



**ANDERSON SECONDARY SCHOOL**  
**Weighted Assessment 2 2024**  
**Secondary Three Express**



CANDIDATE NAME:

CLASS:

INDEX NUMBER:

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**ADDITIONAL MATHEMATICS**

**4049**

**29 April 2024**

**45 minutes**

Candidates answer on the Question Paper.  
No Additional Materials are required.

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**READ THESE INSTRUCTIONS FIRST**

Write your name, class and index number in the spaces at the top of this page.  
Write in dark blue or black pen.  
You may use an HB pencil for any diagrams or graphs.  
Do not use paper clips, highlighters, glue or correction fluid/tape.

Answer **all** the questions.

Give non-exact numerical answers correct to 3 significant figures, or 1 decimal place in the case of angles in degrees, unless a different level of accuracy is specified in the question.  
The use of an approved scientific calculator is expected, where appropriate.  
You are reminded of the need for clear presentation in your answers.

The number of marks is given in brackets [ ] at the end of each question or part question.

The total number of marks for this paper is 30.

*Mathematical Formulae***1. ALGEBRA*****Quadratic Equation***

For the equation  $ax^2 + bx + c = 0$ ,

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

- 1** Find the range of values of  $k$  for which  $(k+3)x^2 - 4x + k$  is always positive for all real values of  $x$ . [4]

- 2      (a)      The equation of a polynomial is given by  $f(x) = x^3 - 9x - 10$ .  
Factorise  $f(x)$  completely. [3]

- (b)      Hence solve the equation  $f(x) = 0$ . [2]

- 3 A triangle has an area of  $(3 + \sqrt{75}) \text{ cm}^2$ . Its perpendicular height is given to be  $(2\sqrt{108} - 4)$  cm. Find the length of its base leaving your answer in the form  $\left(\frac{a + b\sqrt{3}}{m}\right)$  cm where  $a, b$  and  $m$  are integers.

[4]

- 4      **(a)**      Solve the equation  $\sqrt{3-11x} = 2x$ . [3]

- (b) Given that  $\sqrt{15+12\sqrt{5}}$  can be expressed in the form  $a+b\sqrt{5}$ , where  $a$  and  $b$  are rational numbers, show that  $\frac{36}{b^2} + 5b^2 = 15$ .

[4]

- 5 The line  $y = x - k$  is a tangent to the curve  $x^2 + 3y^2 = 9$ .  
Find the possible values of  $k$ .

[4]



- 6 The function  $f(x) = 3x^3 + ax^2 - 5x + b$ , where  $a$  and  $b$  are constants, has a factor of  $3x - 2$  and leaves a remainder of  $-40$  when it is divided by  $x + 2$ .

(a) Find the value of  $a$  and of  $b$ . [5]

(b) Hence find the remainder when  $f(x)$  is divided by  $x + 4$ . [1]

**End of Paper**