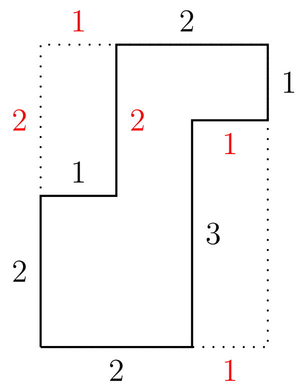
Third Quiz

The Answers

1. Find the perimeter and the area of the following polygon, where all angles are right angles.

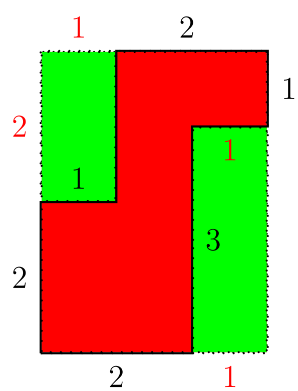
   Solution. We complete the shape into a rectangle and calculate the missing lengths (shown in red)



We now can calculate the perimeter by adding all the sides:

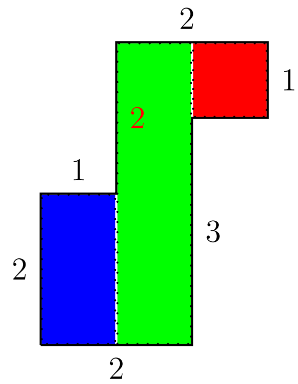
$P = 1 + 2 + 2 + 1 + 1 + 3 + 2 + 2 =$ 14 in

We can find the area in two ways. In the first way we calculate the area of the big rectangle and subtract the area of the two missing pieces:



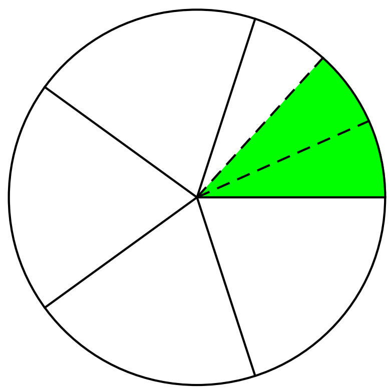
The big rectangle has area $3 \times 4 = 12$ in^2, the top left missing piece has area $2 \times 1 = 2$ in^2, and the bottom right has area $3 \times 1 = 3$ in^2. So the two missing pieces together have area $3 + 2 = 5$ in^2. Our polygon therefore encloses area of $12 - 5 =$ 7 in^2.

The other way of calculating the area is to cut our polygon into shapes that we can calculate their area and then add up the areas of the pieces. This can be done in many ways. We show one bellow:



The red square has area $1 \times 1 = 1$ in^2, the green has area $4 \times 1 = 4$ in^2, and the blue has area $2 \times 1 = 2$ in^2. So the total area is $1 + 4 + 2 = 7$ in^2. □

2. What fraction of the circle is shaded?



Solution. The circle has been divided into 5 equal pieces and then one of those pieces (that is one fifth of the circle) has been divided into 3 equal pieces and two of those smaller pieces have been shaded. So the shaded area consists of two thirds of one fifth of the circle. This is the fraction:

$$\frac{2}{3} \times \frac{1}{5} = \frac{2}{15}$$

□

3. Convert the following fractions to mixed numbers:
   (a) $\frac{13}{6} = 2\frac{1}{6}$
   (b) $\frac{25}{7} = 3\frac{4}{7}$
   (c) $\frac{105}{9} = 11\frac{6}{9}$

4. Convert the following mixed numbers to fraction:

   (a) $3\frac{3}{8} = \frac{27}{8}$

   (b) $2\frac{3}{5} = \frac{13}{5}$

   (c) $1\frac{21}{35} = \frac{56}{35}$