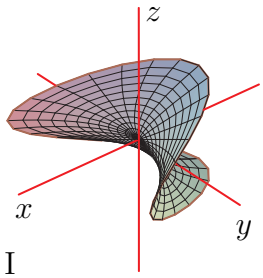
Quadrics Homework Math 221 Frank Sottile

Consider the following quadratic equations in $\mathbb{R}^3$:

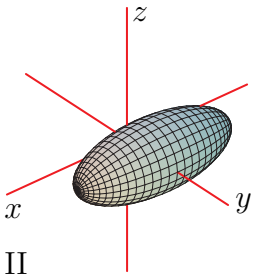
(a)	$z = x^2 + y^2$	(b)	$4x^2 + 25y^2 - 50y + 25z^2 = 0$	(c)	$2y^2 + 4z^2 - 2x^2 = 1$
(d)	$z = -xy$	(e)	$x^2 - y^2 - z^2 + 2z = 2$	(f)	$y^2 - 4z^2 = 4x$
(g)	$y^2 = x^2 + 3z^2$	(h)	$9z^2 + 4x^2 = 4y + 12$	(i)	$25x^2 + 25y^2 + 4z^2 = 25$
(j)	$2x^2 = z^2 + 8y^2$	(k)	$z^2 - 8x^2 - 2y^2 = 1$	(l)	$x^2 + 8y^2 - z^2 = 2$

1. For the equations (b), (d), (g), and (l), describe the cross sections for fixed x, fixed y, and fixed z.

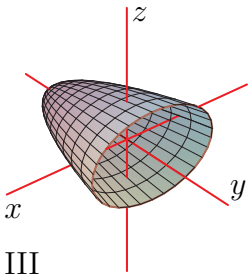
2. Match each equation with one of the quadrics displayed below, and identify its type (ellipsoid, hyperbolic paraboloid, etc.)



I



II



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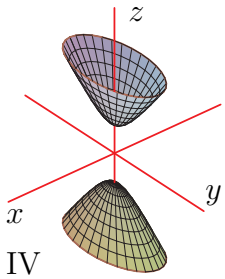

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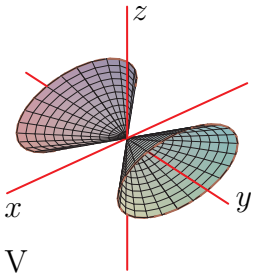

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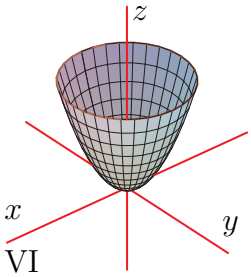

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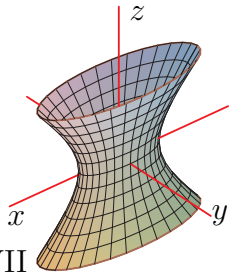
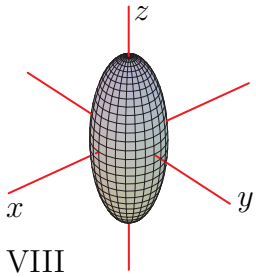
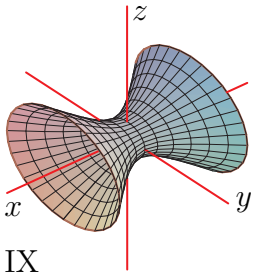


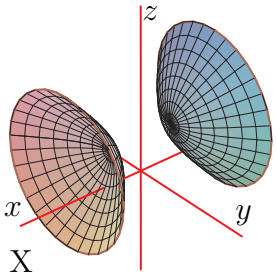
VII



VIII



IX



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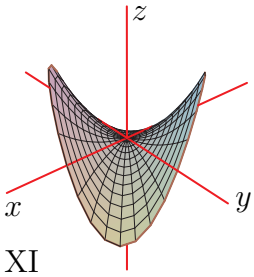

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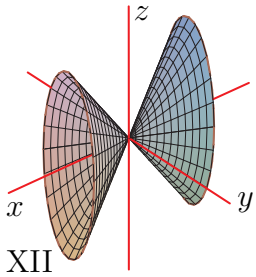

XII