Rules of Indices Worksheet www.m4ths.com Created by Steve Blades

GCSE C Grade (indices multiplication)
Complete the table below. The first one has been done for you!

$\times$	p	p^2	p^3	p^4	p^5	p^6
p	p^2					
p^2						
p^3						
p^4						
p^5						

GCSE C Grade (indices division)
Complete the table below. The first two been done for you! (Divide the top row by the column)

$\div$	p^6	p^5	p^4	p^3	p^2	p
p	p^5	p^4				
p^2						
p^3						
p^4						
p^5						

GCSE C/B Grade
Complete the table below. Be careful!

$\times$	p^6		p^4		p^9	
p						
p^2				p^4		p^5
p^3		p^4				
p^4						
p^5						

GCSE B Grade
Complete the table below. 3 have been done for you! (We now have integers involved)

$\times$	m	$2m^2$	$3m^5$	$6m^3$	$9m$	$4m^4$
$4m$	$4m^2$	$8m^3$				
$5m^2$						
$3m^8$			$9m^{13}$			
2						
$3m^5$						

GCSE B/A Grade
Complete the table below. 3 have been done for you! (This one is really tough!)

$\times$	$4m^2$	4			$3m^8$	$10m^3$
$4m$			$8m^3$			
$5m^2$						
$2m$						
2				$4m$		
$4m^3$						$40m^6$

Extension work (1)
Simplify the following expressions:

(1) $m^3 \times m^2 \times m^4$

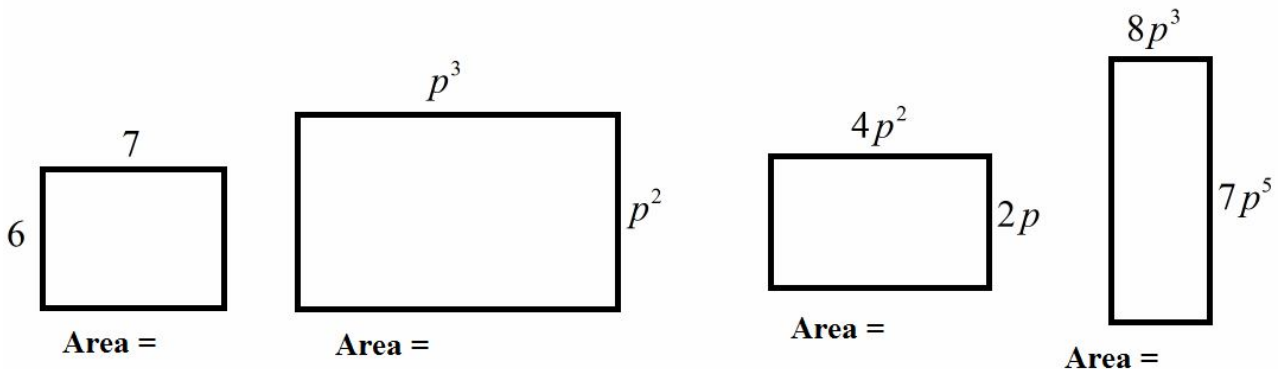(2) $m^3 \times 2m^2 \times 3m^4$

(3) $4m \times 3m^2 \times 3m^3$

(4) $8m \times 2m^2 \times m^{-1}$

(5) $m^3 \times m^5 \div m^2$

Extension work (2)
(1) Write down the formula to find the area of a rectangle
(2) Find expressions for the areas below

Investigation 1 (for the brave!)

Study the following patterns with powers (indices) in the table below.

Here are some powers of 2	Here are some powers of 3
$2^6 = 64$	$3^6 = 729$
$2^5 = 32$	$3^5 = 243$
$2^4 = 16$	$3^4 = 81$
$2^3 = 8$	$3^3 = 27$
$2^2 = 4$	$3^2 = 9$
$2^1 = 2$	$3^1 = 3$
$2^0 = ?$	$3^0 = ?$

What is happening to the power each time as they go from 6 to 0?
What is happening to the values each time?
Can you find the value of 2^0 and 3^0?
Can you find a general rule for the value of $a^0 = ?$

Investigation 2 (From nrich) (http://nrich.maths.org/847)

What can you say about the values of n that make $7^n + 3^n$ a multiple of 10?

Are there other pairs of integers between 1 and 10 which have similar properties?