



## Problem of the Week

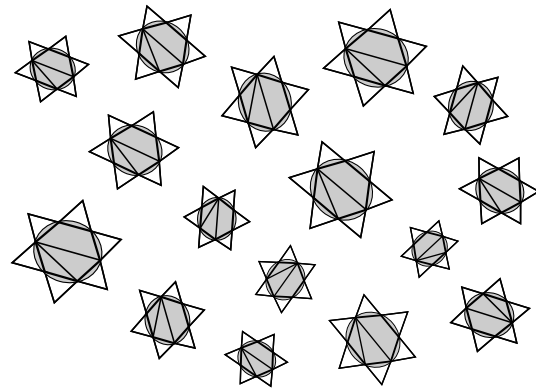
### Problem B and Solution

### Something's Missing...

#### Problem

The figures in the diagram below are similar. They each contain a circle and some straight lines.

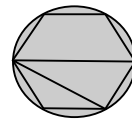
- a) Suppose new figures are created by removing all straight lines which lie outside the circle from 75% of the figures.
- (i) Draw a diagram showing what one of the new figures would look like.
  - (ii) How many new figures are created?
  - (iii) How many of the original figures remain unchanged?



- b) Now suppose that the circle is removed from  $\frac{2}{3}$  of the new figures created in part a).
- (i) How many of the new figures from part a) will still contain a circle?
  - (ii) Draw a diagram of one of the new figures with the circle removed. Then name all the geometric shapes formed by the straight lines in this figure.

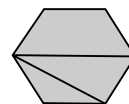
#### Solution

- a) (i) A typical new figure would look like this:



- (ii) There are 16 figures in total. Since  $75\% = \frac{75}{100} = \frac{3}{4} = \frac{12}{16}$ , that tells us 12 new figures were created.
- (iii) There are 16 figures in total and 12 of them were changed. So  $16 - 12 = 4$  of the original figures remain unchanged.
- b) (i) There were 12 new figures created in part a). Since  $\frac{2}{3} = \frac{8}{12}$ , that tells us 8 of the figures have no circle, so  $12 - 8 = 4$  will still have a circle.

- (ii) A typical new figure would look like this:



It contains a pentagon, a hexagon, two trapezoids, and two triangles, as shown below.

