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

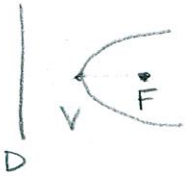
[a] vertex at the origin, directrix $y = 10$

$x^2 = 4(-10)y$

$x^2 = -40y$

(1) (1) (1)

[b] focus $(6, 2)$, directrix $x = -5$



VERTEX $= \left(\frac{6-5}{2}, 2\right) = \left(\frac{1}{2}, 2\right)$

$p = 6 - \frac{1}{2} = \frac{11}{2}$

$(y-2)^2 = 4\left(\frac{11}{2}\right)\left(x - \frac{1}{2}\right)$

$(y-2)^2 = 22\left(x - \frac{1}{2}\right)$

(1) $(\frac{1}{2})$ (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 $x^2 + 14x + 12y - 23 = 0$.

SCORE: ____ / 5 PTS

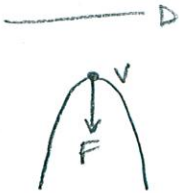
$x^2 + 14x = -12y + 23$

$x^2 + 14x + 49 = -12y + 72$ (½) (1)

$(x+7)^2 = -12(y-6)$ (1)

$4p = -12$

$p = -3$ (½)



VERTEX $(-7, 6)$ (½)

FOCUS $(-7, 6-3)$

$= (-7, 3)$ (½)

DIRECTRIX $y = 6 + 3$

$y = 9$ (1)

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

Find the co-ordinates of the vertices and foci of the ellipse $\frac{x^2}{40}+\frac{y^2}{12}=1$.

SCORE: _____ / 3 PTS

↑ SHORT & FAT

$40 = 12 + c^2$

$c^2 = 28$

$c = 2\sqrt{7}$

VERTEX $(\pm\sqrt{40}, 0) = (\pm 2\sqrt{10}, 0)$ (1/2)

FOCI $(\pm 2\sqrt{7}, 0)$ (1/2)

SUBTRACT ½ POINT

EACH ANSWER YOU FORGOT ±

Find the equation of the ellipse with vertices $(0, \pm 7)$ and foci $(0, \pm 6)$.

SCORE: _____ / 3 PTS

$7^2 = b^2 + 6^2$

$49 = b^2 + 36$

$b^2 = 13$

$$\frac{x^2}{13} + \frac{y^2}{49} = 1$$

(1) (1) ($\frac{1}{2}$)

($\frac{1}{2}$)