

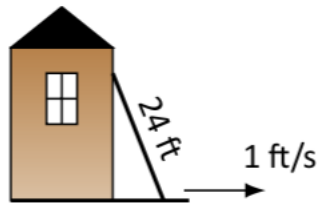
# HW 13

Calculus Book, Chapter 4, Page 179, Question 9

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A 24ft. ladder is leaning against a house while the base is pulled away at a constant rate of 1ft/s.



At what rate is the top of the ladder sliding down the side of the house when the base is:

- (a) 1 foot from the house?
- (b) 10 feet from the house?
- (c) 23 feet from the house?
- (d) 24 feet from the house?

a) 1 foot from the house

```
# assign x as 1
x <- 1

# assign y as square root of the value: (ladder height square - slide rate square)
y <- sqrt(24^2 - x^2)

# compute derivative of x
dxdt <- 1

# compute derivative of y
dydt <- -x*dxdt/y
dydt
```

```
## [1] -0.04170288
```

b) 10 foot from the house

```

# assign x as 10
x <- 10

# assign y as square root of the value:(ladder height square - slide rate square)
y <- sqrt(24^2 - x^2)

# compute derivative of x
dxdt <- 1

# compute derivative of y
dydt <- -x*dxdt/y
dydt

```

```
## [1] -0.4583492
```

c) 23 foot from the house

```

# assign x as 23
x <- 23

# assign y as square root of the value:(ladder height square - slide rate square)
y <- sqrt(24^2 - x^2)

# compute derivative of x
dxdt <- 1

# compute derivative of y
dydt <- -x*dxdt/y
dydt

```

```
## [1] -3.354895
```

d) 24 foot from the house

```

# assign x as 24
x <- 24

# assign y as square root of the value:(ladder height square - slide rate square)
y <- sqrt(24^2 - x^2)

# compute derivative of x
dxdt <- 1

# compute derivative of y
dydt <- -x*dxdt/y
dydt

```

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