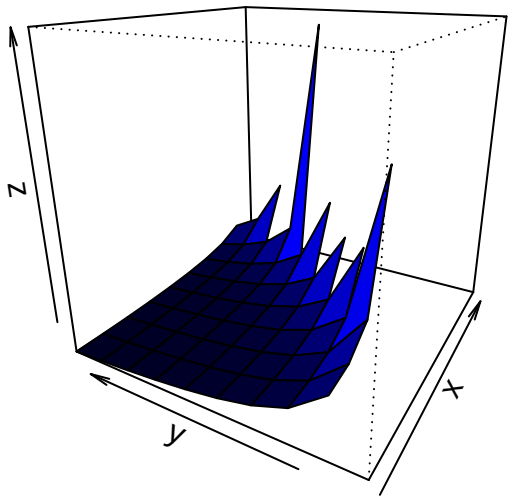
discussion15

```
f1 <- function(x,y) {1 / sqrt(y - x^2)}

x <- seq(0, 10, length = 10)
y <- seq(1, 110, length = 10)
z <- outer(x, y, f1)
```

```
## Warning in sqrt(y - x^2): NaNs produced
```

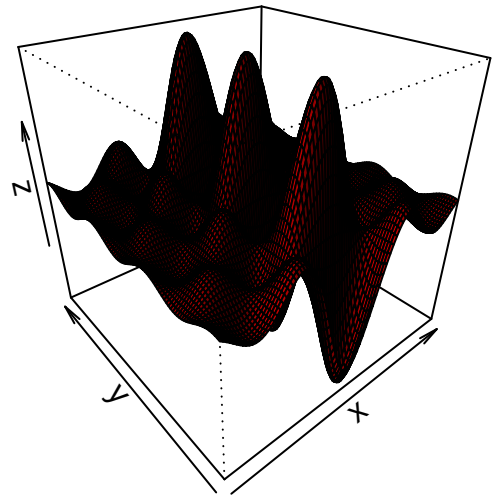
```
persp(x, y, z, main = "Some Section of 1/y-x^2",
      theta = 300, phi = 20, col = "blue", shade = 3)
```




```
f2 <- function(x,y) {cos(y) * sin(x) / x}

x <- seq(-10, 10, length = 100)
y <- seq(-10, 10, length = 100)
z <- outer(x, y, f2)
```

```
persp(x, y, z, main = "Some Section of cosy*sinx/x",
      theta = 320, phi = 30, col = "red", shade = 1)
```



12.2 #20

A limit is given. Evaluate the limit along the paths given, then state why these results show the given limit does not exist.

$$\lim_{(x,y)\to(\pi,\pi/2)} \frac{\sin x}{\cos y}$$

(a) Along $x = \pi$

First, substitute:

$$\lim_{y\to\pi/2} \frac{\sin pi}{\cos y}$$

Now apply Bernoulli's Rule:

```
D(sin(pi)/cos(y), 'y')
```

```
## [1] 0
```

(b) Along $y = x - \pi/2$

$$\lim_{x \to x - pi} \frac{\sin x}{\cos x - \pi}$$

```
D(sin(x)/cos(x-pi), 'x')
```

```
## [1] 0
```

Evaluating this function for the pair (0,0) gives us negative infinity....

```
cos(0) / -sin(0)
```

```
## [1] -Inf
```

This shows that $y = 0$ is outside of the domain of the function. Dividing by zero is not okay in this case.