SCORE: 18½ / 20 POINTS

1. NO CALCULATORS ALLOWED
2. UNLESS STATED OTHERWISE, YOU MUST SIMPLIFY ALL ANSWERS
3. SHOW PROPER PRECALCULUS LEVEL WORK TO JUSTIFY YOUR ANSWERS

Write the formal definition of a parabola used in lecture. SCORE: 2 / 2 PTS

A locus of points on the plane that are equidistant from a fixed point, called the focus, and a fixed line, called the directrix.

COMPLETE SENTENCE
NEXT TIME

Find the equations of the following parabolas. SCORE: 5½ / 7 PTS

[a] vertex at the origin, directrix $y = 8$

$y = -p$; $y = 8$; $p = -8$ $\quad x^2 = 4py$

$x^2 = 4(-8)y$

$\boxed{x^2 = -32y}$ (1) (1) (1)

[b] focus $(7, 1)$, directrix $x = -6$

$x = -p$; $p = 6$; $x = -6$ $\quad y^2 = 4px$

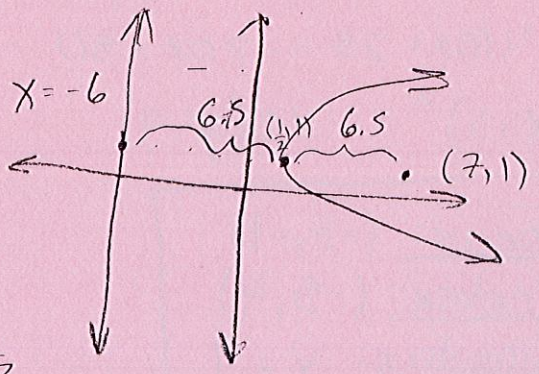
center $= (\frac{1}{2}, 1)$

$\frac{7 + (-6)}{1}$

$(y-1)^2 = 4(6)(x-\frac{1}{2})$ (5)

$\boxed{(y-1)^2 = 24(x-\frac{1}{2})}$ (1) (1)

$\frac{7+(-6)}{2} = \frac{1}{2}$



Find the equation of the ellipse with vertices $(0, \pm 6)$ and foci $(0, \pm 5)$.

SCORE: 3 / 3 PTS

$\frac{x^2}{11} + \frac{y^2}{36} = 1$ (1 + ½ + 1 + ½)

$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$

$36 = b^2 + 25$

$11 = b^2 \quad b = \sqrt{11}$

$6^2 = 36; \; 5^2 = 25$

$a = 6, \; c = 5$

Find the co-ordinates of the vertices and foci of the ellipse $\frac{x^2}{50} + \frac{y^2}{32} = 1$.

SCORE: 3 / 3 PTS

$a = \sqrt{50}, \; b = \sqrt{32},$

$a^2 = b^2 + c^2 \quad 50 = 32 + c^2; \; 18 = c^2, \; c = \sqrt{18}$

center = (0,0)

Vertices: $(\pm 5\sqrt{2}, 0)$ (½)

foci: $(\pm 3\sqrt{2}, 0)$ (½)

$18 = 2 \cdot 9 = 2 \cdot 3 \cdot 3$

$50 = 2 \cdot 25 = 2 \cdot 5 \cdot 5$

Find the co-ordinates of the focus and vertex, and the equation of the directrix, of the parabola $x^2 + 10x + 20y - 55 = 0$.

SCORE: 5 / 5 PTS

$x^2 + 10x = -20y + 55$

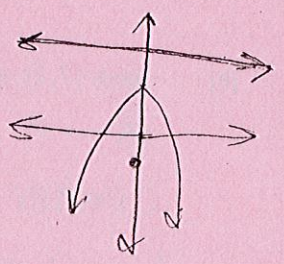
$x^2 + 10x + (10/2)^2 = -20y + 55 + 5^2$

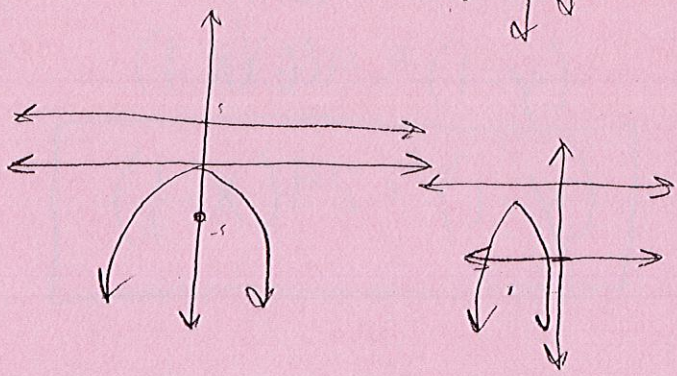
(½) $x^2 + 10x + 25 = -20y + 80$ (1)

$(x+5)^2 = -20(y-4)$ (1)

$4p = -20$

$p = -5$ (½)





focus: $(-5, -1)$ (½)

Vertex: $(-5, 4)$ (½)

directrix: $y = 9$ (1)