

WHAT DO I REMEMBER FROM LAST YEAR?

Name: _____

Marks: /54

1. Solve for the roots and simplify the following by using the quadratic formula

a) $y = 5x^2 - 6x + 3$

[2]

b) $y = \sqrt{3}x^2 - \sqrt{5}x + 9$

[3]

c) $y = 12x^2 - 16x + 27$

[2]

2. Factorise the following:

a) $y = x^2 - 4x + 3$

[1]

b) $y = x^2 + 5x + 6$

[1]

c) $y = x^2 + 5$

[2]

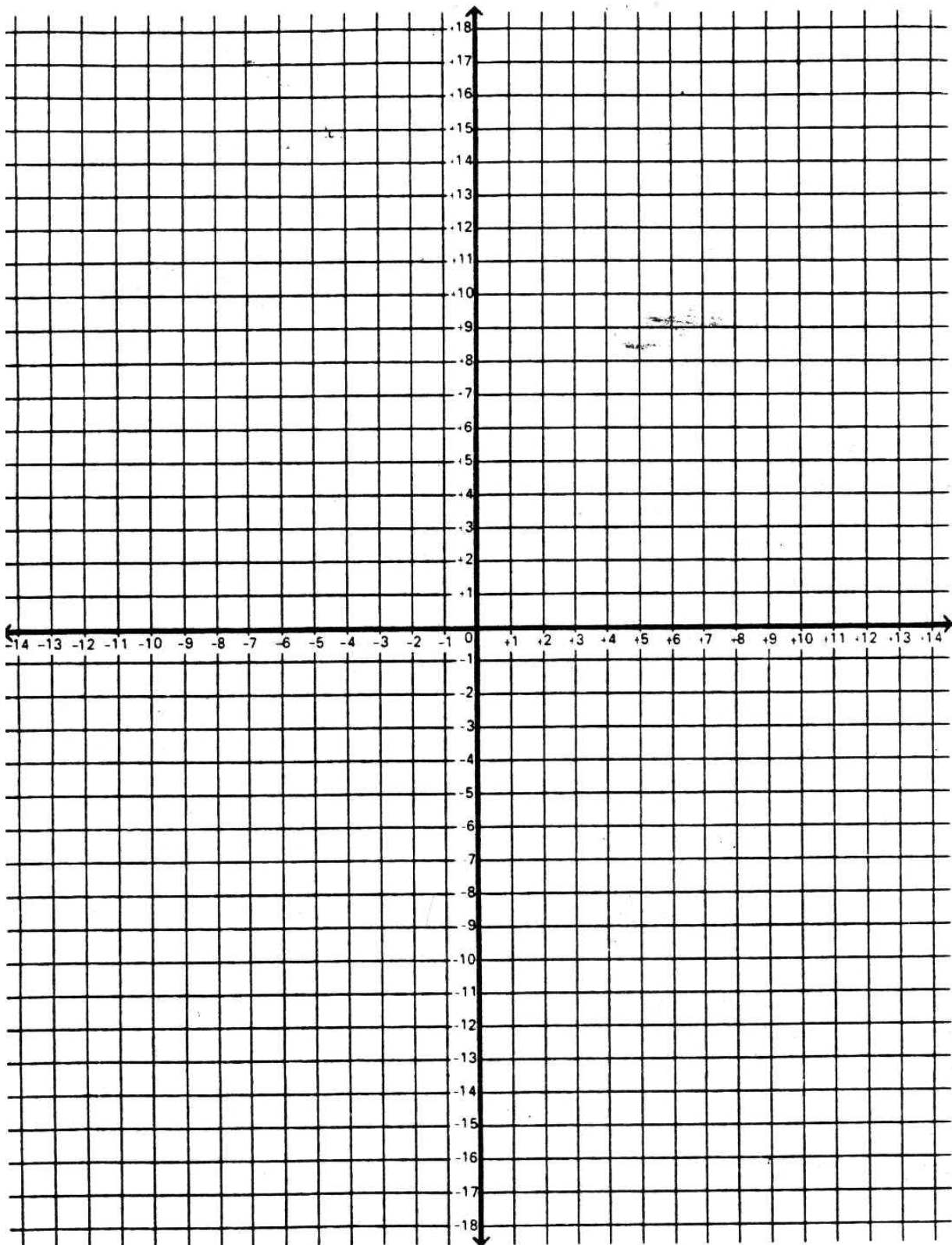
d) $y = (x + 3)^2$

[2]

e) Write a generic expression for the perfect square law

[2]

3. On the set of axes below, sketch the graph $f(x) = x^2 - 2x + 2$ and the graph $g(x) = -x^2 - 2x + 2$. State any minimums and maximums using technology.



[4]

4. Develop a conjecture as to what the sign of the “a” term in the quadratic formula determines, if the quadratic formula is represented in the form $ax^2 + bx + c$

[3]

- a) Consider $h(x) = -x^2 + 3x + 2$ and $i(x) = x^2 + 3x + 2$. Determine $h(2)$, $h(-2)$, $i(2)$ and $i(-2)$ algebraically and hence comment on the nature of the parabolas. Does this support your original conjecture?

[6]

5. A canon is fired with a cannonball following the trajectory of the function $f(x) = -x^2 + 5x$ with the x-axis representing the ground. One unit on the y-axis is equal to 2m and one unit on the x-axis also represents 2m. If the cannonball exceeds a height of 14m, then it may cause damage to the roof of a stadium arena.

a) Show that the cannonball has a horizontal displacement of 10m when it hits the ground after being fired

b) Determine the x co-ordinate that corresponds to the apex (maxima) of the cannonball's trajectory [2]

c) Hence, determine if the cannonball can be fired without causing damage to the roof of the stadium arena [2]

A different cannonball follows the trajectory of $f(x) = -x^2 + 4x$. [3]

d) Determine the x intercept and hence the horizontal displacement of the cannonball before it hits the ground again.

[2]

- e) Hence, forms a possible conjecture linking the value of b in the equation $y = -x^2 + bx$ to the horizontal displacement of the cannonball before it hits the ground.

[2]

6. The side of a cube is given by $(x+1)$ centimeters.

- a) Show that the volume of the cube is given by $x^3 + 3x^2 + 3x + 1$ m³

[1]

- b) Determine the surface area of the cube in expanded form

- c) Hence, if the total surface area is to be 200m², determine the value of x .

[3]

[4]

7. A swimming pool is twice as long as it is wide. The pool is surrounded by a path that is 2m wide and the combined area of the path and pool is 900m^2 .
- a) Sketch a diagram of the situation

- b) Derive the dimensions of the pool.

[3]

[4]