



### Plotting an equal angle:

**3** Plot  $\angle QRP$  that is equal to the given  $\angle AOB$ :

Plotting  $\angle QRP$  that is equal to the given  $\angle AOB$

// Plotting auxiliary equal circles

1. Plot  $v = \text{Circ}(O, x)$

2. Plot  $w = \text{Circ}(R, x)$

// Finding connecting arc

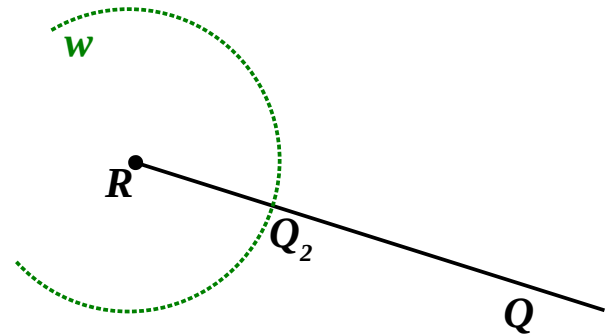
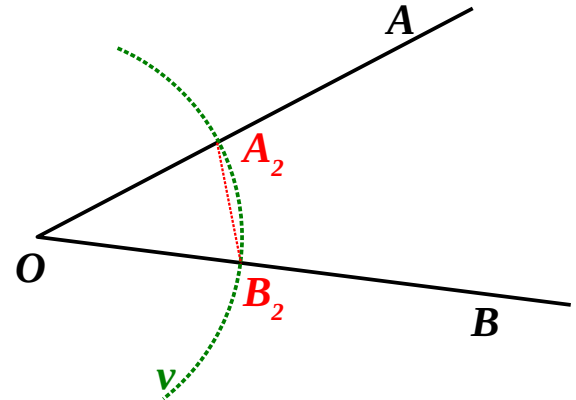
3. Find  $A_2 = v \cap [OA]$

4. Find  $B_2 = v \cap [OB]$

// Plotting an equal arc

5. Plot  $q = \text{Circ}(Q_1, |A_2B_2|)$

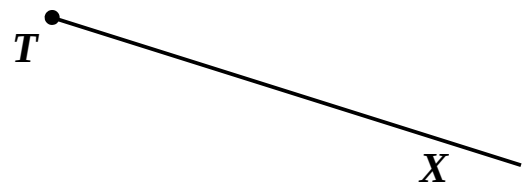
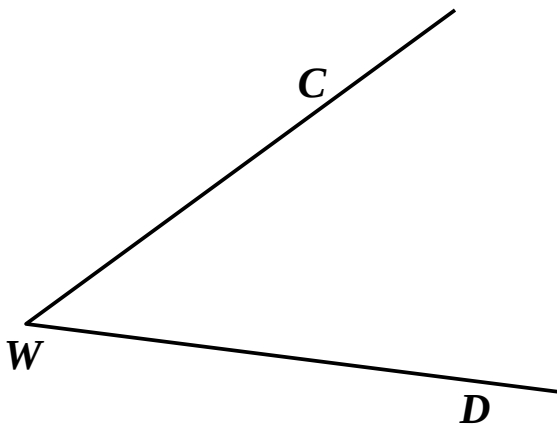
6. Find  $P \in w \cap q$

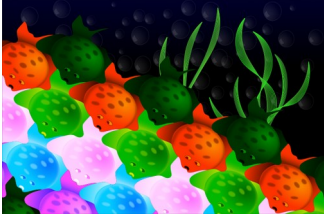


Equal angles cut equal arcs from equal circles with centers at the vertexes of these angles

Equal arcs are connected by equal chords

**4** Plot  $\angle XTZ = \angle CWD$

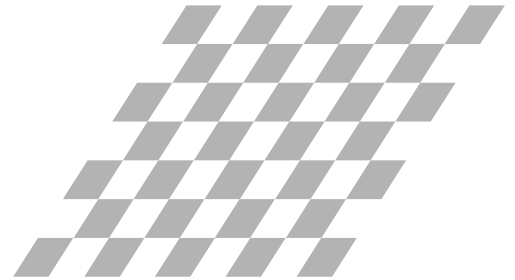
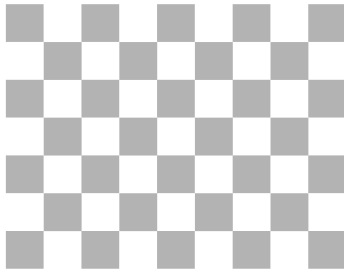




## Tessellations:

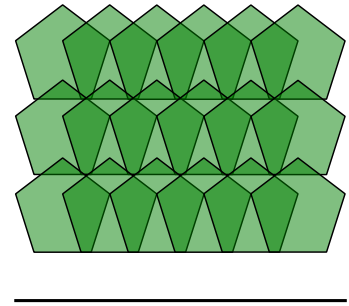
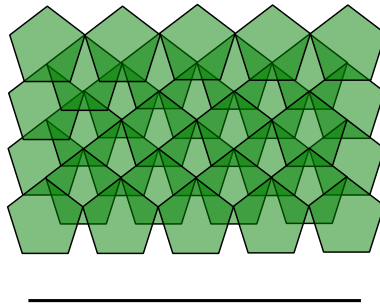
A coverage of a plane by identical shapes without overlaps is called a tessellation.

**For example**, a plane may be paved by squares or any parallelograms.



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These tessellations look like they are made of pentagons; but these pentagons overlap. Which elements are actually used to make these tessellations?

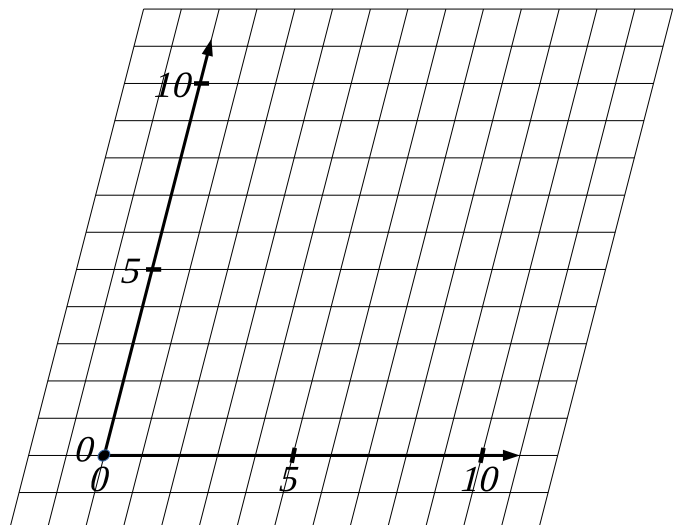
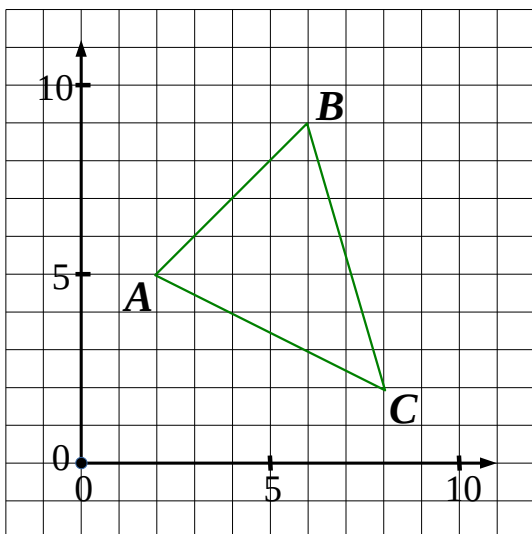


## Coordinates are tessellations.

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Redraw  $\triangle ABC$  in the “tilted” coordinates made of parallelograms:

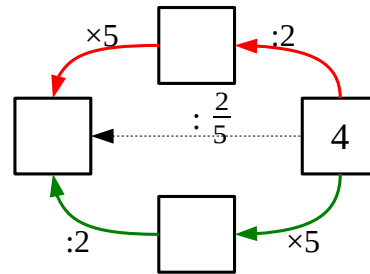
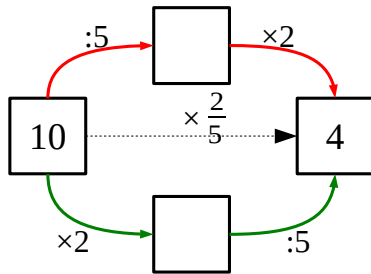
The  $\frac{1}{2}$  cm squares in your notebook are tessellations



## Dividing by a random fraction $\frac{m}{n}$ .

By definition dividing  $S$  by  $a$  means finding such  $b$  that:

$$S : a \stackrel{\text{def}}{=} b \iff b \times a = S$$

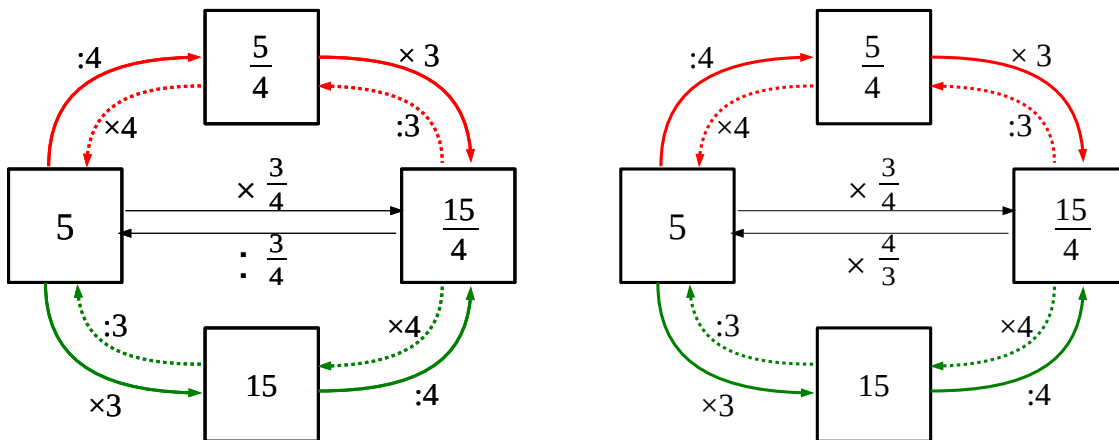


$$10 \times \frac{2}{5} = 10 : \square \times \square = 4$$

$$10 \times \frac{2}{5} = 10 \times \square : \square = 4$$

$$\text{Therefore: } 4 : \frac{2}{5} \stackrel{\text{def}}{=} 10$$

In order to find the quotient we need to undo the operations performed upon multiplication by a fraction!



Dividing a number by a fraction  $\frac{m}{n}$  is equivalent to multiplying this number by the inverse fraction  $\frac{n}{m}$ .

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Calculate:

$$3 : \frac{2}{3} = 3 \times \frac{\square}{\square} =$$

$$4 : \frac{2}{5} = 4 \times \frac{\square}{\square} =$$

$$5 : \frac{3}{4} = 5 \times \frac{\square}{\square} =$$

$$3 : \frac{1}{3} = 3 \times \frac{\square}{\square} =$$

$$7 : \frac{3}{5} = 7 \times \frac{\square}{\square} =$$

$$4 : \frac{3}{4} = 4 \times \frac{\square}{\square} =$$

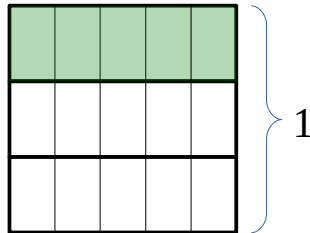
**Equivalent fractions.**

Any fraction  $\frac{m}{n}$  may be expressed with a multiple denominator and a corresponding factor:  $\frac{m}{n} = \frac{2 \times m}{2 \times n} = \frac{3 \times m}{3 \times n} = \frac{k \times m}{k \times n}$

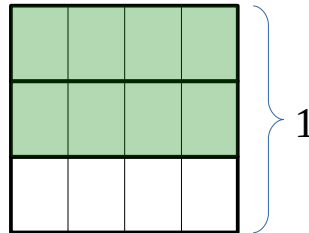
Similarly, certain fractions may be simplified

$$\frac{k \times m}{k \times n} = \frac{m}{n}$$

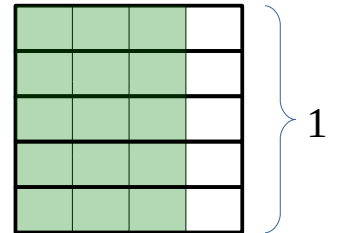
$$\frac{1}{3} = \frac{5}{15}$$



$$\frac{2}{3} = \frac{8}{12}$$



$$\frac{3}{4} = \frac{15}{20}$$



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Transform the fractions into equivalent ones by changing their denominators and factors appropriately. Some examples are impossible to do. Cross them out.

$$\frac{3}{4} = \frac{\square}{12}$$

$$\frac{2}{7} = \frac{\square}{21}$$

$$\frac{3}{9} = \frac{\square}{3}$$

$$\frac{\square}{6} = \frac{4}{12}$$

$$\frac{\square}{9} = \frac{7}{26}$$

$$\frac{12}{8} = \frac{3}{\square}$$