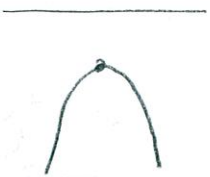
Find the equations of the following parabolas.

SCORE: _____ / 7 PTS

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



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

$x^2 = -32y$

(1) (1) (1)

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

VERTEX $= \left(\frac{7-6}{2}, 1\right) = \left(\frac{1}{2}, 1\right)$

$p = 7 - \frac{1}{2} = \frac{13}{2}$

$(y-1)^2 = 4\left(\frac{13}{2}\right)\left(x - \frac{1}{2}\right)$

$(y-1)^2 = 26\left(x - \frac{1}{2}\right)$

(1) (1½) (1)

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

A PARABOLA IS THE LOCUS OF POINTS IN THE PLANE WHOSE DISTANCES TO A FIXED POINT AND A FIXED LINE ARE EQUAL

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 PTS

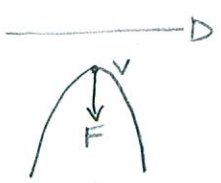
$x^2 + 10x = -20y + 55$

(½) $x^2 + 10x + 25 = -20y + 80$ (1)

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

$4p = -20$

$p = -5$ (½)



VERTEX $(-5, 4)$ (½)

FOCUS $(-5, 4-5)$

$= (-5, -1)$ (½)

DIRECTRIX $y = 4 + 5$

$y = 9$ (1)

SUBTRACT ½ POINT IF YOU FORGOT $y =$ OR WROTE $x =$ INSTEAD

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

SCORE: _____ / 3 PTS

$6^2 = b^2 + 5^2$

$36 = b^2 + 25$

$b^2 = 11$

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

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

SCORE: ____ / 3 PTS

↑ SHORT + FAT

$50 = 32 + c^2$

$c^2 = 18$

$c = 3\sqrt{2}$

VERTICES $(\pm\sqrt{50}, 0) = (\pm 5\sqrt{2}, 0)$ (1½)

FOCI $(\pm 3\sqrt{2}, 0)$ (1½)

SUBTRACT ½ POINT EACH ANSWER YOU FORGOT ±