

MATH 253 Spring 2003 Section 503

Maple Quiz Solutions

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

```
#1
```

```
> f:=MF(<x,y>,x^2+y^4);
```

$$f := (x, y) \rightarrow x^2 + y^4$$

```
> fx:=D[1](f);
```

$$fx := (x, y) \rightarrow 2x$$

```
> fy:=D[2](f);
```

$$fy := (x, y) \rightarrow 4y^3$$

```
> P:=<2,1>;
```

$$P := \begin{bmatrix} 2 \\ 1 \end{bmatrix}$$

```
> fP:=f &@ P;
```

$$fP := 5$$

```
> fxP:=fx &@ P;
```

$$fxP := 4$$

```
> fyP:=fy &@ P;
```

$$fyP := 4$$

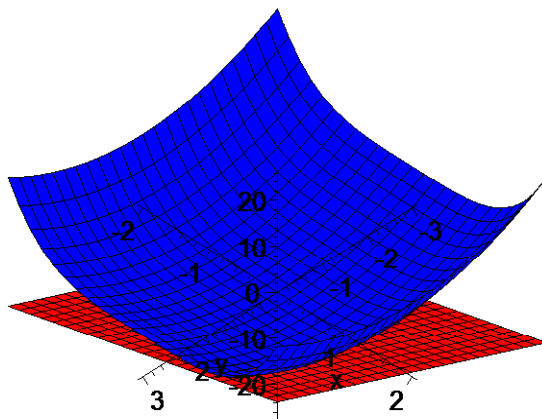
```
> ftan:=MF(<x,y>,fP+fxP*(x-2)+fyP*(y-1));
```

$$ftan := (x, y) \rightarrow -7 + 4x + 4y$$

```
> pf:=plot3d(f(x,y), x=-3..3, y=-2..2, color=blue):
```

```
> pftan:=plot3d(ftan(x,y), x=-3..3, y=-2..2, color=red):
```

```
> display(pf,pftan, axes=normal);
```



```

[ #2
[ > delta:=r^2;

                                 $\delta := r^2$ 
[ > J:=r;

                                 $J := r$ 
[ > M:=Muint(delta*J, z=r..9, r=0..9, theta=0..2*Pi); M:=value(%);

                                
$$M := \int_0^{2\pi} \int_0^9 \int_r^9 r^3 dz dr d\theta$$

                                
$$M := \frac{59049 \pi}{10}$$

[ > Mz:=Muint(z*delta*J, z=r..9, r=0..9, theta=0..2*Pi); Mz:=value(%);

                                
$$Mz := \int_0^{2\pi} \int_0^9 \int_r^9 z r^3 dz dr d\theta$$

                                
$$Mz := \frac{177147 \pi}{4}$$

[ > zbar:=Mz/M;

                                
$$zbar := \frac{15}{2}$$


```