



## Problem of the Week

### Grade 7 and 8

### Pesky Products

### Solution

#### Problem

Three positive numbers exist such that the following is true: the product of the first and second numbers equals the third number; the product of the second and third numbers is 180; and the second number is five times the third number. Determine the product of the three numbers.

#### Solution

Let the three numbers be represented by  $a$ ,  $b$ , and  $c$ .

Since the product of the first and second numbers equals the third number,  $a \times b = c$ . We are looking for  $a \times b \times c = (a \times b) \times c = (c) \times c = c^2$ . So when we find  $c^2$  we have found the required product  $a \times b \times c$ .

We know that  $b \times c = 180$  and  $b = 5 \times c$  so  $b \times c = 180$  becomes  $(5 \times c) \times c = 180$  or  $5 \times c^2 = 180$ . Dividing by 5, we obtain  $c^2 = 36$ . This is exactly what we are looking for since  $a \times b \times c = c^2$ .

Therefore, the product of the three numbers is 36.

For those who need to know what the actual numbers are, we can proceed and find the three numbers. We know  $c^2 = 36$ , so  $c = 6$  since  $c$  is a positive number. So  $b = 5 \times c = 5 \times (6) = 30$ . And finally,  $a \times b = c$  so  $a \times (30) = 6$ . Dividing by 30, we get  $a = \frac{6}{30} = \frac{1}{5} = 0.2$ . We can verify the product  $a \times b \times c = (0.2) \times (30) \times (6) = 6 \times 6 = 36$ .

