

# The Theatre Problem

Mr Thorpe was opening a new theatre in Northampton. The theatre was 43m long and 27m wide.

The stage was as wide as the theatre and had a total area of 324 metres squared.

The orchestra pit was also as wide as the theatre and had a total area of 81 metres squared.

Mr Thorpe needs to know how many seats he can fit in the remaining space. Each seat is 50cm long and 50cm wide. There must also be 50cm of space between each row as legroom.

**Question 1: How many rows of seats can Mr Thorpe have in his theatre?**

Because of fire safety regulations, there must be an aisle running down the middle of the theatre. This aisle is 3m wide. There must also be an aisle on each side. These are 1m wide.

**Question 2: How many seats can Mr Thorpe have in each row?**

**Question 3: How many seats can Mr Thorpe have in the whole theatre?**

Mr Thorpe decides to charge £30 per seat in the first 6 rows, £20 per seat in the next 6 rows and £10 per seat in all the other rows.

**Question 4: How much money will Mr Thorpe make from each performance if the theatre is sold out?**



Mr Thorpe has the following expenses when putting on a performance:

Expense	Cost for each performance
Actor's salaries	£8321.17
Musician's salaries	£1437.85
Lighting	£1652.79
Sound	£1528.92
Costumes	£3832.45
Theatre rent	£1000.00
Publicity (posters, adverts etc.)	£3326.73

**Question 5: What is the total of expenses for each performance?**

**Question 6: Does Mr Thorpe make a profit or a loss on each performance?  
How much does he gain/lose?**

Mr Thorpe needs to adjust ticket prices to make more money. He can only alter the top price tickets.

**Question 7: What is the minimum ticket price he must charge on a top price ticket to make a profit of at least £500 per show? You may use calculators for this question.**



