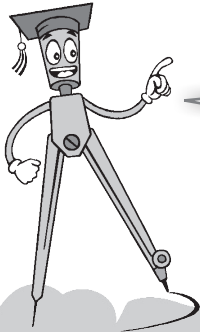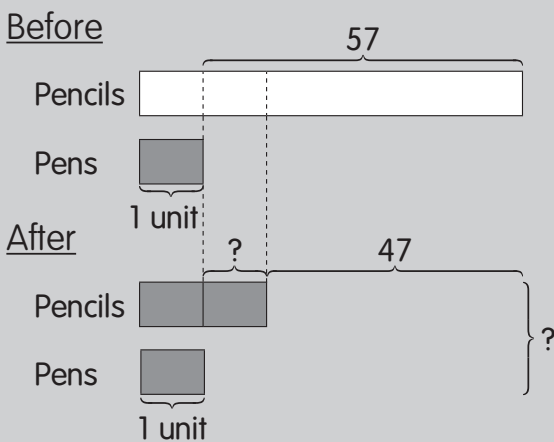# Worked Example 3

Sally had 57 more pencils than pens. After she gave away 47 pencils, she had twice as many pencils as pens. How many pens and pencils did she have left altogether?
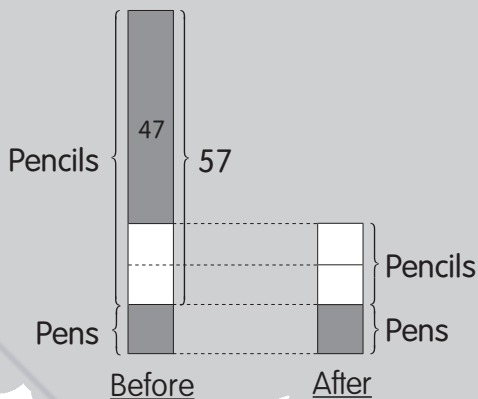
Before

Pencils

57

Pens

1 unit

After

?

47

Pencils

Pens

1 unit

?

Method 1

1 unit = 57 − 47 = 10

3 units = 3 × 10 = 30

Sally had **30** pens and pencils left altogether.

Pencils

47

57

Pens

Pencils

Pens

Before

After

Method 2

1 unit = 57 − 47 = 10

3 units = 3 × 10 = 30

Sally had **30** pens and pencils left altogether.

Answer all questions. Show your work and write your statements clearly.

1. The sum of P and Q is 1,023 greater than Q. The sum of P and Q is 549 greater than P.
   (a) What is the value of P?
   (b) What is the value of Q?
   (c) What is the sum of P and Q?

   Hint: Draw a diagram to visualize each situation.

2. Laval is 18 years older than Chris. How old will Chris be when Laval is three times as old as Chris?

   Hint: The age difference between Laval and Chris remains unchanged.

Challenging Problems

Worked Example 1

Bus service 28 leaves the terminal every 10 minutes.
Bus service 111 leaves the same terminal every 15 minutes.
On Sunday, both bus services leave the terminal at 9:00 A.M.
When will both bus services next leave the terminal together?

Method 1

Time of departure	
Bus service 28	**Bus service 111**
9:00 A.M.	9:00 A.M.
9:10 A.M.	9:15 A.M.
9:20 A.M.	9:30 A.M.
9:30 A.M.	9:45 A.M.

Both bus services will next leave the terminal together at **9:30 A.M.**

Method 2

| Bus 28 leaves after	Bus 111 leaves after
10 min	15 min
20 min	**30 min**
30 min	45 min

9:00 A.M. $\xrightarrow{\text{+ 30 min}}$ 9:30 A.M.

Both bus services will next leave the terminal together at **9:30 A.M.**

6. The following table shows the mass of some students measured to the nearest kilogram.

40	43	45	35	42	43
45	50	37	38	41	39
41	49	32	40	43	43

(a) Draw a line plot to show the data.
(b) How many of the students were between 38 kg and 42 kg?
(c) How many students were heavier than 40 kg?
(d) How many students were lighter than 38 kg?
(e) What was the most common mass?

7. Mr. Yan gave a math quiz to a group of 14 students. He drew this line plot to show which questions the students got wrong most often.

Question number
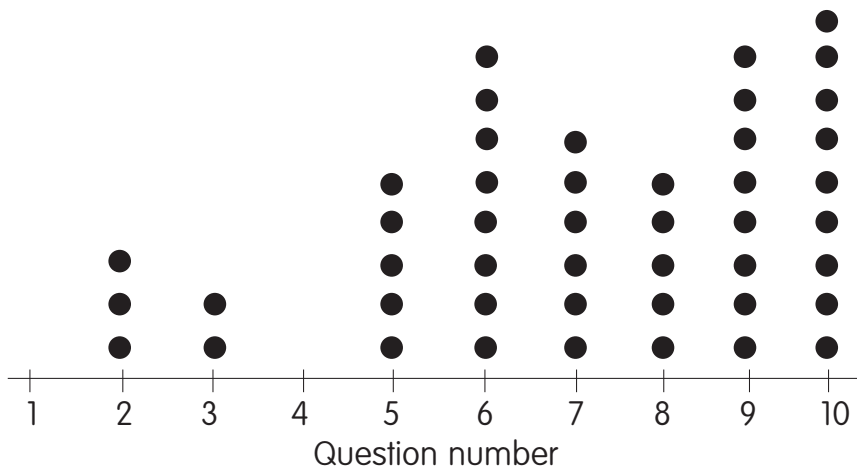
(a) How many questions were on the quiz?
(b) Which questions did all students answer correctly?
(c) Which question was the most difficult for most students?
(d) What fraction of the students got question 9 wrong?
(e) What fraction of the students got question 7 correct?

5. Answers vary. Two examples are:
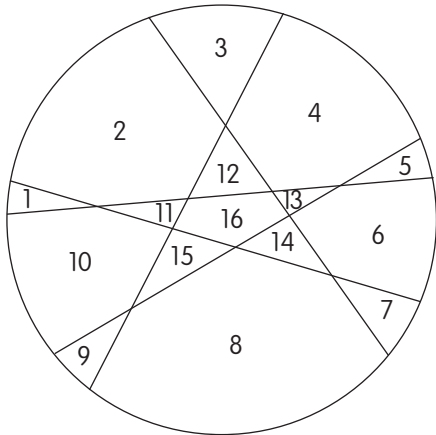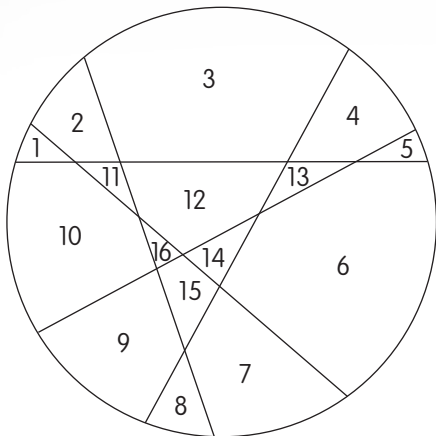
The most number of pieces is **16**.

6. (a) Left circle: $\frac{1}{8} + \frac{1}{8}$

    Right circle: $\frac{1}{4}$

    $\frac{1}{8} + \frac{1}{8} = \frac{1}{4}$

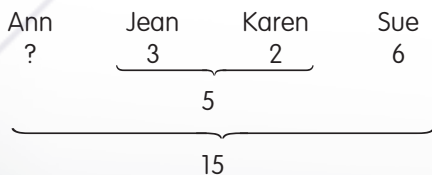 $\frac{1}{8} = \frac{1}{4} - \frac{1}{\mathbf{4}}$

    (b) Left circle: $\frac{3}{6} = \frac{1}{6} + \frac{1}{6} + \frac{1}{6}$

    Right circle: $\frac{1}{2}$

    $\frac{1}{6} + \frac{1}{6} + \frac{1}{6} = \frac{1}{2}$

    $\frac{1}{6} + \frac{1}{6} = \frac{1}{2} - \frac{1}{\mathbf{6}}$

7.

Ann	Jean	Karen	Sue
?	3	2	6

5

15

? + 5 + 6 = 15
? + 11 = 15
? = 15 − 11 = 4
Ann borrowed **4** books.

8. Suppose Lisa bought 11 erasers.
    Then the total cost would be 11 × 40¢ = 440¢.
    The extra 500¢ − 440¢ = 60¢ must have come from the pens.
    A pen costs 50¢ − 40¢ = 10¢ more than an eraser.
    60¢ ÷ 10¢ = 6 pens and 11 − 6 = 5 erasers.
    (a) She bought **5** erasers.
        6 × 50¢ = 300¢ = $3.00.
    (b) The total cost of the pens is **$3.00**.

9. Observe that the length of one rectangle is 4 times its width.
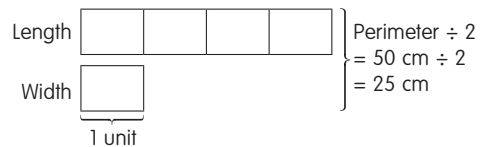
    5 units = 25 cm
    1 unit = 25 cm ÷ 5 = 5 cm
    4 units = 4 × 5 cm = 20 cm
    Length of one rectangle = 20 cm
    Length of square = Length of rectangle
                     = 20 cm
    The length of the square is **20 cm**.

10. If all 13 children drank 3 cups each, then they would consume 13 × 3 = 39 cups.
    The extra 46 − 39 = 7 cups must have come from the boys, who each drank 4 cups each.
    Each boy drank 4 − 3 = 1 more cup than each girl.
    7 ÷ 1 = 7 boys and 13 − 7 = 6 girls.
    There were **7** boys and **6** girls.

11. Length of the original wire
    = Sum of the two perimeters
    = (5 cm + 9 cm + 5 cm + 9 cm) + (10 cm + 6 cm + 10 cm + 6 cm)
    = 28 cm + 32 cm
    = 60 cm
    The length of the original wire is **60 cm**.

12. There are **16** right angles in the figure.