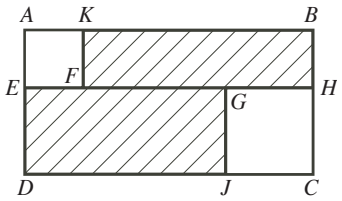
# Problem of the Week
## Grade 7 to 8

## Shady Rectangles
## Solution

### Problem

A rectangle $ABCD$ has a square $AEFK$ of area 4 cm$^2$ and a square $GHCJ$ of area 9 cm$^2$ removed. If $EFGH$ is a straight line segment and $FG = 5$ cm, determine the total area of the two shaded rectangles.




### Solution

Since square $AEFK$ has area 4 cm$^2$, its side lengths must be $AE = EF = 2$ cm. Since square $GHCJ$ has area 9 cm$^2$, its side lengths must be $JC = CH = 3$ cm.

Since line segment $AKB$ passes through the top of square $AEFK$ and line segment $EFGH$ passes through the bottom of the same square, $AKB \parallel EFGH$ and it follows that $AB = EH$. Therefore, $AB = EH = EF + FG + GH = 2 + 5 + 3 = 10$ cm.

Also, $EDJG$ is a rectangle so $ED = GJ = HC = 3$ cm. Then $AD = AE + ED = 2 + 3 = 5$ cm.

The area of the shaded rectangles can be calculated by finding the total area of rectangle $ABCD$ and subtracting the area of the two squares that have been removed.

$$\begin{aligned} \text{Area of Shaded Rectangles} &= \text{Area } ABCD - \text{Area } AEFK - \text{Area } GHCJ \\ &= AB \times AD - 4 - 9 \\ &= 10 \times 5 - 13 \\ &= 37 \text{ cm}^2 \end{aligned}$$

**$\therefore$ the shaded area is 37 cm$^2$.**

It should be noted that we could also find the areas of each of the rectangles $EDJG$ and $KFHB$ and then determine the sum of the areas achieving the same result.