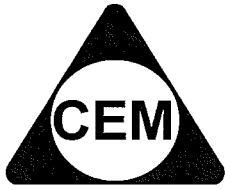


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YEAR 12 – MATHEMATICS

SPECIMEN PAPER 2

**TOPIC : LOCUS AND THE
PARABOLA**

AMP 2002 Q3

(c) For the parabola $x^2 = -12y - 12$, find the

(i) focal length 1

(ii) coordinates of the vertex 1

(iii) coordinates of the focus 1

(iv) equation of the directrix. 1

ASCHAM 2001 Q6

- a) Find the equation of the parabola with focus $(-2, -1)$ and directrix $y = 5$. **(2)**

ASCHAM 2000 Q5

(d) Write the equation of the parabola $y^2 - 6y + 25 = 8x$ in the form $(y-k)^2 = 4a(x-h)$ and find:

(i) the focal length

(ii) the co-ordinates of the focus

(iii) the equation of the directrix

JAMES RUSE 2002 Q4

(a) Given the parabola $y = \frac{1}{2}x^2 - 3x + 1$,

(i) Express the equation in the form $(x-h)^2 = 4a(y-k)$, where a , h and k are constants.

3

(ii) Write down the coordinates of the focus of this parabola.

2

INDEPENDENT 2000 Q5

(a) For the parabola $y^2 - 6y - 9 = 4x$ **4**

(i) Find the coordinates of the vertex.

(ii) Find the coordinates of the focus.

(iii) Sketch the curve clearly labelling the vertex and focus

SGHS 2000 Q4

(c) A parabola has its focus at (3,3) and its directrix is the line $y = -1$

(i) Sketch the parabola showing the vertex, focus and directrix

(ii) Write down the equation of the axis of symmetry

(iii) Write down the equation of the parabola

(iv) Find the equation of the tangent to the parabola at the point where the parabola intersects the y - axis. [5]

SOLUTIONSAMP 2002 Q3

(c) $x^2 = -12(y+1)$ in the form

$$(x-h)^2 = -4a(y-k)$$

(i) $a = 3$ ✓

(ii) Vertex $(0, -1)$ ✓

(iii) Focus $(0, -4)$ ✓

(iv) Directrix is $y = 2$ ✓

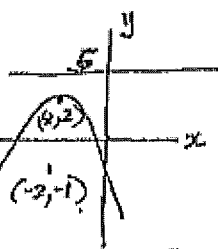
ASCHAM 2001 Q6QUESTION 6

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

$a = 3$

✓ ✓ ✓

$\therefore (x+2)^2 = -12(y-2)$



(2)

ASCHAM 2000 Q5

$$\begin{aligned}
 \text{0) } & y^2 - 6y + 25 = 8x \\
 & (y^2 - 6y + 9) + 25 - 9 = 8x \\
 & (y-3)^2 + 16 = 8x \\
 & (y-3)^2 = 8(x-2) \quad \checkmark
 \end{aligned}$$

$$\text{i) focal length} = 4a = 8$$

$$a = 2 \quad \checkmark$$

$$\text{ii) vertex} = (2, 3) \quad \checkmark$$

$$\text{focus} = (4, 3) \quad \checkmark$$

$$\text{iii) Directrix } x = 0 \quad \text{ie the } y\text{-axis} \quad \checkmark$$

JAMES RUSE 2002 Q4

$$\text{(a) (i) } x^2 - 6x = 2y - 2$$

$$x^2 - 6x + 9 = 2y + 7$$

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

$$(x-3)^2 = 4\left(\frac{y}{2} + 3\right)$$

$$\text{(ii) focus } (3, -3)$$

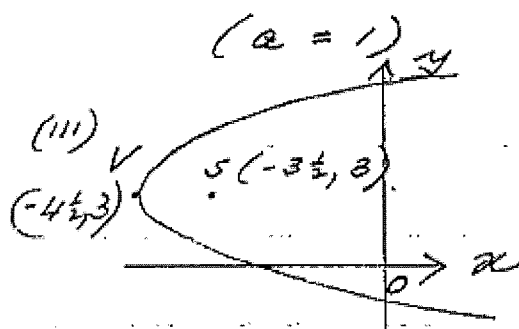
INDEPENDENT 2000 Q5

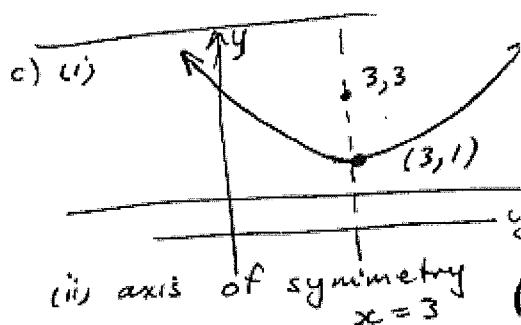
$$(a) \quad y^2 - 6y + 9 = 4x + 18$$

$$(y - 3)^2 = 4(x + 4\frac{1}{2})$$

$$(i) \quad V \quad \underline{(-4\frac{1}{2}, 3)}$$

$$(ii) \quad \text{Focus (S)} \quad \underline{(-3\frac{1}{2}, 3)}$$



SGHS 2000 Q4

(iii) Parabola with $a = 2$
 $(x - 3)^2 = 8(y - 1)$

(iv) $y = \frac{1}{8}(x^2 - 6x + 17)$
 $\frac{dy}{dx} = \frac{2x}{8} - \frac{6}{8}$

At $x = 0$ $\frac{dy}{dx} = -\frac{3}{4}$

Eqn of tangent $y - \frac{17}{8} = -\frac{3}{4}(x - 0)$
 $y = -\frac{3}{4}x + \frac{17}{8}$ *