1 Work out the **two** roots of $(7x + 1)(2x - 3) = 0$

Circle **both** roots.

[1 mark]

$-\frac{1}{7}$ $\frac{1}{7}$ $-\frac{3}{2}$ $\frac{3}{2}$

1

2 The **only** solution to $x^2 + bx + c = 0$ is $x = 5$

Work out the values of b and c.

[2 marks]

$(x-5)(x-5)$

$= x^2 - 10x + 25$ (1)

$b = -10$, $c = 25$

$b =$ -10 (1) $c =$ 25

3 $(x + a)(x + 3a) \equiv x^2 + bx + 75$

Work out the **two** possible values of b.

[3 marks]

$(x+a)(x+3a) = x^2 + 3ax + ax + 3a^2$

$= x^2 + 4ax + 3a^2$ (1)

$3a^2 = 75$

$a^2 = 25$

$a = \pm 5$ (1)

$4a = b$

$4(5) = b$ or $4(-5) = b$

$b = 20$ or $b = -20$

Answer 20 and -20 (1)

4 The flight of a plane was in two stages.

The table shows information about the flight.

	Distance (miles)	Speed (mph)	Time (hours)
1st stage	731	x	$\frac{731}{x}$
2nd stage	287	$x - 24$	$\frac{287}{x-24}$

In total, the flight lasted 2 hours.

Work out the value of x.

[5 marks]

$\frac{731}{x} + \frac{287}{x-24} = 2$ (1)

$731(x-24) + 287x = 2(x)(x-24)$ (1)

$731x - 17544 + 287x = 2x^2 - 48x$

$2x^2 - 1066x + 17544 = 0$

$x^2 - 533x + 8772 = 0$ (1)

$x = \frac{533 \pm \sqrt{(-533)^2 - 4(1)(8772)}}{2}$ (1)

$= \frac{533 \pm \sqrt{284089 - 35088}}{2}$

$= \frac{533 \pm 499}{2}$ time cannot be negative

$= \frac{34}{2}$ or $\frac{1032}{2}$ $= 17$ or 516

Answer 516 (1)

5 Solve $x^2 + 7x - 11 = 0$

Give your solutions as decimals.

[2 marks]

$x = \dfrac{-7 \pm \sqrt{7^2 - 4(1)(-11)}}{2(1)}$ (1)

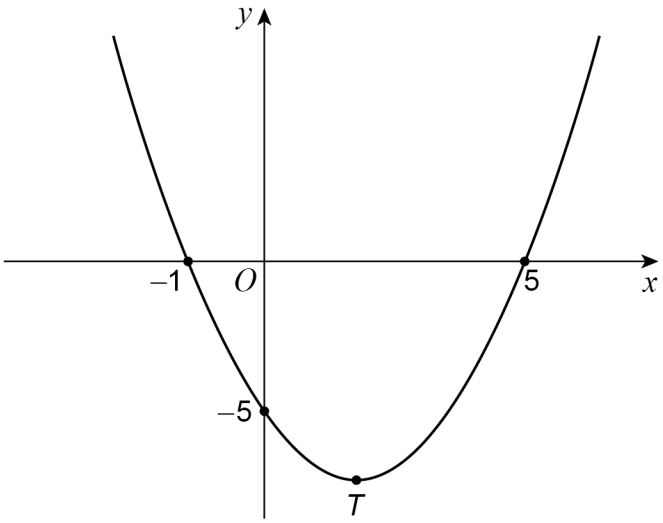
$= \dfrac{-7 \pm \sqrt{93}}{2}$

$= 1.32\ldots$ or $-8.32\ldots$

(1)

Answer 1.32.. and -8.32..

6 Here is a sketch of the curve $y = x^2 - 4x - 5$



6 (a) Write down the **two** roots of $x^2 - 4x - 5 = 0$

[1 mark]

Answer −1 and 5 (1)

7 $f(x) = x^2 + 6x$

$g(x) = 2x + 4$

7 (a) Solve $fg(x) = -5$

[3 marks]

$4x^2 + 28x + 40 = -5$

$4x^2 + 28x + 45 = 0$ (1)

$x = \dfrac{-28 \pm \sqrt{28^2 - 4(4)(45)}}{2(4)}$ (1)

$= \dfrac{-28 \pm \sqrt{64}}{8}$

$= \dfrac{-28 \pm 8}{8}$ $= \dfrac{-20}{8}$ or $-\dfrac{36}{8}$

$= -2.5$ or -4.5

Answer -2.5 and -4.5 (1)

8 The only solution to $x^2 + bx + c = 0$ is $x = -15$

Work out the values of b and c.

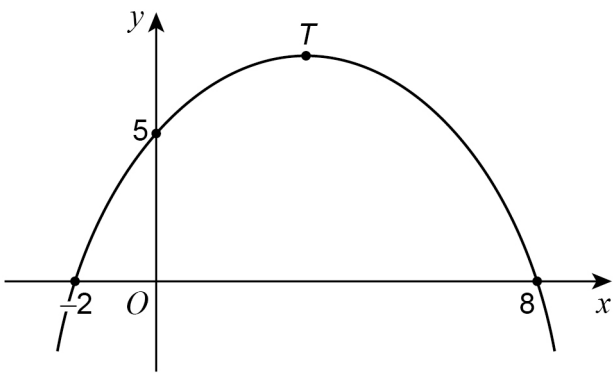
[3 marks]

$(x+15)(x+15) = x^2 + 30x + 225$ (1) (1)

$b = 30$, $c = 225$ (1)

$b =$ 30 $c =$ 225

9 (a) Here is a sketch of a quadratic graph.



Complete the following statements.

[2 marks]

The value of the ***y*-intercept** is 5 ✓0

The ***x*-coordinate** of the turning point, *T*, is 3 ✓0