

# BHAKTI SHARMA MAT / 19 / 92

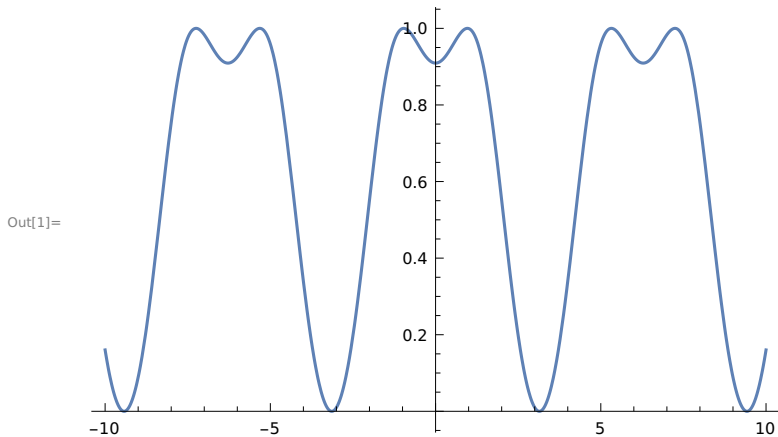
## CHAPTER 3 – TORRENCE

### SECTION 3.2

QUES1 : PLOT THE FOLLOWING FUNCTION ON THE DOMAIN

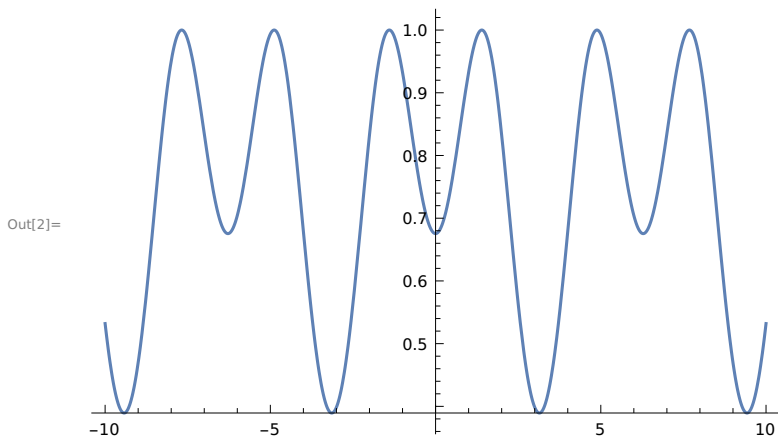
a)  $\sin(1 + \cos(x))$

In[1]:= `Plot[Sin[1 + Cos[x]], {x, -10, 10}]`



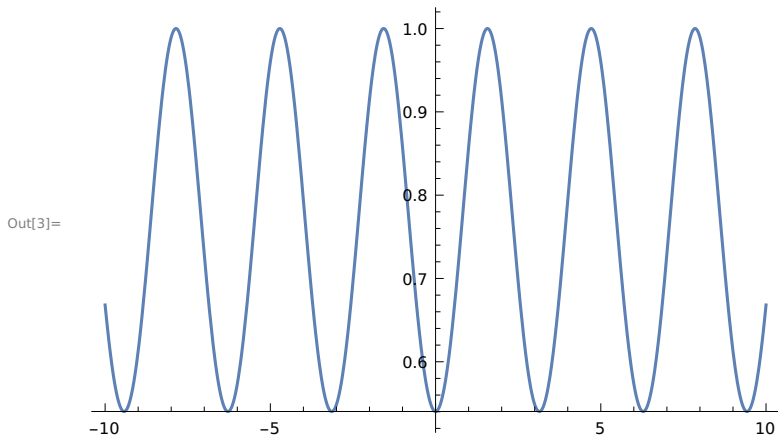
b)  $\sin(1.4 + \cos(x))$

In[2]:= `Plot[Sin[1.4 + Cos[x]], {x, -10, 10}]`



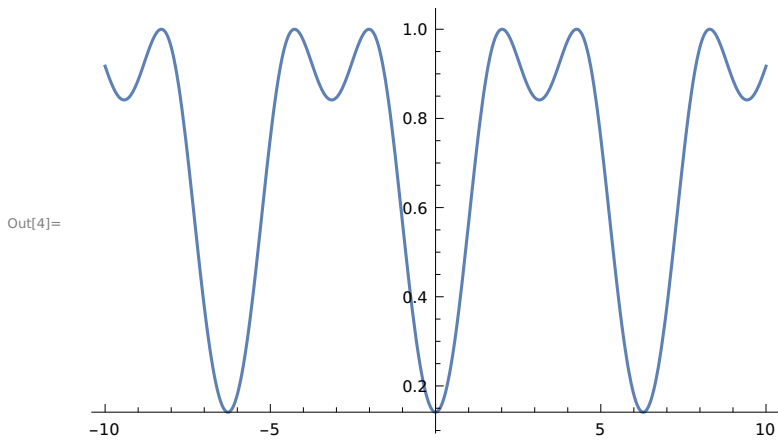
c)  $\sin(\pi/2 + \cos(x))$

In[3]:= `Plot[Sin[  $\pi$  / 2 + Cos[x]], {x, -10, 10}]`



d)  $\text{Sin}(2 + \text{Cos}(x))$

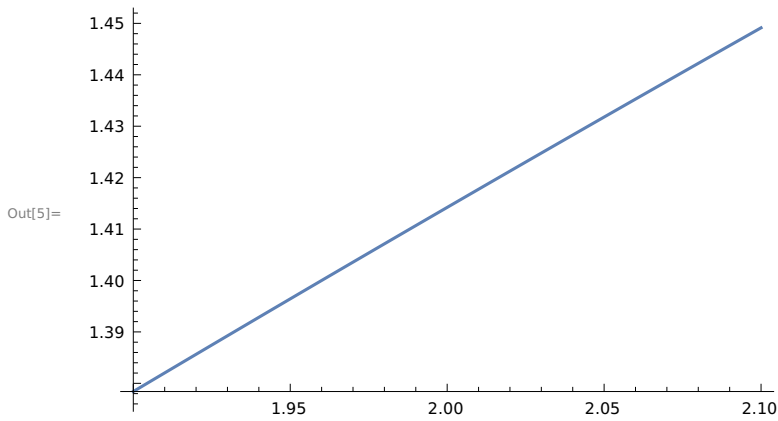
In[4]:= `Plot[Sin[2 + Cos[x]], {x, -10, 10}]`



### QUES2

a)  $\sqrt{x}$

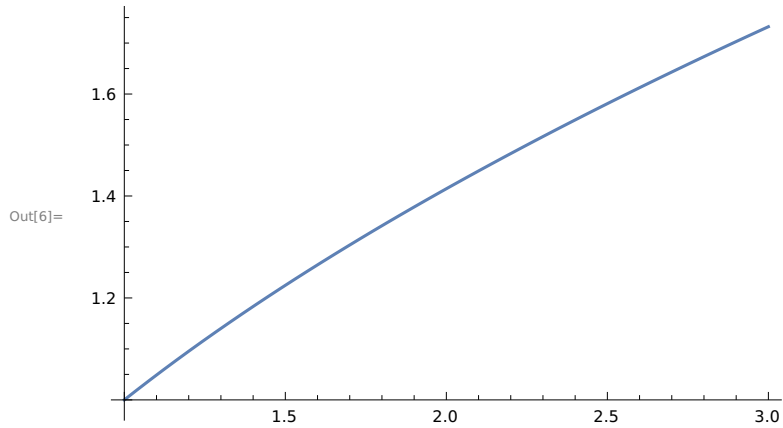
In[5]:= `Plot[ $\sqrt{x}$ , {x, 1.9, 2.1}]`



b)

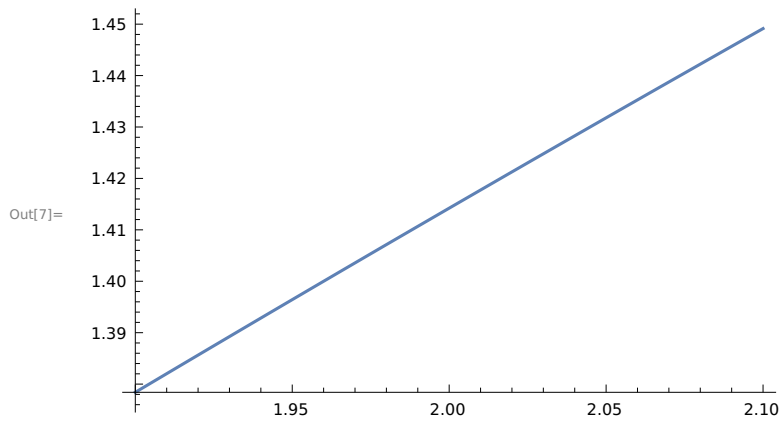
$$\delta = 10^0$$

In[6]:= `With[{ $\delta = 10^0$ }, Plot[ $\sqrt{x}$ , {x, 2 -  $\delta$ , 2 +  $\delta$ }]]`



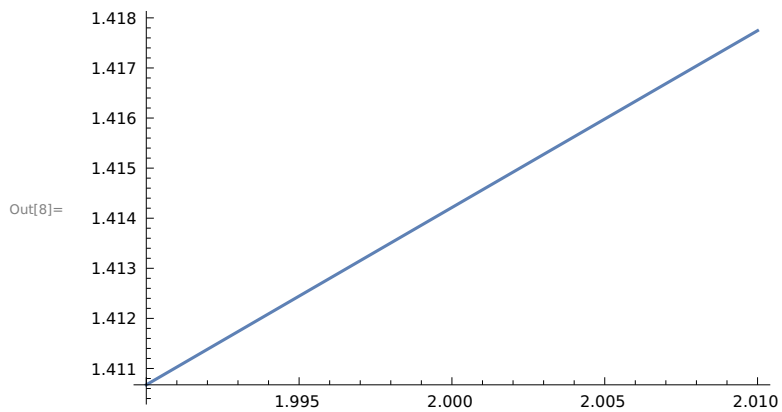
$$\delta = 10^{-1}$$

In[7]:= `With[{ $\delta = 10^{-1}$ }, Plot[ $\sqrt{x}$ , {x, 2 -  $\delta$ , 2 +  $\delta$ }]]`



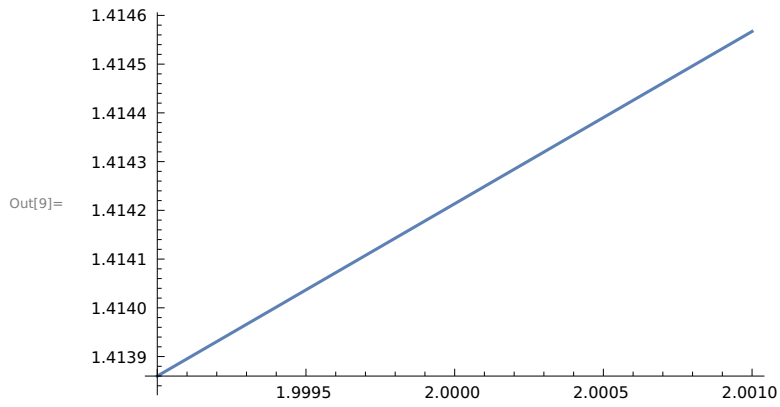
$$\delta = 10^{-2}$$

In[8]:= `With[{ $\delta = 10^{-2}$ }, Plot[ $\sqrt{x}$ , {x, 2 -  $\delta$ , 2 +  $\delta$ }]]`



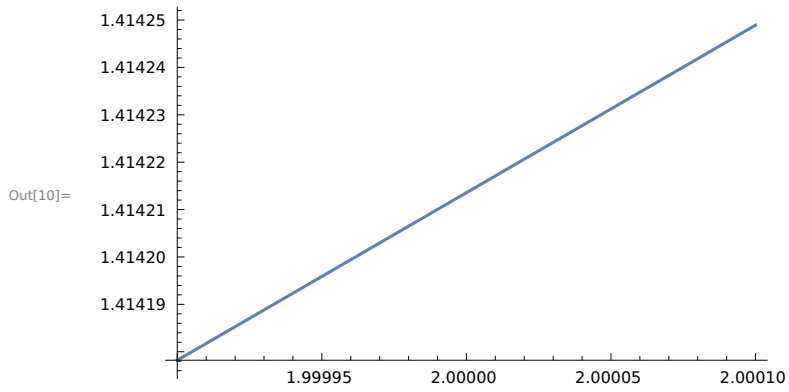
$$\delta = 10^{-3}$$

In[9]:= With[{ $\delta = 10^{-3}$ }, Plot[ $\sqrt{x}$ , {x, 2 -  $\delta$ , 2 +  $\delta$ }]]



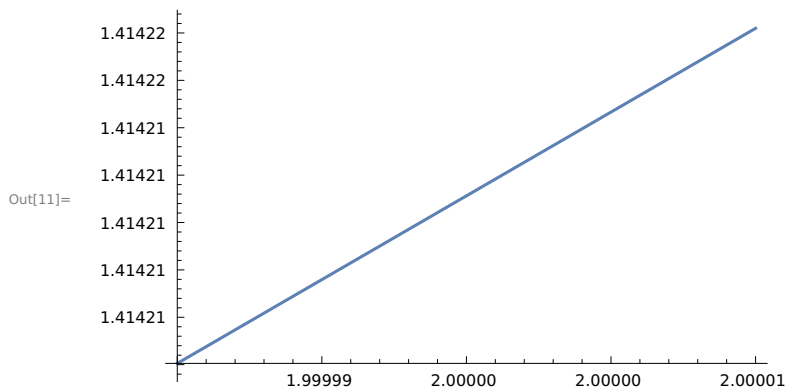
$$\delta = 10^{-4}$$

In[10]:= With[{ $\delta = 10^{-4}$ }, Plot[ $\sqrt{x}$ , {x, 2 -  $\delta$ , 2 +  $\delta$ }]]



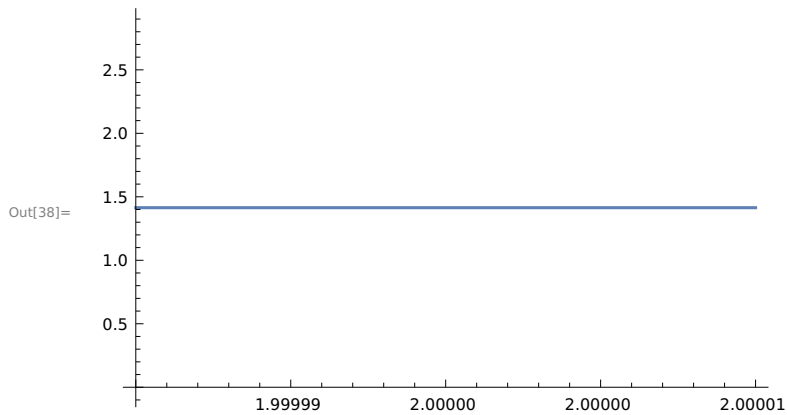
$$\delta = 10^{-5}$$

In[11]:= With[{ $\delta = 10^{-5}$ }, Plot[ $\sqrt{x}$ , {x, 2 -  $\delta$ , 2 +  $\delta$ }]]



c)  $\sqrt{2}$

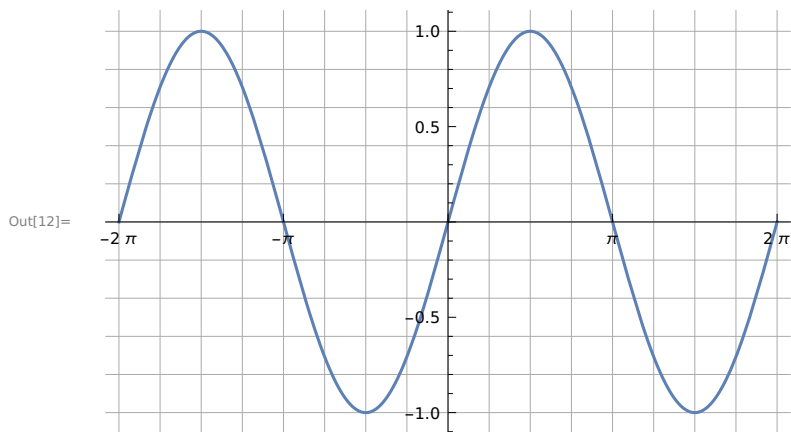
In[38]:= With[{ $\delta = 10^{-5}$ }, Plot[ $\sqrt{2}$ , {x, 2 -  $\delta$ , 2 +  $\delta$ }]]



### SECTION 3.3

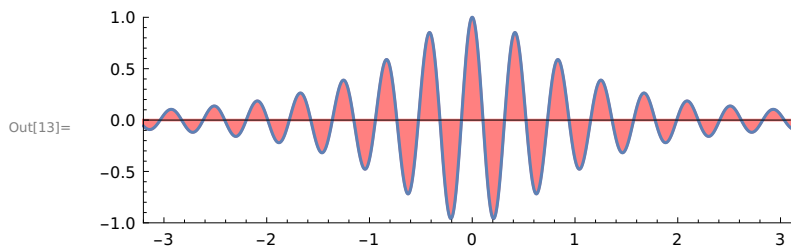
#### QUES1 .

In[12]:= Plot[Sin[x], {x, -2 Pi, 2 Pi}, GridLinesStyle → Lighter[Gray],  
GridLines → {Range[-2 Pi, 2 Pi, Pi/4], Range[-1, 1, 0.2]},  
Ticks → {Range[-2 Pi, 2 Pi, Pi], Automatic}]



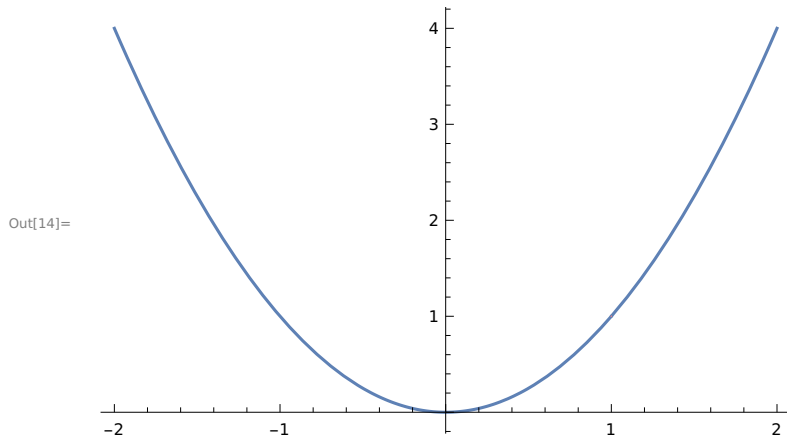
#### QUES2 .

In[13]:= Plot[(Cos[15 x])/(1 + x^2), {x, -3.2, 3.2}, AspectRatio → Automatic,  
AxesOrigin → {-3, 0}, Frame → {{True, False}, {True, False}}, Axes → {x, y},  
PlotRange → {{-3.2, 3.1}, {-1, 1}}, Filling → Axis, FillingStyle → Pink]



**QUES4 .**

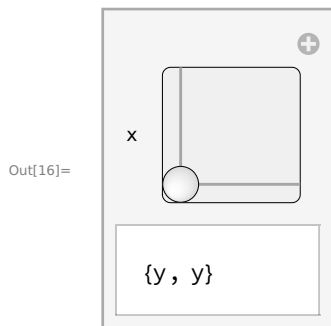
In[14]:= `Plot[x^2, {x, -2, 2}, Exclusions -> {x == 1}, ExclusionsStyle -> Directive[Pink, Dashed]]`



THERE IS NO VERTICAL ASYMPTOTE , THIS SHOWS THE GRAPH IS CONTINUOUS

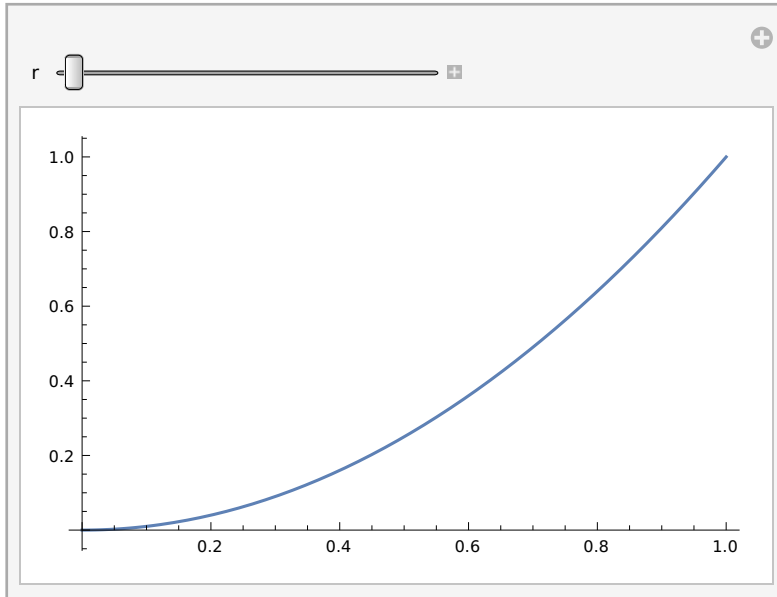
**SECTION 3.4****QUES1 .**

In[16]:= `Manipulate[{x, y}, {x, y, {0, 1}}`

**QUES2 .**

```
In[17]:= Manipulate[Plot[x^2, {x, 0, r}], {r, 1, 3},
  ImageSize -> {Automatic, 128}, AspectRatio -> 5/6]
```

Out[17]=



## SECTION 3.5

### QUES1 .

a)

```
In[18]:= Range[100]
```

```
Out[18]= {1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22,
  23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41,
  42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61,
  62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81,
  82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100}
```

```
In[19]:= Partition[Range[100], 10]
```

```
Out[19]= {{1, 2, 3, 4, 5, 6, 7, 8, 9, 10}, {11, 12, 13, 14, 15, 16, 17, 18, 19, 20},
  {21, 22, 23, 24, 25, 26, 27, 28, 29, 30}, {31, 32, 33, 34, 35, 36, 37, 38, 39, 40},
  {41, 42, 43, 44, 45, 46, 47, 48, 49, 50}, {51, 52, 53, 54, 55, 56, 57, 58, 59, 60},
  {61, 62, 63, 64, 65, 66, 67, 68, 69, 70}, {71, 72, 73, 74, 75, 76, 77, 78, 79, 80},
  {81, 82, 83, 84, 85, 86, 87, 88, 89, 90}, {91, 92, 93, 94, 95, 96, 97, 98, 99, 100}}
```

THE Range[100] COMMAND DISPLAYS NUMBERS FROM 1 TO 100 WHERE AS

THE COMMAND Partition[Range[100], 10] displays the numbers from 1 to 100 while simultaneously segregating them in the list of 10 numbers

b)

```
In[20]:= Grid[Partition [Range[100], 20]]
      1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16 17 18 19 20
      21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40
Out[20]= 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60
      61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80
      81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100
```

c)

```
In[22]:= Grid[Table[Range[x, x + 19], {x, {1, 21, 41, 61, 81}}]]
      1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16 17 18 19 20
      21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40
Out[22]= 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60
      61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80
      81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100
```

d)

```
In[23]:= Grid[Table[Table[x, {x, x, x + 19}], {x, {1, 21, 41, 61, 81}}]]
      1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16 17 18 19 20
      21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40
Out[23]= 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60
      61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80
      81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100
```

## QUES 4.

a)

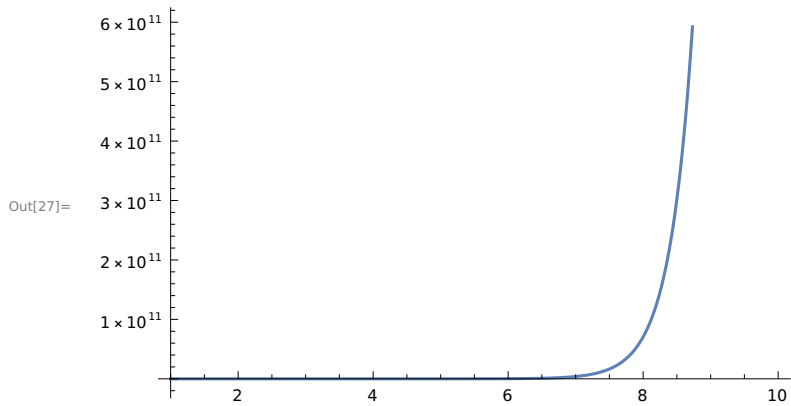
```
In[24]:= Sum[x ^ 3, {x, 1, 20}]
Out[24]= 44 100
```

b)

```
In[25]:= f[x_] := 1 + 2 ^ x + 3 ^ x + 4 ^ x + 5 ^ x + 6 ^ x + 7 ^ x + 8 ^ x + 9 ^ x + 10 ^ x +
      11 ^ x + 12 ^ x + 13 ^ x + 14 ^ x + 15 ^ x + 16 ^ x + 17 ^ x + 18 ^ x + 19 ^ x + 20 ^ x
In[26]:= Table[f[x], {x, 1, 10}]
Out[26]= {210, 2870, 44 100, 722 666, 12 333 300, 216 455 810,
      3 877 286 700, 70 540 730 666, 1 299 155 279 940, 24 163 571 680 850 }
```



In[27]:= `Plot[f[x], {x, 1, 10}]`

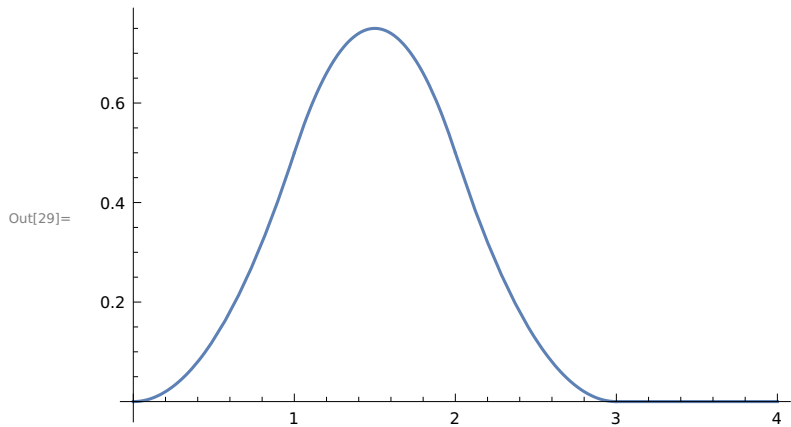


### SECTION 3.6

#### QUES 2.

In[28]:= `g[x_] := Piecewise[{{0, x < 0}, {(x^2)/2, 0 ≤ x ≤ 1},  
{-x^2 + 3x - 3/2, 1 ≤ x ≤ 2}, {1/2 (3 - x)^2, 2 ≤ x ≤ 3}, {0, 3 ≤ x}}]`

In[29]:= `Plot[g[x], {x, 0, 4}]`



#### QUES 3.

In[36]:= `f[x_, n_] := Piecewise[{{n^2, n ≤ x ≤ n + 1}}`

```
In[37]:= Plot[f[x, n], {x, 0, 20}]
```

