

# MathJax

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Fall 2017

## Markdown Code: MathJax

Markdown supports **MathJax JavaScript engine** to render mathematical equations and formulas

```
$s^{2} = \frac{\sum(x-\bar{x})^2}{n-1}$
```

$$s^2 = \frac{\sum(x-\bar{x})^2}{n-1}$$

Check out this online tutorial

<http://meta.math.stackexchange.com/questions/5020/mathjax-basic-tutorial-and-quick-reference>

Inline equations - use single "dollar sign" `$` to specify MathJax coding

# Centering you equations

Insertion of two dollar signs \$\$ centers your equations. Other examples, off set and centered - notice double dollar signs:

```
$ \sum_{i=0}^n i^2 = \frac{(n^2+n)(2n+1)}{6} $
```

```
$$ \sum_{i=0}^n i^2 = \frac{(n^2+n)(2n+1)}{6} $$
```

Inline equation  $\sum_{i=0}^n i^2 = \frac{(n^2+n)(2n+1)}{6}$  on the same line. Or, self-standing equation on a separate line

$$\sum_{i=0}^n i^2 = \frac{(n^2 + n)(2n + 1)}{6}$$

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## More Interesting Codes:

Greek Letters:

```
 $\alpha$      $\beta$      $\gamma$      $\chi$  
 $\Delta$     $\Sigma$    $\Omega$
```

superscripts (^) and subscripts (\_)

```
 $x_i^2$      $\log_2 x$
```

Greek Letters: (not all capitalized Greek letters available)

$\alpha \beta \gamma \chi$

$\Delta \Sigma \Omega$

superscripts (^) and subscripts (\_)

$x_i^2 \log_2 x$

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# Grouping with Brackets

Use brackets `{...}` to delimit a formula containing a superscript or subscript. Notice the difference the grouping makes:

```
$(x^y)^z$
```

```
$x^{y^z}$
```

```
$x_i^2$
```

```
$x_{i^2}$
```

$x^{yz}$   $x^{y^z}$   $x_i^2$   $x_{i^2}$

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# Scaling:

Add the scaling code `\left(...\right)` to make automatic size adjustments

```
$(\frac{\sqrt{x}}{y^3})$
```

```
$$\left(\frac{\sqrt{x}}{y^3}\right)$
```

$\left(\frac{\sqrt{x}}{y^3}\right)$   $\left(\frac{\sqrt{x}}{y^3}\right)$

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# Sums and Integrals

Subscript ( ) designates the lower limit; superscript ( ) designates upper limit:

`\sum_1^n`                      `\sum_{i=0}^{\infty} i^2`

$$\sum_1^n \sum_{i=0}^{\infty} i^2$$

Other notable symbols:

- `\prod`                      `\infty`  
- `\bigcup`                      `\bigcap`  
- `\int`                      `\iint`

$$\prod \infty \cup \cap \int \iint$$

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# Radical Signs

Use 'sqrt' code to adjust the size of its argument. Note the change in size of the square root function based on the code

1. `\sqrt{x^3}`
2. `\sqrt[3]{\frac{xy}{}}`  
and for complicated expressions use brackets
3. `{...}^{1/2}`

1.  $\sqrt{x^3}$
2.  $\sqrt[3]{\frac{x}{y}}$
3. ...<sup>1/2</sup>

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# You can also change fonts!

`$$\mathbb or $$Bbb for 'Blackboard bold'`  
`$$\mathbf for boldface`  
`$$\mathtt for 'typewriter' font`  
`$$\mathrm for roman font`  
`$$\mathsf for sans-serif`  
`$$\mathcal for 'caligraphy'`  
`$$\mathscr for script letter:`  
`$$\mathfrak for "Fraktur" (old German style)`

ABCDEFGH **ABCDEFGH** ABCDEFG ABCDEFG ABCDEFG *ABCDEFGH*  
*ABCDEFGH* **ABCDEFGH**

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# You can also change fonts!

Some special functions such as "lim" "sin" "max" and "ln" are normally set in roman font instead of italic. Use `\lim`, `\sin` to make these (roman):

`$$\sin x$ (roman) vs $$sin x$ (italics)`

$\sin x$  (roman) vs  $\sin x$  (italics)

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## And, add curly brackets

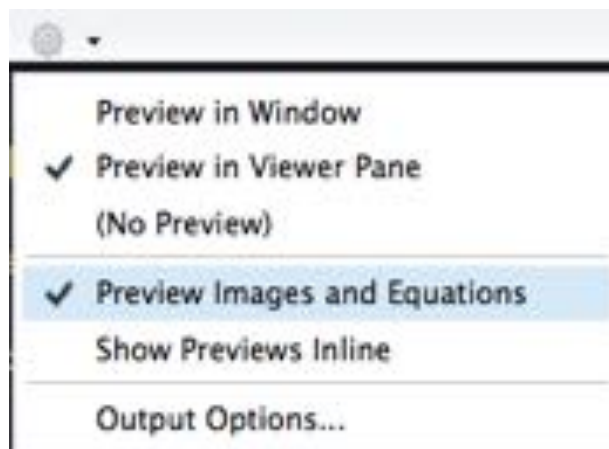
```
$$\begin{cases} \widehat{IF}_{1D} = IF_{1D} - f(D)/2 \\ \widehat{IF}_{2D} = IF_{2D} + f(D)/2 \end{cases} \quad (1)$$
```

$$\begin{cases} \widehat{IF}_{1D} = IF_{1D} - f(D)/2 \\ \widehat{IF}_{2D} = IF_{2D} + f(D)/2 \end{cases} \quad (1)$$

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## RStudio bonus

Inline preview of formulas and images in an RMarkdown document



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# References

[https://github.com/ohsu-knight-cancer-biostatistics/reproducible-research/blob/32bba6a78e347d64745982fb6245915cecb1b7c3/slides-info-reproducible-research/study-group-2016/Chpt%2013%20Web%20Presentations/MathJax\\_2.Rmd](https://github.com/ohsu-knight-cancer-biostatistics/reproducible-research/blob/32bba6a78e347d64745982fb6245915cecb1b7c3/slides-info-reproducible-research/study-group-2016/Chpt%2013%20Web%20Presentations/MathJax_2.Rmd)