MATH 253   Fall 2003   Section 504 P. Yasskin
Maple Quiz Solutions

```
> restart:with(VecCalc):VCalias:
```

#1

```
> rho:=r*sin(theta);
```

$$\rho := r \sin(\theta)$$

```
> M:=Muint(rho*r, r=0..3, theta=0..Pi, z=-1..1); M:=value(%);
```

$$M := \int_{-1}^{1} \int_{0}^{\pi} \int_{0}^{3} r^2 \sin(\theta) \, dr \, d\theta \, dz$$

$$M := 36$$

#2

```
> f:=MF(<x,y,z>,x^2*y+y^2*z^3);
```

$$f := (x, y, z) \to x^2 y + y^2 z^3$$

```
> delf:=Grad(f);
```

$$delf := [(x, y, z) \to 2 y x, (x, y, z) \to x^2 + 2 y z^3, (x, y, z) \to 3 y^2 z^2]$$
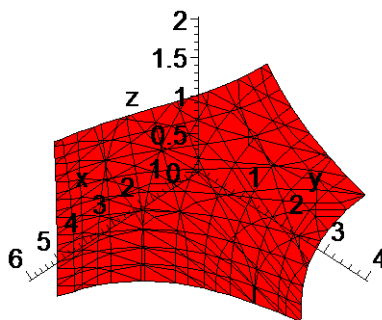
```
> P:=<3|2|1>;
```

$$P := [3, 2, 1]$$

```
> v:=delf &@ P;
```

$$v := [12, 13, 12]$$
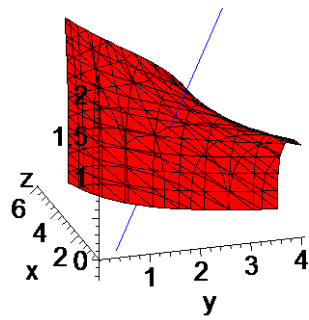
```
> X:=P+t*v;
```

$$X := [3 + 12\,t, 2 + 13\,t, 1 + 12\,t]$$

```
> pf:=implicitplot3d(f(x,y,z)=22, x=0..6, y=0..4, z=0..2, color=red,
  axes=normal): pf;
```



```
> pline:=spacecurve([X[1],X[2],X[3]], t=-.1..0.1, color=blue):
  pline;
```

> display(pf,pline, axes=normal);