁴

n 7.4²

0 6.23

Multiplying numbers with the same base

EXAMPLE 1

a Write the following in expanded form.

iii $3^2 \times 3^4$

b Write the answer for part iii in index form.

C Does $3^2 \times 3^4 = 3^{2+4}$?

a i $3^2 = 3 \times 3$

ii $3^4 = 3 \times 3 \times 3 \times 3$

iii $3^2 \times 3^4 = 3 \times 3 \times 3 \times 3 \times 3 \times 3$

b $3^2 \times 3^4$ in index form = 3^6 The base, 3, is repeated 6 times.

c Yes, $3^2 \times 3^4 = 3^{2+4} = 3^6$

Discuss and then work in your books

Exercise 4B

1 a Write the following in expanded form.

$$i 5^2 = _ \times _$$

iii
$$5^2 \times 5^7 =$$
 ___ \times ____ \times ___ \times ____ \times

b Write the answer to part iii in index form.

$$5^2 \times 5^7$$
 in index form = ____

c Does $5^2 \times 5^7 = 5^{2+7}$? Explain.

2 a Write the following in expanded form.

iii $7^3 \times 7^4$

b Write the answer to part iii in index form.

c Does $7^3 \times 7^4 = 7^{3+4}$?

3 a Write the following in expanded form.

ii 65

iii $6^3 \times 6^5$

b Write the answer to part iii in index form.

c Does $6^3 \times 6^5 = 6^{3+5}$?

4 a Write the following in expanded form.

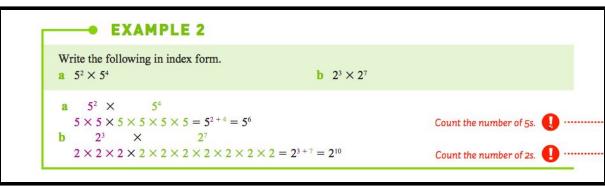
iii $10^6 \times 10^5$

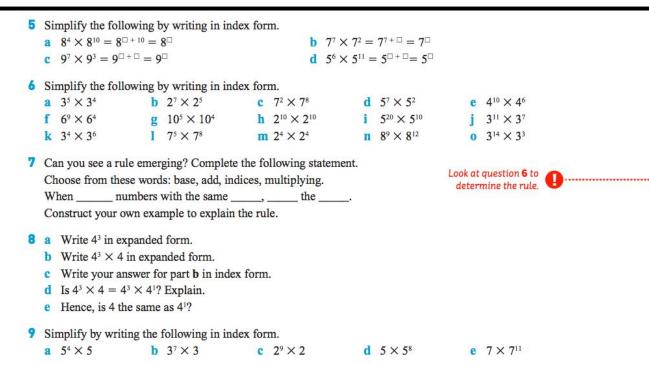
b Write the answer in part iii in index form.

c Does $10^6 \times 10^5 = 10^{6+5}$?

Check your answers

```
Exercise 4B
1 a i 5^2 = 5 \times 5
      ii 5^7 = 5 \times 5 \times 5 \times 5 \times 5 \times 5 \times 5
     b 5^2 \times 5^7 in index form = 5^9
   c Yes, 5 is being multiplied 9 (2 + 7) times.
2 a i 7×7×7
                                   ii 7 \times 7 \times 7 \times 7
     iii 7 \times 7 \times 7 \times 7 \times 7 \times 7 \times 7
   b 77
                                   c Yes
3 a i 6 \times 6 \times 6
                                  ii 6 \times 6 \times 6 \times 6 \times 6
      iii 6 \times 6
4 a i 10 \times 10 \times 10 \times 10 \times 10 \times 10
      ii 10 \times 10 \times 10 \times 10 \times 10
     b 1011
                                   c Yes
```





Check your answers

```
1 a i 5^2 = 5 \times 5
     ii 5^7 = 5 \times 5 \times 5 \times 5 \times 5 \times 5 \times 5
     b 5^2 \times 5^7 in index form = 5^9
  c Yes, 5 is being multiplied 9 (2 + 7) times.
2 a i 7×7×7
                              ii 7×7×7×7
    iii 7 \times 7 \times 7 \times 7 \times 7 \times 7 \times 7
  b 77
                              c Yes
                             ii 6 \times 6 \times 6 \times 6 \times 6
3 a i 6 \times 6 \times 6
    c Yes
  b 68
4 a i 10 \times 10 \times 10 \times 10 \times 10 \times 10
     ii 10 \times 10 \times 10 \times 10 \times 10
    b 1011
                              c Yes
5 a 8^4 \times 8^{10} = 8^{4+10} = 8^{14}
 b 7^7 \times 7^2 = 7^{7+2} = 7^9
  9^7 \times 9^3 = 9^{7+3} = 9^{10}
  \mathbf{d} \ 5^6 \times 5^{11} = 5^{6+11} = 5^{17}
6 a 39
               b 212
                              c 710
                                            d 59
  e 416
               f 613
                                             h 220
                              g 109
  i 530
               318
                             k 310
                                            713
  m 28
                n 821
                              0 317
```

```
7 Rule: When multiplying numbers with the same base, add the indices.
8 a 4 × 4 × 4
b 4 × 4 × 4 × 4
c 4<sup>4</sup>
d Yes, 4 is being multiplied 4 times.
e Yes
9 a 5<sup>5</sup>
b 3<sup>8</sup>
c 2<sup>10</sup>
d 5<sup>9</sup>
e 7<sup>12</sup>
```