Curves

Checklist of important curves: (implicit parametric and in other coordinates)

- line
- circle
- ellipse
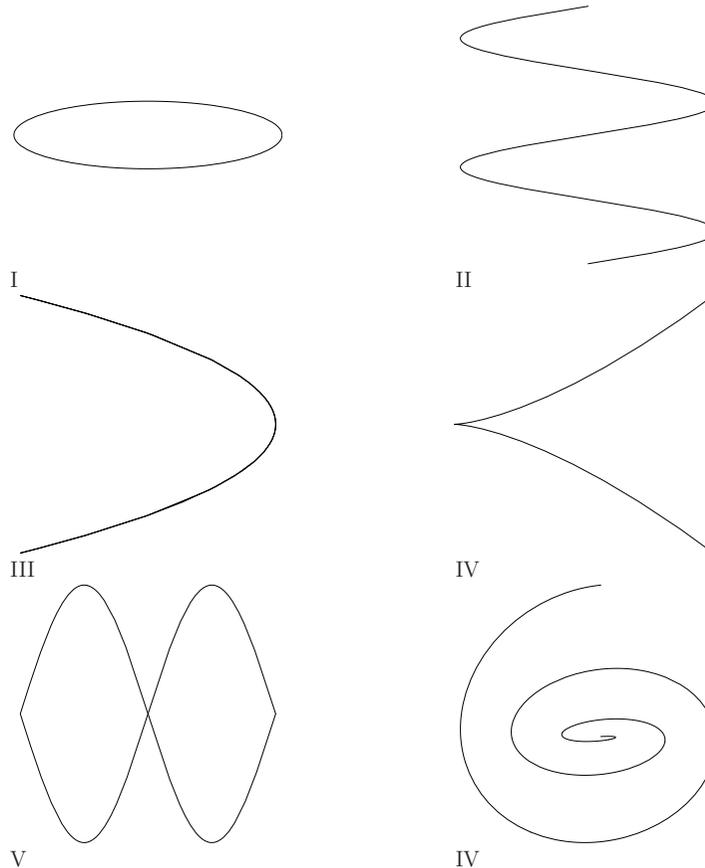- hyperbola
- graph of a function
- spiral

Surfaces

Checklist of important surfaces (implicit, parametric and in other coordinates)

- plane
- sphere
- graph
- surface of revolution
- cylinder
- cone
- hyperboloid
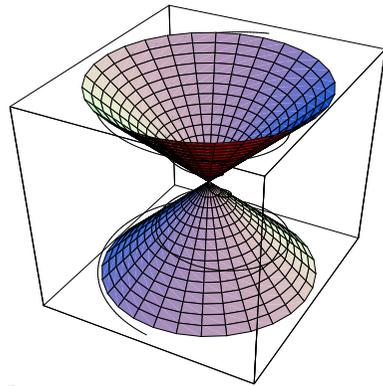- paraboloid
- hyperbolic paraboloid

Problem 1) Matching curves

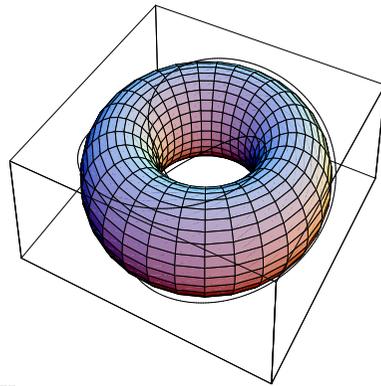Match the following curves with their parametrizations

I

II

III

IV

V

IV

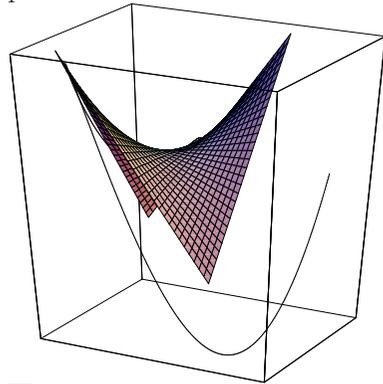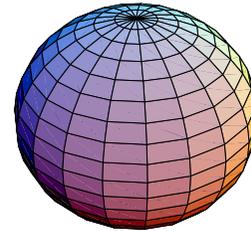| Enter number I,II,III,IV,V,VI of the figure	Parametric equation of the curve
	$\vec{r}(t) = (\cos^2(t), \sin(t))$
	$\vec{r}(t) = (t^2, t^3)$
	$\vec{r}(t) = (4\cos(t), \cos(\pi/2 - t))$
	$\vec{r}(t) = (t\sin(t), t^2\cos(t)$
	$\vec{r}(t) = (\sin(t), t)$
	$\vec{r}(t) = (|t|, \sin(t))$

Problem 2) Matching surfaces

I

II

III
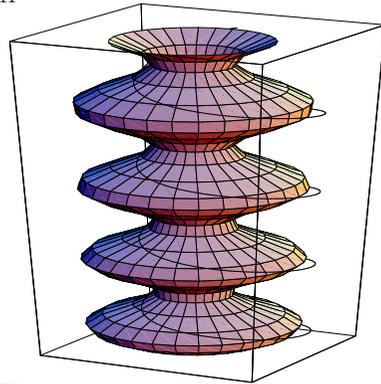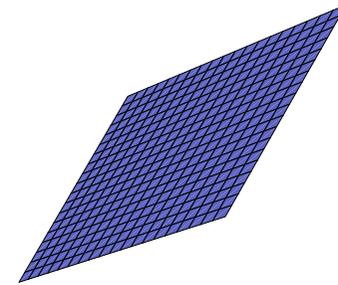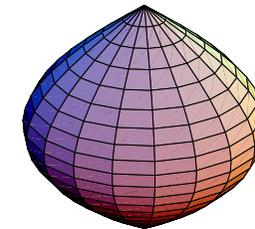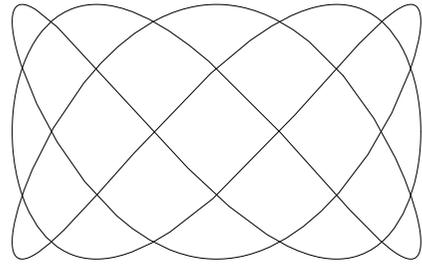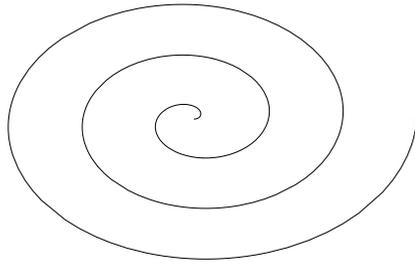

IV

Problem 3) Matching surfaces

I

II
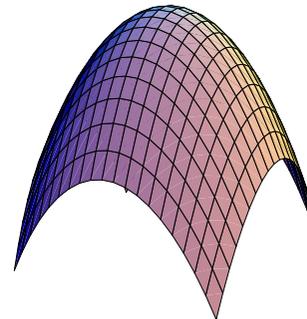
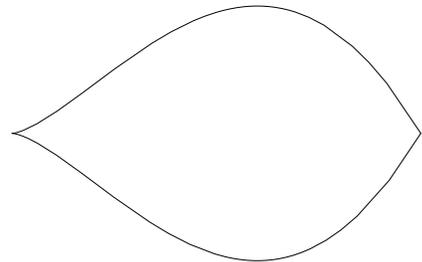| Enter I,II,III,IV here	Parameterization
	$\vec{r}(s,t) = (s\sin(t), s\cos(t), s)$
	$\vec{r}(s,t) = (2 + \cos(s))\cos(t), (2 + \cos(s))\sin(t), \sin(s))$
	$\vec{r}(s,t) = (s\cos(t), s\sin(t), s^2\cos(t)\sin(t))$
	$\vec{r}(s,t) = ((2 + \sin(s))\sin(t), (2 + \sin(s))\cos(t), s)$

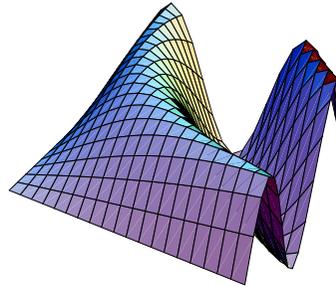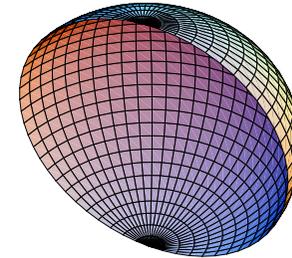Match the equations with the curves and justify briefly your choice.

I

II

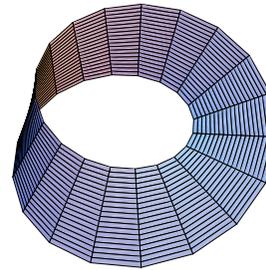| Enter I,II,III,IV here	Equation	Short Justification
	$r(t) = (\cos(3t), \sin(5t))$	
	$r(t) = (t\cos(3t), t\sin(3t))$	
	$r(t) = (t^2, t^3 - t^5)$	
	$r(t) = (\cos(t)^2, \sin(t)^2)$	

Match the parametric surfaces with their equations.

I

II

III

IV
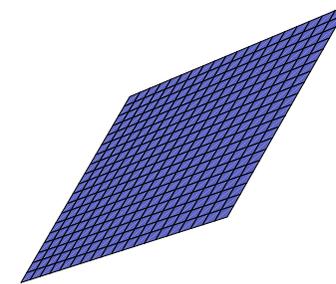
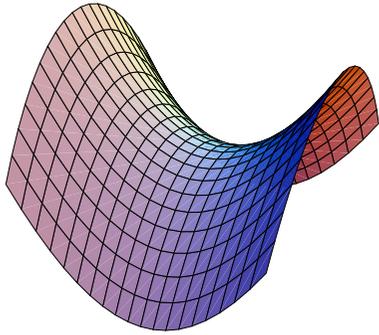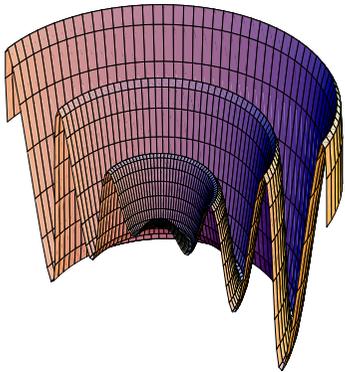| Enter I,II,III,IV here	Equation
	$(u, v) \mapsto (u, v, u + v)$
	$(u, v) \mapsto (u, v, \sin(uv))$
	$(u, v) \mapsto ((2 + v\cos(\pi u))\cos(2\pi u), (2 + v\cos(\pi u))\sin(2\pi u), v\sin(\pi u))$
	$(u, v) \mapsto (\sin(u)\sin(v), \cos(u)\sin(v), \cos(v))$

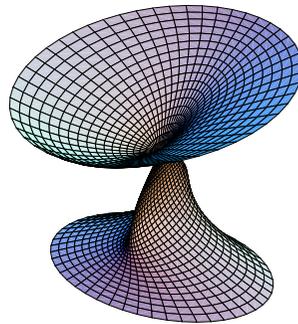Match the parametric surfaces with their equations. No justifications are needed.

I

II

III

IV
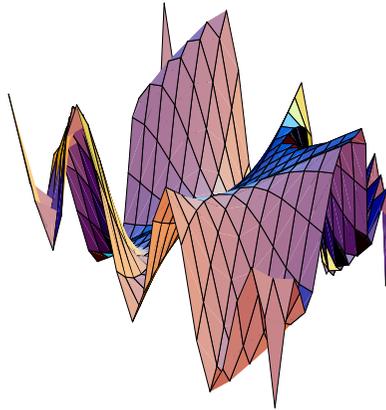
Enter I,II,III,IV here	Equation
	$(u,v) \mapsto (u\cos(v), u\sin(v), u^2\cos(u)/(u+1))$
	$(u,v) \mapsto (u, v, u^2 - v^2)$
	$(u,v) \mapsto (u, v, v\sin(uv) + u\cos(v))$
	$(u,v) \mapsto ((u - \sin(u))\cos(v), (u - \cos(u))\sin(v), u)$