

# SK4

## Trig Function-Fourier Series Explorations

April 2009 Notes by WS

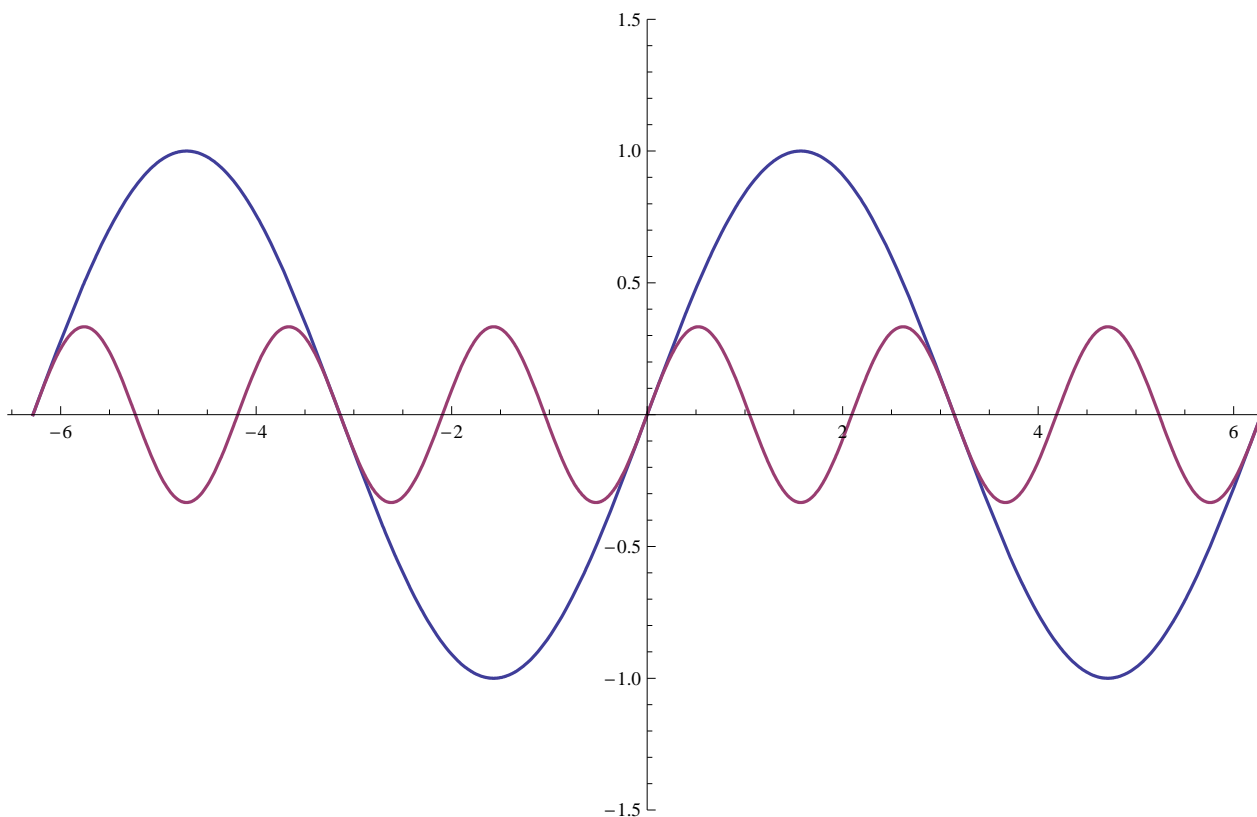
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### Graphics Example 1

- The graphic below shows the two curves  
 $y_1 = \sin[x]$  and  
 $y_2 = (1/3) \sin[3x]$   
 $x \in [-2\pi, 2\pi]$ ,  $y \in [-3, 3]$ .

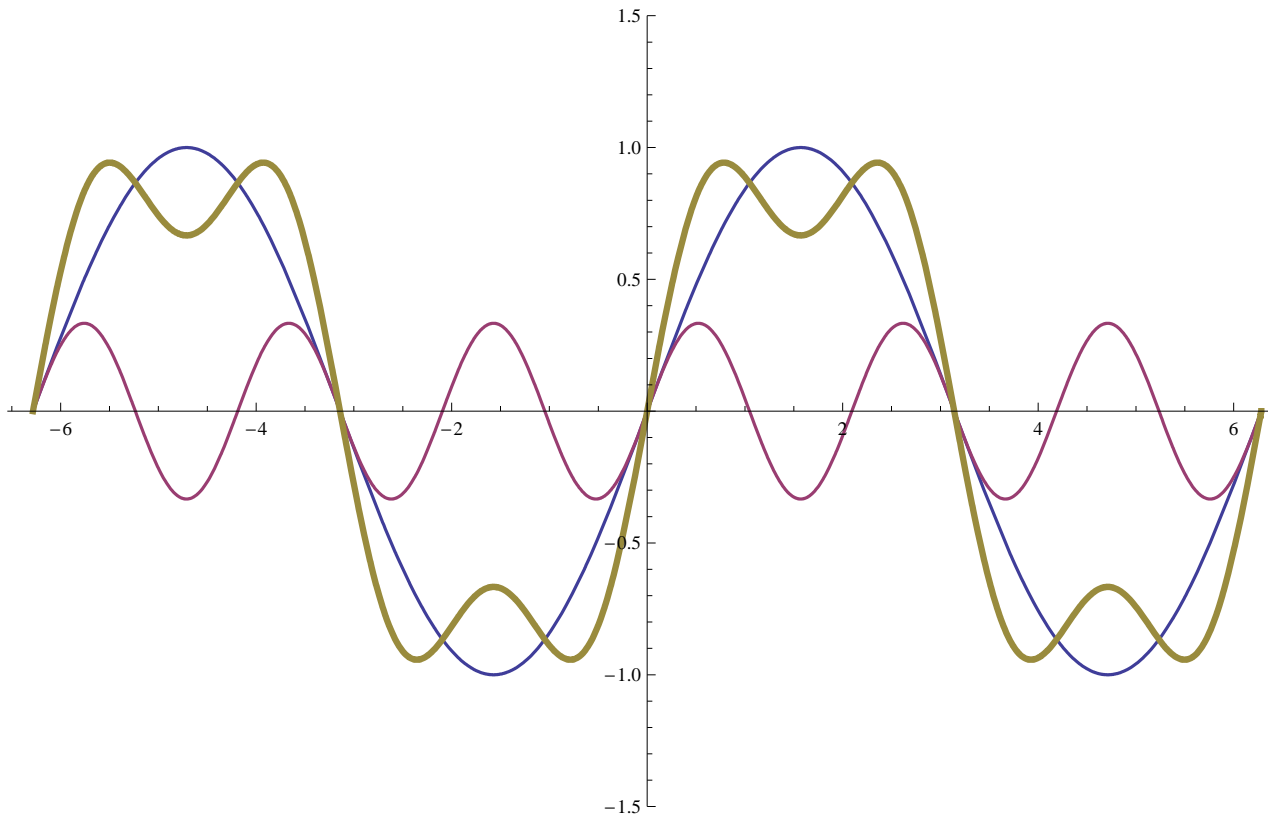
**QUESTION:** what does the curve  $y_1 + y_2$  look like? See next cell for an answer.

```
Plot[{Sin[x], (1/3) Sin[3*x]}, {x, -2 Pi, 2 Pi},  
PlotRange -> {-1.5, 1.5}, PlotStyle -> {Thickness[.0025]}, ImageSize -> 600]
```



- $y_1 = \sin[x]$  and  
 $y_2 = (1/3) \sin[3x]$   
 $x \in [-2\pi, 2\pi]$ ,  $y \in [-3, 3]$ .  
ANSWER:  $y_1 + y_2$  looks like this:

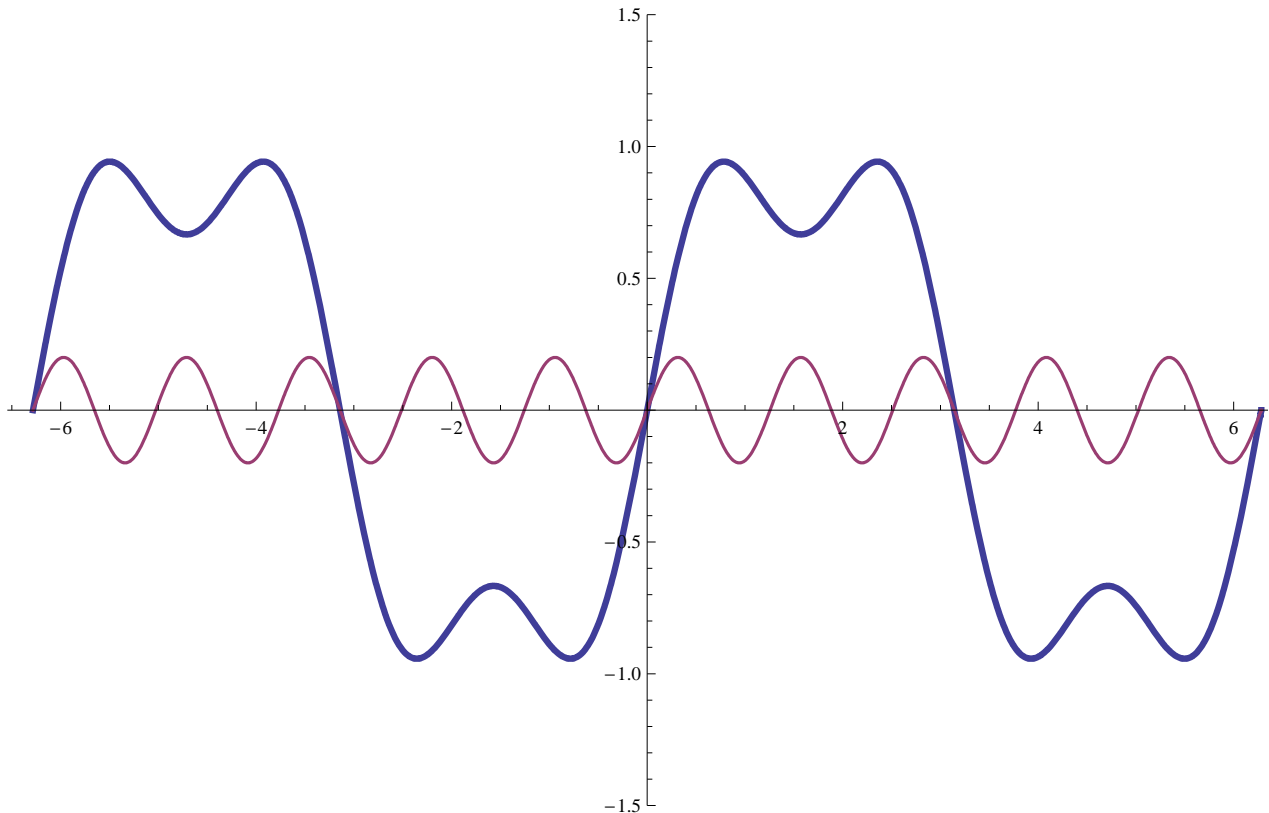
```
Plot[{Sin[x], (1 / 3) Sin[3 * x], Sin[x] + (1 / 3) Sin[3 * x]},  
  {x, -2 Pi, 2 Pi}, PlotRange -> {-1.5, 1.5},  
  PlotStyle -> {Thickness[.0025], Thickness[.0025], Thickness[.005]}, ImageSize -> 600]
```



- The graphic below shows the curves  
 $(y_1 = \sin[x]) + (y_2 = (1/3) \sin[3x])$   
 $y_3 = (1/5) \sin[5x]$   
 $x \in [-2\pi, 2\pi], y \in [-3, 3]$ .

**QUESTION:** what does the curve  $y_1 + y_2 + y_3$  look like?

```
Plot[{Sin[x] + (1/3) Sin[3*x], (1/5) Sin[5*x]}, {x, -2 Pi, 2 Pi},
  PlotRange -> {-1.5, 1.5}, PlotStyle -> {Thickness[.005], Thickness[.0025]}, ImageSize -> 600]
```



```
Plot[{Sin[x] + (1/3) Sin[3*x], (1/5) Sin[5*x], Sin[x] + (1/3) Sin[3*x] + (1/5) Sin[5*x]},
  {x, -2 Pi, 2 Pi}, PlotRange -> {-1.5, 1.5},
  PlotStyle -> {Thickness[.005], Thickness[.0025], Thickness[.01]}, ImageSize -> 600]
```