6/5 Maths w/c 27th April 2020

2. Calculating Scale Factors

‘Scale Factor’ is the name we give to the number that we multiply by to enlarge a shape. For example, if we drew a shape that was three times bigger, we say it has a scale factor of 3 (because we multiplied by 3). A shape that is two times bigger has a scale factor of 2; a shape that is ten times bigger has a scale factor of 10.

Sometimes, we might have the two shapes – the original one and the larger one – and we might be asked to find the scale factor. This is same as asking ‘how many times bigger is the second shape?’

Follow this example to see how. Here are the two shapes.

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The first thing I do is to measure the length and width of both of my rectangles.

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|  | 1 | 2 | 3 | 4 |  |  |  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |  |  |
|   |  | 1 |  |  |  | 1 |  |
|  | 2 |  |  | 2 |  |
|  |  |  |  |  |  |  |  | 3 |  |
|  |  |  |  |  |  |  |  | 4 |  |
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I can record my answers in a table like the one below.

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| --- | --- | --- | --- |
|  | Small rectangle | scale factor | Large rectangle |
| Length | 4 | ? | 8 |
| Width | 2 | ? | 4 |

The missing number is how much I need to multiply the small rectangle measurement by to get the large rectangle.

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| --- | --- | --- | --- |
|  | Small rectangle | scale factor | Large rectangle |
| Length | 4 | x2 | 8 |
| Width | 2 | x2 | 4 |

*Both scale factor numbers should be the same. If they aren’t, there’s probably a mistake somewhere.*

If you are struggling to work out the scale factor, remember to use divide to ‘undo’ the multiply like this: large rectangle $÷$ small rectangle = scale factor (in our example that is

8 $÷$ 4 = 2

4 $÷$ 2 = 2

For our example, we can say that “the large rectangle is two times as big as the small shape” and “the small shape was enlarged by a scale factor of 2 to make the big shape.”

Now you try with the next example.

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|   | A |  |  |  |  | B |  |  |  |  |  |
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Follow the steps:

a) count the squares the measure the length and width of both rectangles.

b) Put your measurements in the table below.

c) Work out the scale factor number. Use times tables or divide to help.

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| --- | --- | --- | --- |
|  | A | scale factor | B |
| Length |  |  |  |
| Width |  |  |  |

Now complete these sentences:

Shape B is \_\_\_\_\_ times bigger than Shape A.

Shape A has been enlarged by a scale factor of \_\_\_\_\_ to make Shape B.

Practice some more on these three examples.

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|   | C |  |  |  |  |  |  |  |  |  |  |  |  |
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|  | C | scale factor | D |
| length |  |  |  |
| width |  |  |  |

Shape D is \_\_\_\_\_ times bigger than Shape C.

Shape C has been enlarged by a scale factor of \_\_\_\_\_ to make Shape D.

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|   | E |  |  | F |  |  |  |  |  |
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| --- | --- | --- | --- |
|  | E | scale factor | F |
| length |  |  |  |
| width |  |  |  |

Shape F is \_\_\_\_\_ times bigger than Shape E.

Shape E has been enlarged by a scale factor of \_\_\_\_\_ to make Shape F.

3.

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|   | G |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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|  | G | scale factor | H |
| length |  |  |  |
| width |  |  |  |

Shape H is \_\_\_\_\_ times bigger than Shape G.

Shape G has been enlarged by a scale factor of \_\_\_\_\_ to make Shape H.