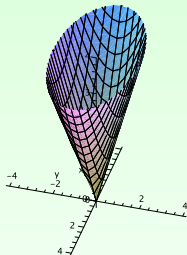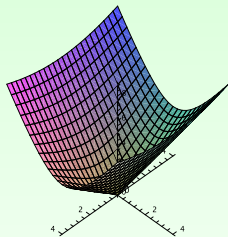1. (a) For $f(x, y) = \sqrt{x^2 + 4y^2}$, identify the surface $z = f(x, y)$ by sketching traces or plotting it in Maple.

First try in Maple, on left – hard to tell what it is. Adjusted the z-range and now it's clear it is the upper half of an elliptic cone:
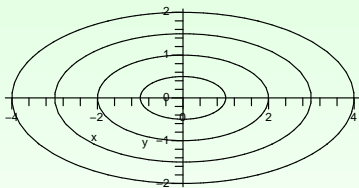


```
plot3d(sqrt(x^2+4*y^2),

x=-4..4, y=-4..4,
axes=normal);
```

right-click on graph - axes - properties

change z to going from 0 to 4

1. (b) For $f(x, y) = \sqrt{x^2 + 4y^2}$: on a single set of 2-dimensional axes, sketch the traces $z = 1$, $z = 2$, $z = 3$, and $z = 4$ to form a *contour plot* of the surface. Pay attention to the relationship between the contour plot and the surface.
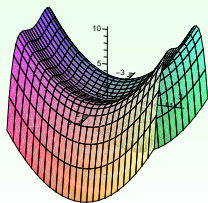
2. Match the functions to the surfaces:
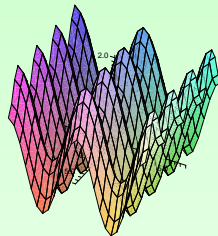
(a) $f(x, y) = x^2 - \frac{x^4}{4} + y^2$

(b) $f(x, y) = (\sin(x))^2 + y^2$

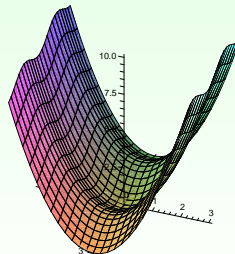(c) $f(x, y) = (\sin(x))^2 + \cos(y)$

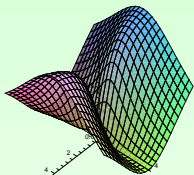Surface A $\longleftrightarrow$ (c)

Surface B $\longleftrightarrow$ (a)
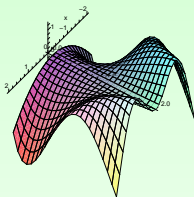
Surface C $\longleftrightarrow$ (b)

3. Match the surfaces to the contour plots

Surface (a)
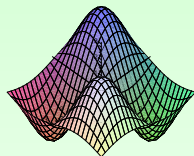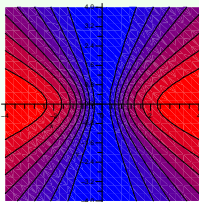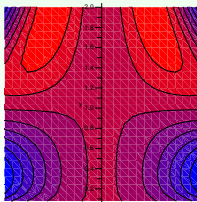

Surface (b)

Surface (c)

Contour Plot B

↕

Contour Plot C

↕

Contour Plot A

↕