Stage 3 ★
Mixed Selection 1 – Solutions

1. 3x3 areas
All but D have an area of 3 square units. D has an an area half a unit less than the other shapes.

2. Mid-point area
M is the midpoint of the side of the rectangle, so RM has length 2 units.

$$\text{Area of triangle PRM} = \frac{1}{2} \times \text{base} \times \text{height}$$
$$= \frac{1}{2} \times 2 \text{ units} \times 3 \text{units}$$
$$= 3 \text{ square units}$$

3. Rectangle cutting
Tom and Jerry must each cut their piece of paper in half. Suppose the sides of the original piece of paper have length $2x$ and $2y$, with $x \geq y$.
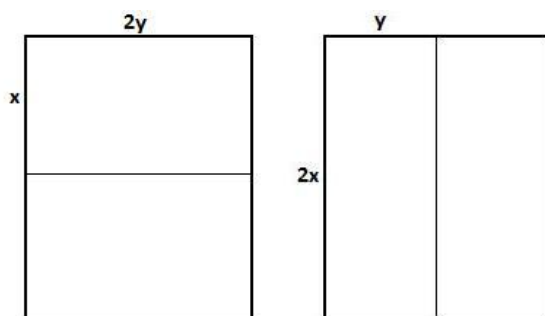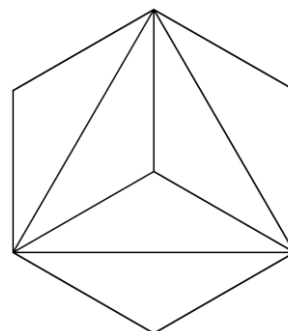

Then $2x + 4y = 40$ and $4x + 2y = 50$ which implies that $6x + 6y = 90$, therefore the perimeter of the original piece, $4x + 4y = 60$.

4. Hexa-split
All the areas of the three figures are equal (X = Y = Z).

The shaded area in Y is clearly half the area of the hexagon and the diagram below demonstrates why the shaded areas in X and Z are also both equal to half the area of the hexagon.

These problems are adapted from UKMT Mathematical Challenge problems (ukmt.org.uk)