Discussion 15

MGinorio

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```
f_ <- expression(x**3 - 3*x + y**2 - 6*y)
x <- -1
y <- 3
f_x <- D(f_, "x")
f_x
```

```
## 3 * x^2 - 3
```

```
f_y <- D(f_, "y")
f_y
```

```
## 2 * y - 6
```

```
eval(f_x)
```

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

```
eval(f_y)
```

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

WK 15

Rate of Change of a function Δ
hold 1 variable
other — constant

Notation if $z = f(x,y)$

$f(x) = \frac{\partial f}{\partial x} = \frac{\partial z}{\partial x} = D_x f$

$f(x) = \frac{\partial f}{\partial y} = \frac{\partial z}{\partial y} = D_y f$

6

$x^3 - 3x + y^2 - 6y$ $(-1,3)$ $f_x(x,y)$ and $f_y(x,y)$

a) allow x to vary and hold (y) fixed

b) allow y to vary and hold (x) fixed

Find $f(x)$: $f(x,y) = x^3 - 3x + y^2 - 6y$

$x^3 - 3x + \# - \#$

$3x^2 - 3$

$f(x) = 3(x^2 - 3)$ //

$(-1,3)$: $3((-1)^2 - 3)$

$3(1-3)$

$3 - 3$

0

Find $f(y)$: $f(x,y)$ $x^3 - 3x + y^2 - 6y$

$\# - \# \quad 2y - 6$

$f(y) = 2y - 6$ //

$(-1,3)$: $2(3) - 6$

$6 - 6$

0