

Name:

Group 1

Result:

1. Find the possible values of  $k$  for which the equation

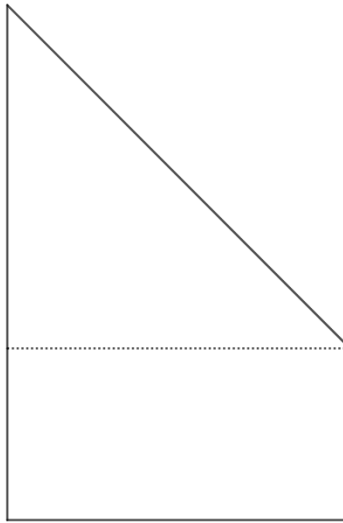
*(5 points)*

$$x^2 + (k - 3)x + k = 0$$

has two positive real solutions.

**2.** A guesthouse has 60 rooms. It charges 320 PLN per room per day. At this price all rooms are rented. Research shows that an increase in price by 20 PLN per room per day decreases the number of rooms rented by 3. Find the price per room per day that maximizes the income of the guesthouse. *(4 points)*

3. A window has a shape of a isosceles right triangle on top of a rectangle as shown on the diagram below: *(5 points)*



The perimeter is equal to 6 metres. Let  $x$  be the width of the window.

- (a) Find the function of the area of the window in terms of  $x$ .
- (b) Write down the domain of the function from part (a).
- (c) Find the value of  $x$  that maximizes the area of the window.