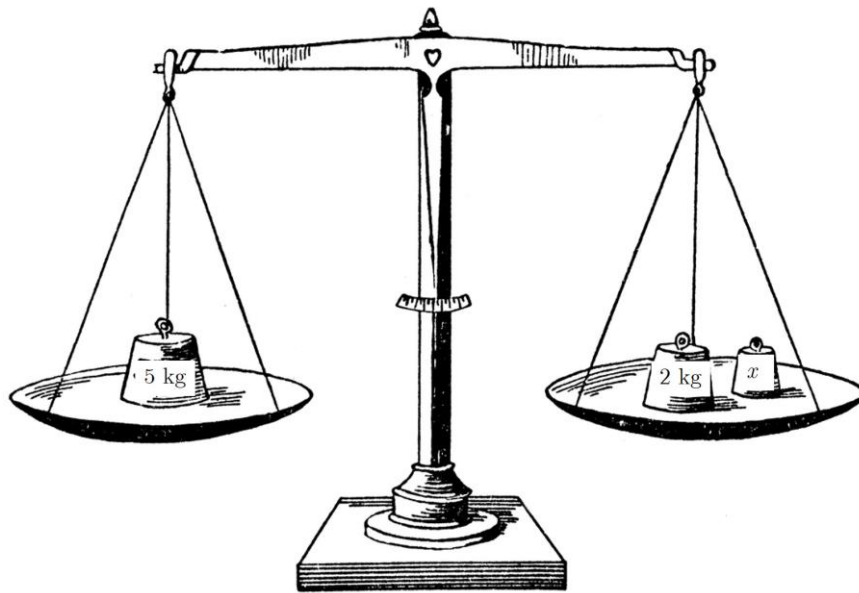1. Construct an equation that describes mathematically the relationship between the weights on the scales shown in figure below. You do not need to solve the equation.

2. Two sandwiches priced at s each and three Cola cans priced at c each together cost €11. Which of the following statements are correct?

(a) $3c = 11 - 2s$ (b) $3c + 2s = 11$ (c) $s + c = 11$ (d) $11 = 2s + 3c$

3. Two plots of land, of circular and rectangular shapes, have equal areas.
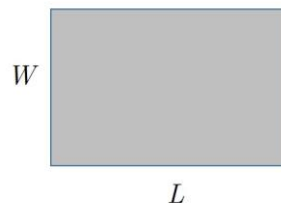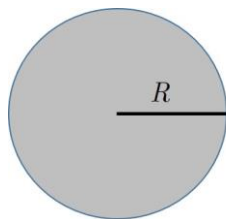
Is the following statement true or false?

$$L = \frac{\pi R^2}{W}$$

(a) True   (b) False

4. Apples and pears are used to balance the scales shown below.

If a is the weight of an apple and p is the weight of a pear, which of the following statements are correct?

(a) $10a = 2a + 6p$ (b) $3p = 4a$ (c) $5a = 3p$ (d) $a + 3p = 5a$

5.   Given that $3x = 5$ explain briefly why each of the following three statements is correct.

$3x + 🍎 = 5 + 🍎$

$9x^2 = 25$

$5 \cdot 🍐 = 3x \cdot 🍐$

6. A student was solving a practical problem of finding a stopping distance of a car. The student was given the following formula from physics: $v^2 = u^2 + 2as$ where s is the distance travelled, u is the initial velocity, v is the final velocity and a is the acceleration. The student's work is shown below where their answer is clearly wrong as they found the stopping distance to be negative.

(a) Circle the part of the solution where the mistake is made.

(b) Use the box below to explain briefly why it is wrong.

$$v^2 = u^2 + 2as$$

$$\frac{v^2}{2a} = u^2 + s$$

$$s = \frac{v^2}{2a} - u^2$$

Given :

$$u = 25\ \tfrac{m}{s}; \quad v = 10\ \tfrac{m}{s}; \quad a = -2.5\ \tfrac{m}{s^2}$$

$$s = \frac{10^2}{2 \cdot (-2.5)} - 25^2 = -645\, m \quad ???$$

7. In an exam students had to re-arrange (transpose) the following formula to express r which represents the thickness of an engineering part:

$$p = \frac{r^2 + q^2}{L}$$

Below are two solutions by two students. One of these solutions is incorrect.

(a) Identify the incorrect solution.

(b) Circle the part of the incorrect solution where the mistake is made.

(c) Use the box below to explain briefly why it is wrong.

$$p = \frac{r^2 + q^2}{L}$$

$$pL = r^2 + q^2$$

$$pL - q^2 = r^2$$

$$r = \sqrt{pL - q^2}$$

$$p = \frac{r^2 + q^2}{L}$$

$$pL = r^2 + q^2$$

$$\sqrt{pL} = r + q$$

$$r = \sqrt{pL} - q$$