Quadratics and Other Polynomials Quiz
The indicator of points show a rough indication of difficulty, 60 minutes

- Graph the equation x^2

[1]

- What is this shape and what would be the y intercept?

[2]

- Factorise $x^2 - 4$ and then expand to prove

[2]

- Factorise $x^2 - 13x + 40$ and then expand to prove

[2]

- Complete the square for $x^2 - 10x + 25$ and write in vertex form

[3]

- What would be the vertex for the previous function where you completed the square?

[2]

- Use the vertex formula to prove

[2]

- Describe the nature and number of the roots if the result of the discriminant were to be positive

[2]

- A polynomial is used to analyse the motion of a bouncy ball. Would one expect the parabola to concave or convex after the first bounce? Why?

[1]

- A cannon fires a cannonball in a parabolic shape that fits the function of $-x^2 + x + 5$, graph this equation by calculating the x intercepts, y intercept and vertex, WITHOUT the use of technology or with the use of technology but demonstrating all lines of reasoning

[4]

- A side of a cube is (x+1). Derive volume.

[3]

- What effect would changing "c" have on the parabola in the quadratic general form of $ax^2 + bx + c$?

[1]

- A swimming pool is twice as long as it is wide. It is surrounded by a path that is 2m wide around the pool and has a total area of 900m². Derive the dimensions of the pool.

[3]

- Use the discriminant to derive what value m might be in $X^2 + mx + 2$, if there are two real distinct roots

[2]

- Harry is playing Angry Birds and fires a bird that passes through the co-ordinates of (4.3, 26.21), (8.08, 13.44) and (0,6). Calculate the quadratic equation for this using a calculator.

[1]

- Using the quadratic formula, derive any zeroes of the function

[2]

- Harry wants to know how far the bird travelled. Assume that 1 unit is equal to 10m and derive the distance between the zeroes of the function.

[2]

- Lucy argues that completing the square for the general quadratic form can derive the quadratic formula. Bill thinks that this is nonsense and that the quadratic formula and general form can not be derived like this. Who is right? Show evidence and mathematical proof to support your claim.

[4]

- Calculate the vertex of a function that has an a value of 6 and a b value of 7.

[1]

- Simplify the following algebraic expression using DOTS, the difference of two squares and isolation methods

$$f(x) = \frac{x^2 + 6x + 18}{x^2 + 9}$$

[4]

- Bill wants to throw a pencil to Mary and wants to see how he can increase the amount of time the pencil is in the air for. Based on the quadratic general form, which value would best be changed to manipulate the height of the parabola? Why?

[3]

- Factorise the following polynomial to find real roots or if impossible, comment why.
2X^2 – 9x - 921

[2]

- Calculate the vertex of $x^2 - mx + 81$, if the factorized equation is a perfect square. Calculate in vertex form to show how one could derive co-ordinates from the $(a+h)^2 + k$ form

[4]

EXTRA PAGE FOR WORKING SPACE