



## Course Methods      Year 11      Test 2

Student name: \_\_\_\_\_  
Teacher name: \_\_\_\_\_

Task type: Response

Time allowed for this task: 40 mins

Number of questions: 5

Materials required: Formula Sheet and 1 page both sides of notes permitted.

No Calculators allowed.

Standard items: Pens (blue/black preferred), pencils (including coloured), sharpener, correction fluid/tape, eraser, ruler, highlighters

Special items: Drawing instruments.

Marks available: 35 marks

Task weighting: 10 %

Formula sheet provided: Yes

Note: All part questions worth more than 2 marks require working to obtain full marks.

**Question 1 (1.1.8)****(4 marks)**

A parabola that has its vertex at the point with coordinates  $(-1, 6)$  passes through the point  $(2, 10)$ .

Find the equation of the parabola.

$$\begin{aligned} \therefore y &= a(x+1)^2 + 6 \\ \text{i.e. } 10 &= a(2+1)^2 + 6 \\ 4 &= 9a \\ a &= \frac{4}{9} \checkmark \end{aligned} \quad \therefore \text{The equation is } y = \frac{4}{9}(x+1)^2 + 6 \checkmark$$

**Question 2 (1.1.10)****(4 marks)**

Find the exact y-coordinate of the points of intersection of the curve with equation

$$y = x^2 \quad \text{and the circle} \quad x^2 + y^2 = 1$$

Answer  $y = \frac{\sqrt{5}-1}{2}$  recognises that we have only 1 solution  $(-1)$

$$\begin{aligned} \therefore y + y^2 &= 1 \checkmark \\ y^2 + y - 1 &= 0 \checkmark \end{aligned}$$

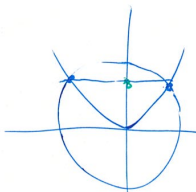
$$\text{i.e. } y = \frac{-1 \pm \sqrt{1^2 - 4(1)(-1)}}{2(1)}$$

$$= \frac{-1 \pm \sqrt{1+4}}{2} \checkmark$$

$$= \frac{-1 + \sqrt{5}}{2} \checkmark$$

$$\boxed{\neq \frac{-1 - \sqrt{5}}{2}}$$

-1 if given



(1, 2, 2 = 5 marks)

- ✓ sketch geo thru 2 critical pts

(3, 2, = 5 marks)

(a) Find the discriminant.

$$\Delta = (p-2)^2 - 4(-2p+1)(6p) \checkmark$$

$$= p^2 - 4p + 4 + 48p^2 - 24p \checkmark$$

$$= 49p^2 - 28p - 4 \checkmark$$

- By inspection  $\downarrow$  (7P-2)<sup>2</sup> ✓

(2, 2 = 4 marks)

- $$0 \leq 11 - x \leq 1$$

$$\therefore 3x \geq \frac{3}{11} \Rightarrow D: \left\{ x \geq \frac{3}{11} \right\} \checkmark$$

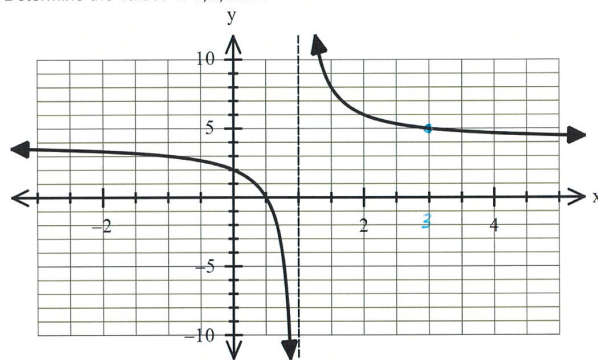
- $$\sqrt{f(2a+3) - 11}$$

$$\sqrt{6a-2}$$

**Question 5** (1.1.14)

(4 marks)

Given that the graph below is in the form  $y = \frac{a}{x-b} + c$   
Determine the values of  $a$ ,  $b$ , and  $c$



$$y = \frac{a}{x-1} + 4 \quad \checkmark, \text{ thru } (3, 5)$$

$$\therefore 5 = \frac{a}{3-1} + 4$$

$$\underline{a = 2} \quad \checkmark$$

$$a = 2$$

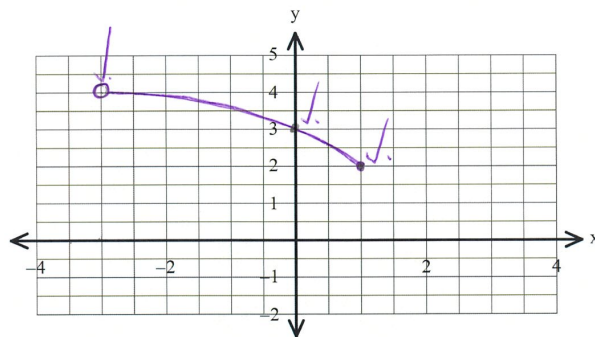
$$b = 1$$

$$c = 4$$

**Question 6** (1.1.15)

(3 marks)

Sketch  $y = \sqrt{-x+1} + 2$  within the domain  $-3 < x \leq 3$

**Question 7** (1.1.21, 1.1.22)

(2, 4 = 6 marks)

Consider the Polynomial  $G(m) = m^3 - 3m^2 - 6m + 8$

(a) Find  $G(4)$

$$= 4^3 - 3(4)^2 - 6 \times 4 + 8 \quad \checkmark$$

$$= 0 \quad \checkmark \quad \therefore m-4 \text{ is a factor.}$$

(b) Hence or otherwise fully factorise  $G(m)$

can use any method  
eg trial  $\pm 1, 2, 3$  / long division etc

$$\therefore (m-4)(m^2+m-2) = G(m)$$

$$(m-4)(m+2)(m-1) = G(m)$$

$$\begin{array}{r} m^2 + m - 2 \\ m-4 \overline{) m^3 - 3m^2 - 6m + 8} \\ \underline{-m^3 - 4m^2} \phantom{+ 8} \\ m^2 - 6m + 8 \quad \checkmark \\ \underline{-m^2 - 4m} \phantom{+ 8} \\ -2m + 8 \\ \underline{-2m + 8} \\ 0 \end{array}$$