

Problem 1

Answer: 3

There are three decision variables, x_1 , x_2 and x_3 . The variable x_i corresponds to the number of pig valves purchased from the i -th supplier.

Problem 2

Answer: $0.4x_1 + 0.3x_2 + 0.2x_3 \geq 500$

In total, x_1 valves are purchased from supplier 1. In this case, the number of large valves is 40% of the total. Then $0.4x_1$ large valves are purchased from supplier 1. A similar argument allows us to conclude that

▷ $0.3x_2$ large valves are purchased from supplier 2, and

▷ $0.2x_3$ large valves are purchased from supplier 3.

Therefore, the total number of large valves can be expressed as $0.4x_1 + 0.3x_2 + 0.2x_3$. At least 500 such valves need to be purchased every month. Hence the following must hold:

$$0.4x_1 + 0.3x_2 + 0.2x_3 \geq 500. \quad (1)$$

Problem 3

Answer: $0.4x_1 + 0.35x_2 + 0.2x_3 \geq 300$

In total, x_1 valves are purchased from supplier 1. In this case, the number of medium valves is 40% of the total. Then $0.4x_1$ medium valves are purchased from supplier 1. A similar argument allows us to conclude that

▷ $0.35x_2$ medium valves are purchased from supplier 2, and

▷ $0.2x_3$ medium valves are purchased from supplier 3.

Therefore, the total number of medium valves can be expressed as $0.4x_1 + 0.35x_2 + 0.2x_3$. At least 300 such valves need to be purchased every month. Hence the following must hold:

$$0.4x_1 + 0.35x_2 + 0.2x_3 \geq 300. \quad (2)$$

Problem 4

Answer: $0.2x_1 + 0.35x_2 + 0.6x_3 \geq 300$

In total, x_1 valves are purchased from supplier 1. In this case, the number of small valves is 20% of the total. Then $0.2x_1$ small valves are purchased from supplier 1. A similar argument allows us to conclude that

▷ $0.35x_2$ small valves are purchased from supplier 2, and

▷ $0.6x_3$ small valves are purchased from supplier 3.

Therefore, the total number of small valves can be expressed as $0.2x_1 + 0.35x_2 + 0.6x_3$. At least 300 such valves need to be purchased every month. Hence the following must hold:

$$0.2x_1 + 0.35x_2 + 0.6x_3 \geq 300. \quad (3)$$

Problem 5

Answer: Decision variables

Problem 6

Answer: Objective function coefficients

Problem 7

Answer: Constraint function coefficients

Problem 8

Answer: SUMPRODUCT(\$B\$4:\$D\$4,B10:D10)

Problem 9

Answer: All of the above

Problem 10

Answer: \$6450