

#11 from S 1.5 homework.

Messed up on original solutions. Neither graph nor analysis were correct. And the analysis is far advanced, relative to where we are, right now. I'll use L'Hopital's Rule, which we won't see 'til much later.

$$f := x \rightarrow \frac{\cos(2 \cdot x) - \cos(x)}{x^2}$$

0

$$x \rightarrow \frac{\cos(2x) - \cos(x)}{x^2}$$

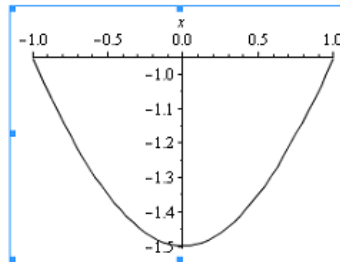
Maple can just clobber the limit, with the `limit` command:

```
limit(f(x), x = 0)
```

$$-\frac{3}{2}$$

We were supposed to approximate the limit by inspecting the graph, and check it, numerically. Here's the graph:

```
with(plots) :  
plot(f(x), x = -1 .. 1, discont = true, thickness = 1, color = black)
```



Looks like it's approaching $y = -1.5$ as $x \rightarrow 0$. That is to say, $y \rightarrow -1.5$ as $x \rightarrow 0$.

Numerical check. Do a bunch of evals at the same time:

```
[f(0.001), f(.0001), f(-.001), f(-.0001)]
```

```
[-1.500000000, -1.500000000, -1.500000000, -1.500000000]
```