IMAP^2 Fairfield , IA
Trig Function Explorations
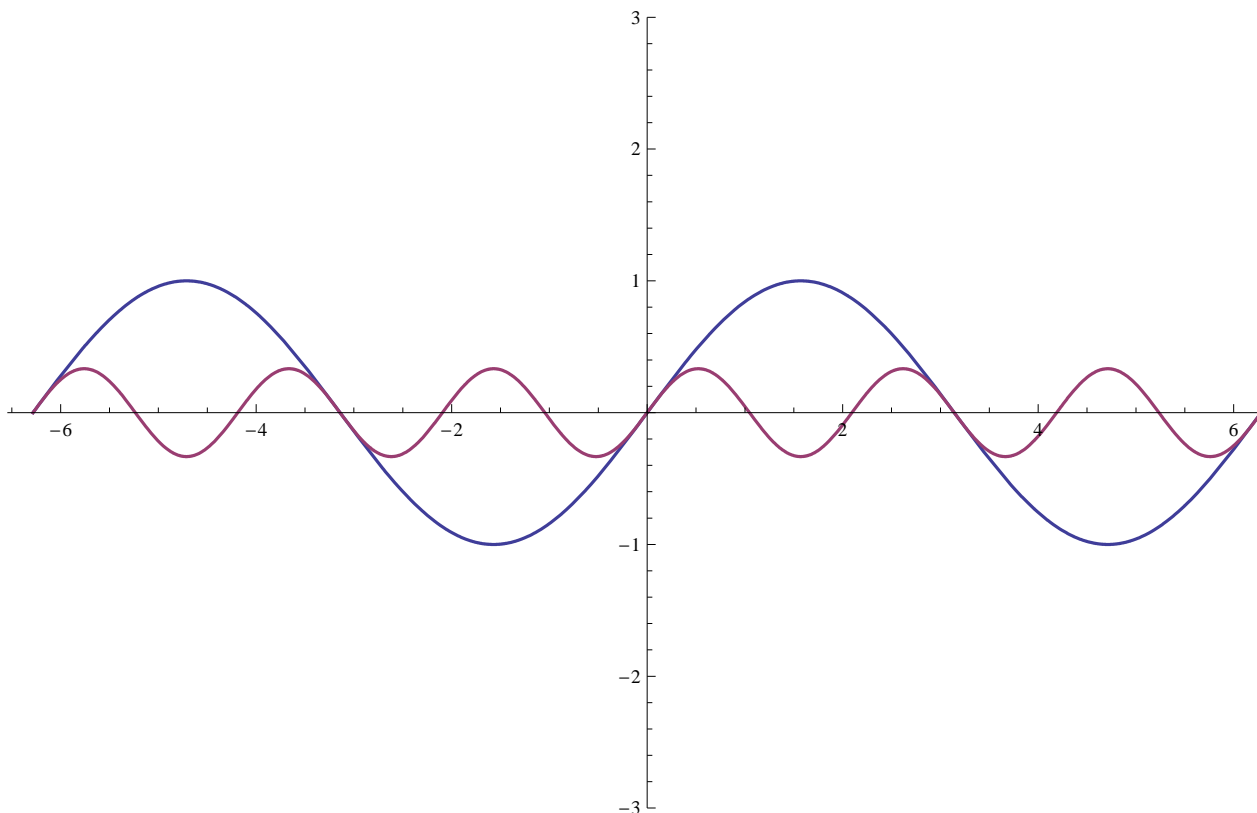June 2008 Notes by WS

EXAMPLE 1

- **The graphic below shows the two curves**
  y1 = Sin[x] and
  y2= (1/3) Sin [3 x]
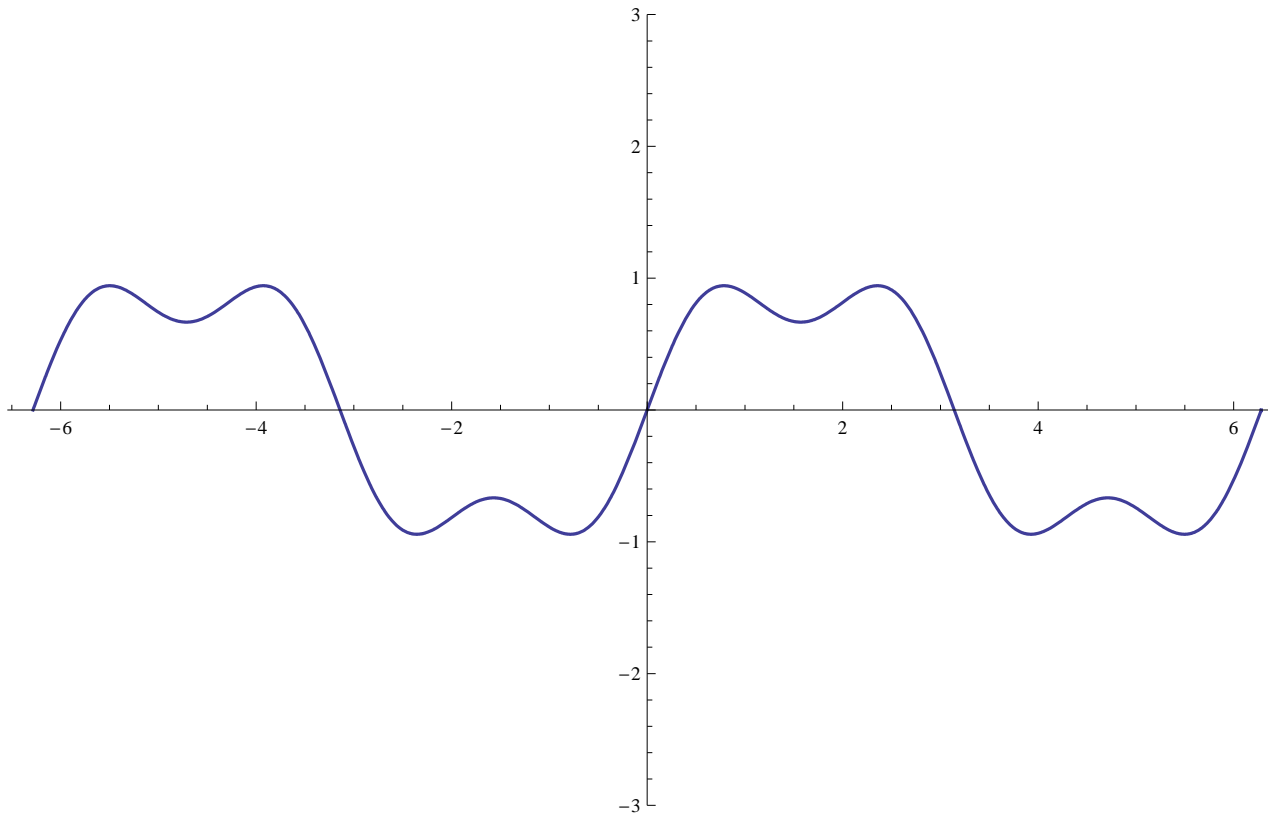 **x ∈[-2π, 2π], y ∈[-3,3].**

   QUESTION: what does the curve y1 + y2 look like? See next cell for an answer.

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

- **y1 = Sin[x] and**
  y2 = (1/3) Sin [3 x]
  x ∈[-2π, 2π], y ∈[-3,3].
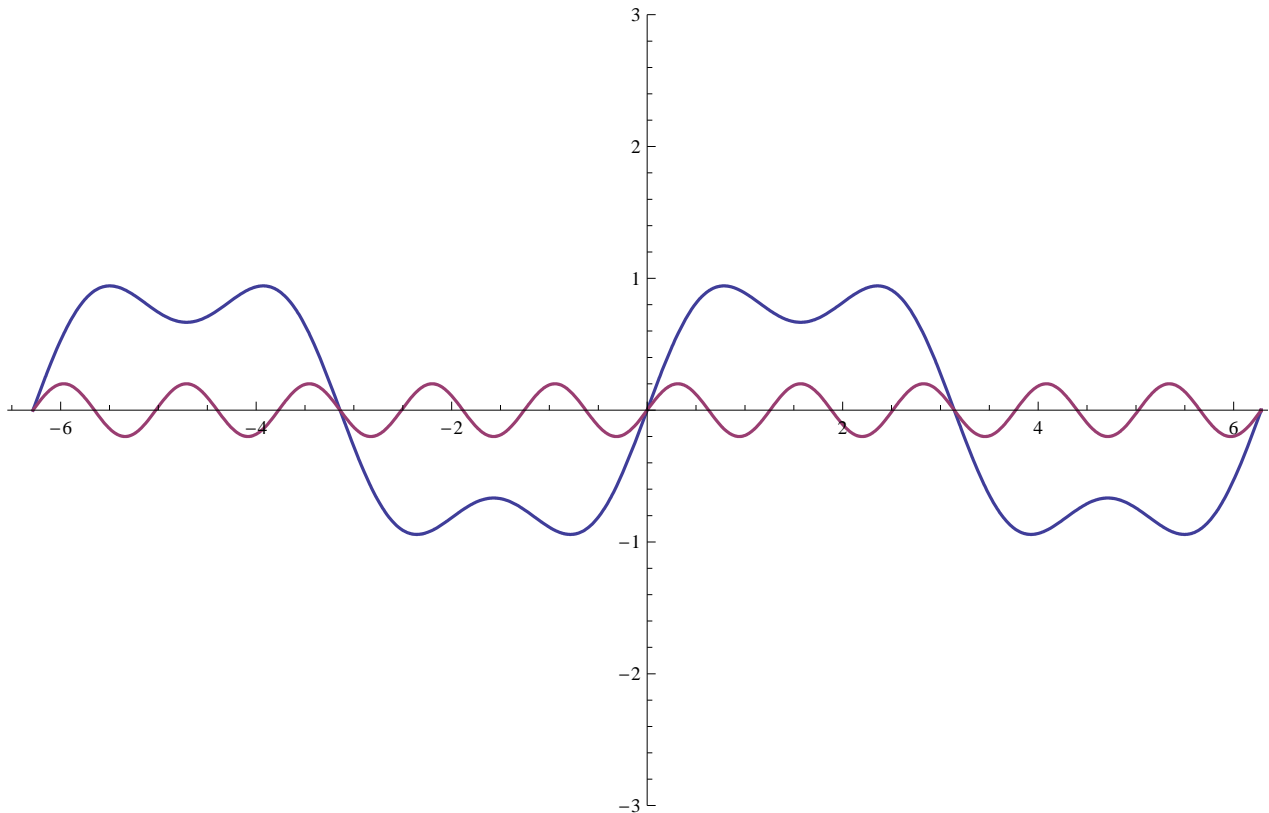 **ANSWER: y1 + y2 looks like this:**

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

■ **The graphic below shows the curves**
   (y1 = Sin[x]) + (y2 = (1/3) Sin [3 x])
   y3 = (1/5) Sin [5 x]
   x ∈[-2π, 2π], y ∈[-3,3].

   QUESTION: what does the curve y1 + y2 + y3 look like?

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



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

EXAMPLE 2

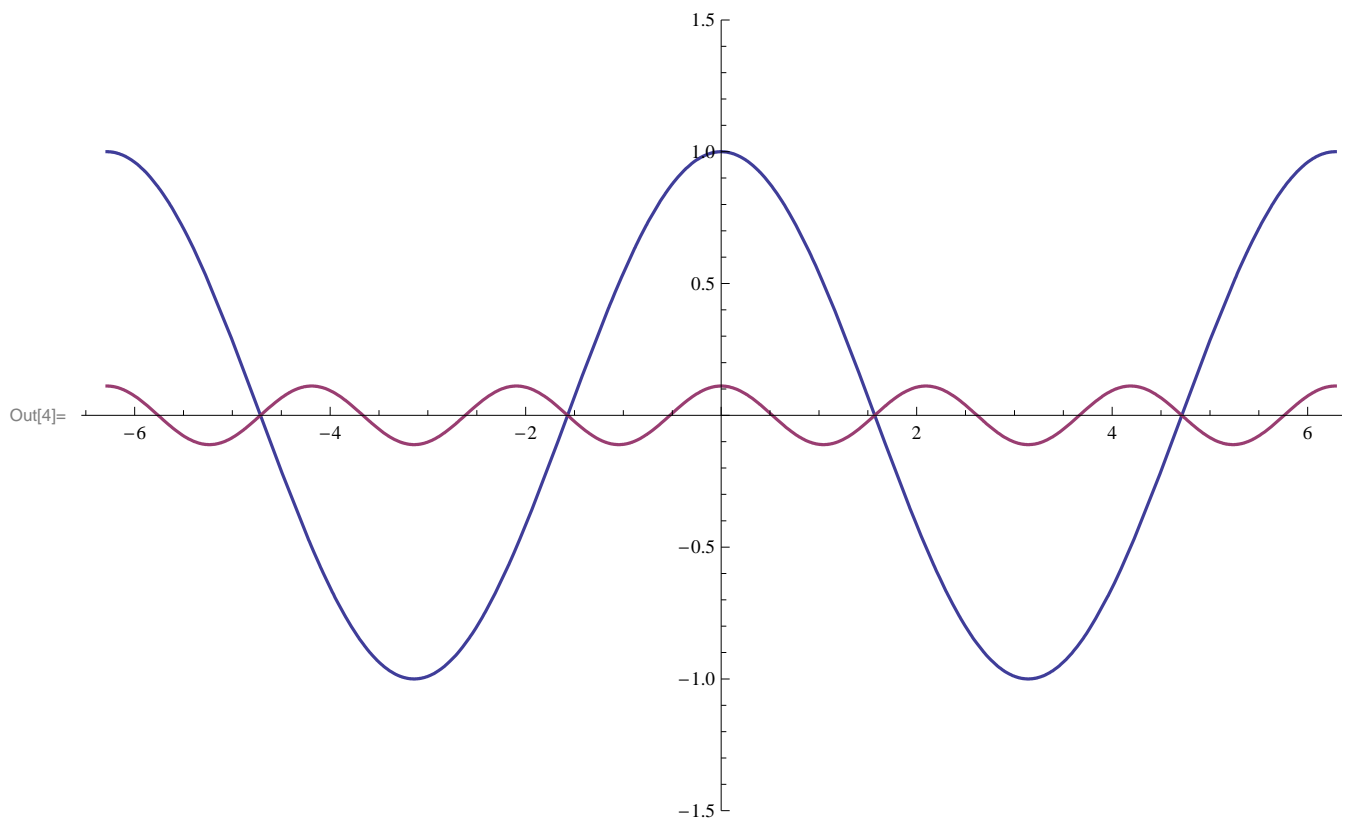- **The graphic below shows the two curves**
  y1 = Cos[x] and
  y2= (1/3^2) Cos [3 x]
  x ∈[-2π, 2π], y ∈[-3,3].

  QUESTION: what does the curve y1 + y2 look like? See next cell for an answer.
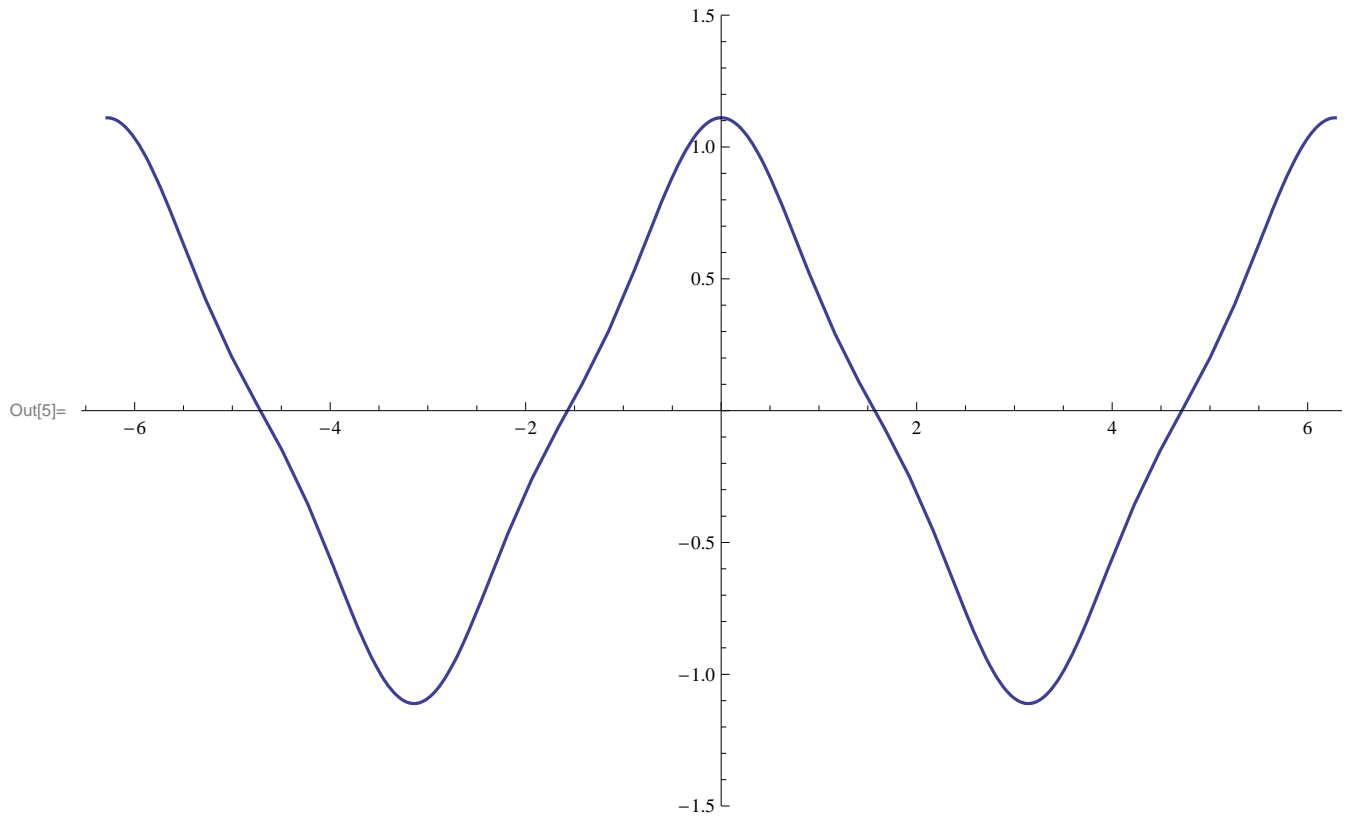
In[4]:= `Plot[{Cos[x], (1/3^2) Cos[3*x]}, {x, -2 Pi, 2 Pi},`
       `PlotRange → {-1.5, 1.5}, PlotStyle → {Thickness[.0025]}, ImageSize → 600]`

Out[4]=

- **y1 = Cos[x] and**
  y2= (1/3^2) Cos [3 x]
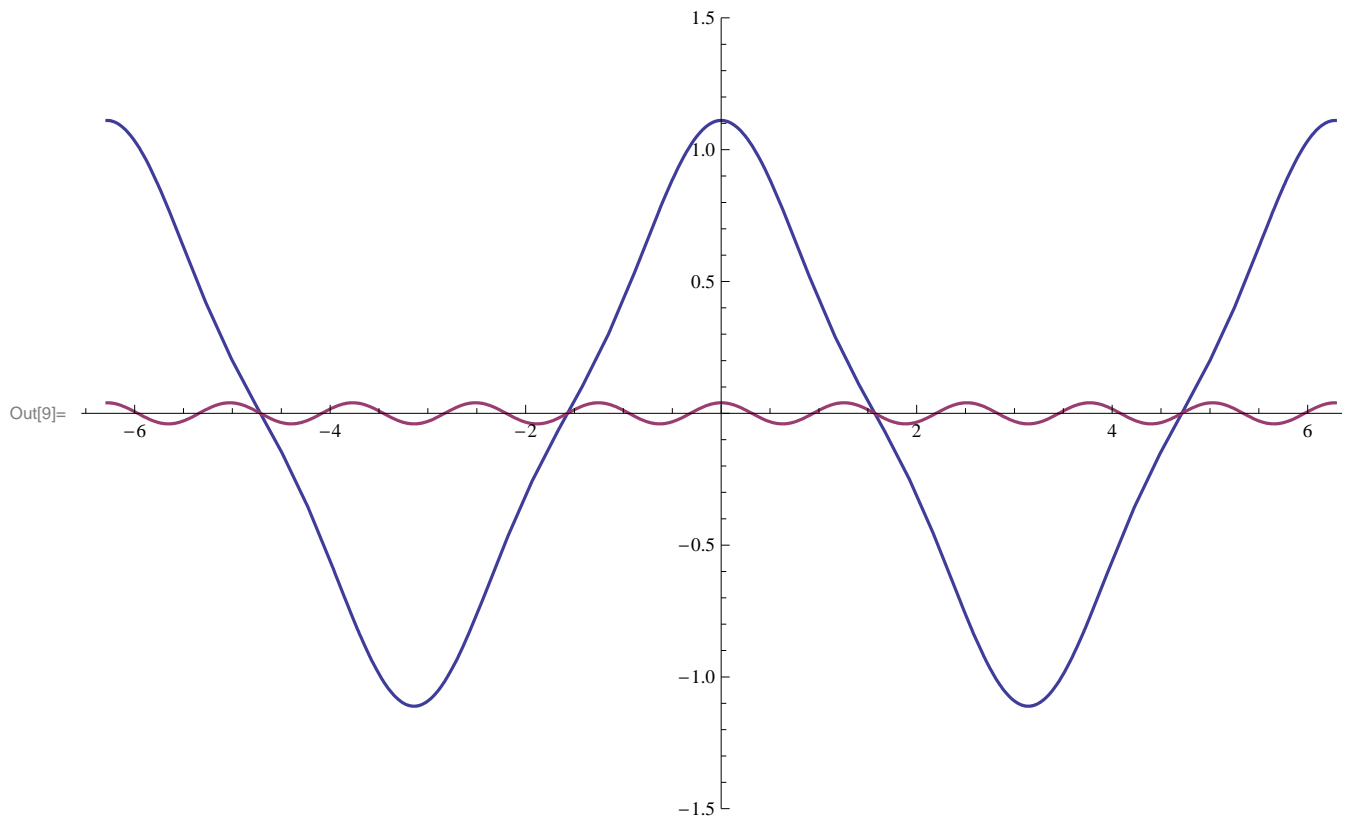 **x ∈[-2π, 2π], y ∈[-3,3].**
  ANSWER: y1 + y2 looks like this:

In[5]:= `Plot[{Cos[x] + (1 / 3 ^ 2) Cos[3 * x]}, {x, -2 Pi, 2 Pi},`
`    PlotRange → {-1.5, 1.5}, PlotStyle → {Thickness[.0025]}, ImageSize → 600]`

Out[5]=

- **The graphic below shows the curves**
  (y1 = Cos[x])+ (y2= (1/3^2) Cos [3 x])
  and
  y3 = (1/5^2) Sin [5 x]
  x ∈[-2π, 2π], y ∈[-3,3].

  QUESTION: what does the curve y1 + y2 + y3 look like?

In[9]:= `Plot[{Cos[x] + (1 / 3 ^ 2) Cos[3 * x], (1 / 5 ^ 2) Cos[5 * x]}, {x, -2 Pi, 2 Pi},`
`    PlotRange → {-1.5, 1.5}, PlotStyle → {Thickness[.0025]}, ImageSize → 600]`

Out[9]=

In[8]:= `Plot[{Cos[x] + (1 / 3 ^ 2) Cos[3 * x] + (1 / 5 ^ 2) Cos[5 * x]}, {x, -2 Pi, 2 Pi},`
`    PlotRange → {-1.5, 1.5}, PlotStyle → {Thickness[.0025]}, ImageSize → 600]`