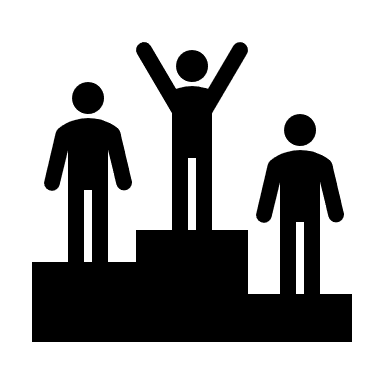
**Skill Sheet: Tessellation**

***What You Need to Know:***

Tessellation means arranging shapes on a surface so that they fit closely together in a repeated pattern. There should be no overlapping and any gaps should be as small as possible. This makes sure that the maximum number of shapes can be cut from a piece of material and minimises the amount of material that is wasted.



***Examiners***

***Top Tip***

*Don’t just put shapes next to each other – remember that they can be rotated*

You might be asked to arrange a shape on a piece of material and to calculate the amount of material that is waste.

***Example:***

**Figure 1 – NOT TO SCALE**

A company needs to cut the shape shown in figure 1 from a sheet of material that is 1.5 m wide and 1.0 m long.

0.4 m

1. Sketch how the shapes could be laid out on the material to minimise waste.

45o

0.3 m

1. Determine the number of shapes that can be cut from each sheet.

0.6 m

***Answer:***

2. 10 shapes could be cut from the sheet

***Now Try These:***

1. A company needs to cut out as many copies as possible of the shape shown in figure 2.

50 cm

**Figure 2 – NOT TO SCALE**

They have a sheet of material 2m x 4 m represented by the rectangle below. Sketch how you would lay out the shapes to minimise waste.

100 cm

50 cm

4 m

2 m

150 cm

**Practice Sheet: Tessellation**

***Now Try These:***

**Figure 1 – NOT TO SCALE, dimensions in mm**

1. A company needs to cut out the shapes in figure 1 from a sheet of material that is 1.1 m x 1.3 m.

450

150

500

150

150

200

350

350

1. Sketch how you would lay out the shapes to minimise waste.

The grid below represents 100 mm squares.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |

1. Determine the maximum number of shapes that could be cut from the sheet.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Calculate the percentage of material that is waste (not used for the shapes).

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Answers:**

**Skill Sheet: Tessellation**



**Practice Sheet: Tessellation**

1. a) (The image below is rotated by 90o)

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |

1. Maximum number of shapes = 8
2. Area of the sheet = 1.1 x 1.3 = 1.43 m2

Area not used = (by measurement) 23 x 0.01 = 0.23 m2

*(Alternative method calculating the area of one shape, multiplying this by the maximum number of shapes, then subtracting from the area of the sheet could be used to calculate the area not used).*

% area not used = 0.23 / 1.43 x 100/1 = 16.1 %