# Test - Quadratic equations and graphs

Year: Year 10 · Duration: 45 minutes · /20

| Name: | Date: | **Mark: /20** |
|---|---|---|

| Question | 1 | 2 | 3 | 4 | 5 | Total |
|---|---|---|---|---|---|---|
| marks | 4 | 4 | 4 | 4 | 4 | **20** |
| Mark | | | | | | |

Show your working.

## Question 1 (4 marks)

**Question 1 – Solving by factorising**

Non-calculator.

a. Solve $x^2 - 3x - 10 = 0$. (2 marks)
b. Solve $x^2 + 4x = 21$. (2 marks)

## Question 2 (4 marks)

**Question 2 – Graph features**

Calculator allowed. The curve $y = x^2 - 4x - 5$ is drawn for $-2 \leq x \leq 6$.

a. Find the coordinates of the points where the curve crosses the axes. (2 marks)
b. Find the equation of the line of symmetry and the coordinates of the turning point. (2 marks)

## Question 3 (4 marks)

**Question 3 – Problem: the rocket**

A toy rocket is launched. Its height $h$ metres after $t$ seconds is $h = 30t - 5t^2$.

a. Work out the height after 2 seconds. (1 mark)
b. Show that the rocket lands after 6 seconds. (2 marks)
c. Find the maximum height. (1 mark)

## Question 4 (4 marks)

**Question 4 – Problem: the rectangle**

A rectangle has width $x$ cm and length $(x + 6)$ cm. The area is 55 cm².

a. Show that $x^2 + 6x - 55 = 0$. (1 mark)

b. Solve the equation by factorising. (2 marks)
c. Find the perimeter of the rectangle. (1 mark)

## Question 5 (4 marks)

**Question 5 – Higher: formula and completing the square**

Higher tier. Give answers to 2 decimal places where needed.

a. Solve $3x^2 - 2x - 4 = 0$ using the quadratic formula. (2 marks)
b. Write $x^2 - 8x + 3$ in the form $(x + a)^2 + b$. (1 mark)
c. Hence write down the minimum value of $x^2 - 8x + 3$. (1 mark)