Assignment 13

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```
derivi <- function(x, lim) {
  xp <- x + lim
  return (((xp**3 + 2*(xp**2)) - (x**3 + 2*(x**2))) / lim)
}

derivi(3, .00005)
```

```
## [1] 39.00055
```

Let's check with the deriv which is $3x^2 + 4x$, plugging in 3 gives... 39. Looks good.

```
x <- seq(1,3,by = .00001)
y <- 3*(x**2) + 4*x
sum(y*.00001)
```

```
## [1] 42.00023
```

And now let's test this with some more plugging in... it gives... 42

Going to exclude the deriv and int symbols to make my latex life easier.

1.

$$cos(x)sin(x)$$

Sub in with power rule to get...

$$\frac{u^2}{2}$$

and then sub back in to get...

$$\frac{sin^2(x)}{2}$$

2.

$$x^2e^x$$

$$-2xe^x$$

$$e^x$$

plug in the integral to get...

$$xe^x - e^x$$

$$2xe^x - 2e^x$$

$$x^2e^x - 2xe^x + 2e^x$$

$$x^2e^x - 2xe^x + 2e^x$$

3.

$$xcos(x)$$

$$cos(x) + (-sin(x)x)$$

$$cos(x) - xsin(x)$$

4.

$$e^{x4}$$

$$e^{x4} * x^4$$

$$4x^3e^{x4}$$