Word Problems with Quadratics (Grade 11)

MEMORANDUM

Name: ..... Class: .....

Date: .....

MARK ____ / 24

Answer all questions. Show all your working — marks are awarded for method as well as the final answer. **Teacher copy: accept any correct equivalent method.**

1 The product of two consecutive positive integers is 132. Determine the integers. **(4)**

$x^2 + x - 132 = 0 \rightarrow (x + 12)(x - 11) = 0 \rightarrow$ reject $x = -12 \rightarrow$ **11 and 12** ✓✓✓✓ (4)

2 A rectangle is 3 m longer than it is wide and has an area of 40 m². Determine its dimensions. **(4)**

$x(x + 3) = 40 \rightarrow x = 5$ (reject -8) $\rightarrow$ **5 m by 8 m** ✓✓✓✓ (4)

3 The sum of a number and its square is 56. Determine the number if it is positive. **(3)**

$x + x^2 = 56 \rightarrow (x + 8)(x - 7) = 0 \rightarrow$ **7** (reject -8) ✓✓✓ (3)

4 A cyclist rides 60 km. Riding 5 km/h faster would take 1 hour less. Determine her speed. **(4)**

$\frac{60}{x} - \frac{60}{x+5} = 1 \rightarrow x^2 + 5x - 300 = 0 \rightarrow$ **15 km/h** ✓✓✓✓ (4)

5 Two consecutive POSITIVE even numbers have a product of 168. Determine them. **(3)**

$x(x + 2) = 168 \rightarrow x^2 + 2x - 168 = 0 \rightarrow (x + 14)(x - 12) = 0 \rightarrow$ **12 and 14** ✓✓✓ (3)

6 Why must you write down a line rejecting one of the two answers? **(2)**

Because a length, speed or count cannot be negative — **the rejection line is worth a mark.** ✓✓ (2)

7 A rectangle's length is twice its width. Its area is 72 m². Determine the width. **(3)**

$2x^2 = 72 \rightarrow x^2 = 36 \rightarrow$ **6 m** (reject -6) ✓✓✓ (3)

8 What is the first line you should write in any word problem? **(1)**

A definition of the variable, e.g. **'Let x be the width in metres'.** ✓ (1)

TOTAL: 24 marks

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