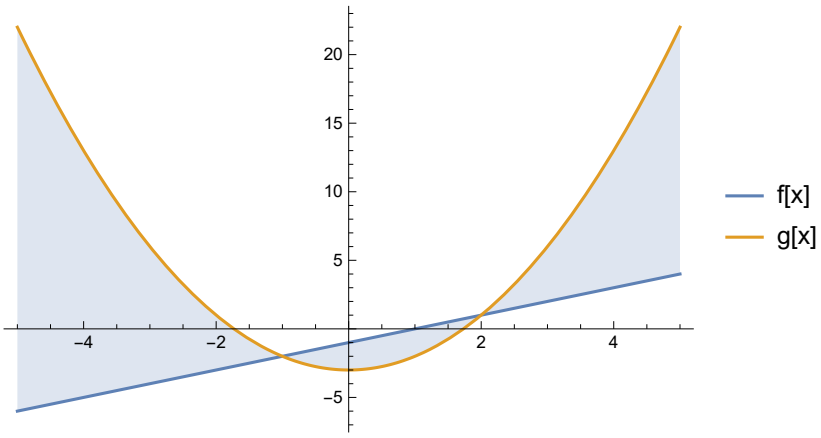
Yohan Lee Lab 3

Examples

```
Clear[f, g];
f[x_] := x - 1;
g[x_] := x^2 - 3;
Plot[{f[x], g[x]}, {x, -5, 5}, Filling → {1 → {2}}, PlotLegends → {"f[x]", "g[x]"}]
```




```
NSolve[f[x] == g[x], x]
```

$\{\{x \to -1.\}, \{x \to 2.\}\}$

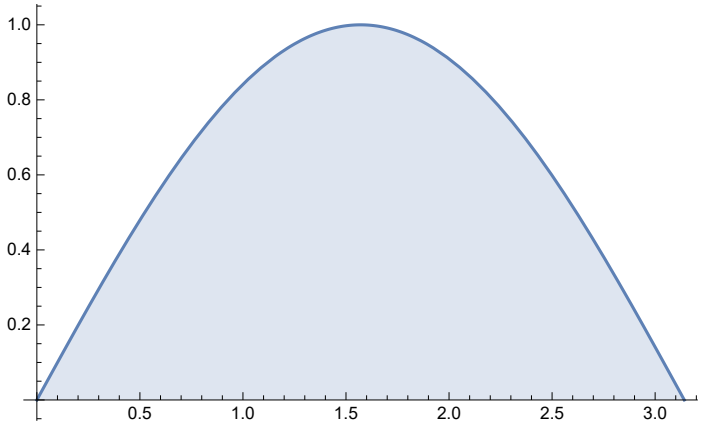
```
Integrate[f[x] - g[x], {x, -1, 2}]
```

$\frac{9}{2}$

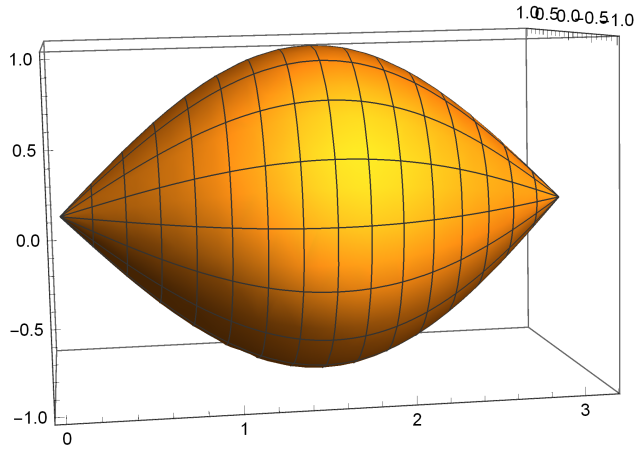
```
Clear[f]
```

```
f[x_] := Sin[x]
```

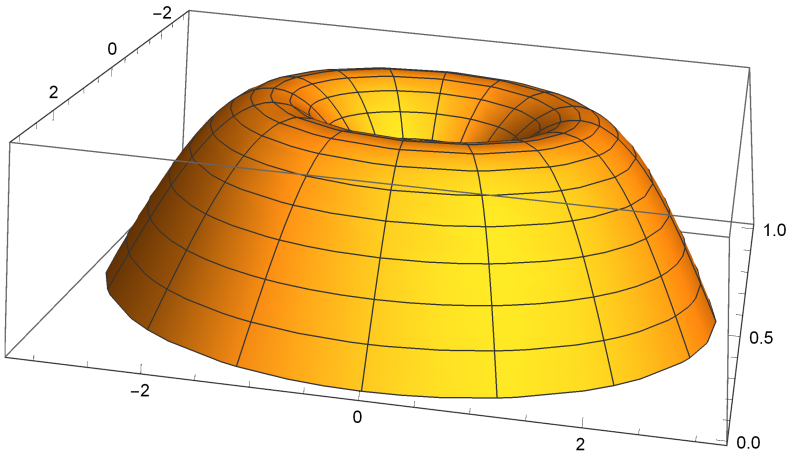
```
Plot[f[x], {x, 0, Pi}, Filling → Axis]
```



```
RevolutionPlot3D[f[x], {x, 0, Pi}, RevolutionAxis → "x"]
```




```
RevolutionPlot3D[f[x], {x, 0, Pi}]
```




```
Clear[f, g];
f[x_] := x - 1;
g[x_] := x^2 - 3;
Pi * Integrate[(3 - g[x])^2 - (3 - f[x])^2, {x, -1, 2}]
Pi * Integrate[(3 - g[x])^2 - (3 - f[x])^2, {x, -1, 2}] // N
```

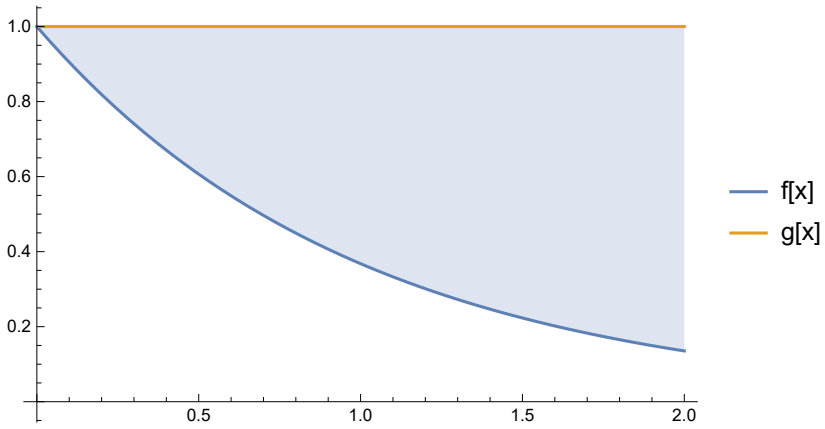
$$\frac{198\,\pi}{5}$$

```
124.407
```

Question 1a

In[2]:=
```
Clear[f, g];
f[x_] = Exp[-x];
g[x_] := 1;
Plot[{f[x], g[x]}, {x, 0, 2}, Filling → {1 → {2}}, PlotLegends → {"f[x]", "g[x]"}]
```

Out[5]=



Question 1b

In[10]:=
```
Pi * Integrate[(2 + f[x])^2 - (2 - 1)^2, {x, 0, 2}]
```

Out[10]= $\left(\frac{21}{2} - \frac{1}{2\,e^4} - \frac{4}{e^2}\right)\pi$

In[9]:=
```
Pi * Integrate[(2 - f[x])^2 - (2 - 1)^2, {x, 0, 2}] // N
```

Out[9]= 9.52588

Volume found by washer method

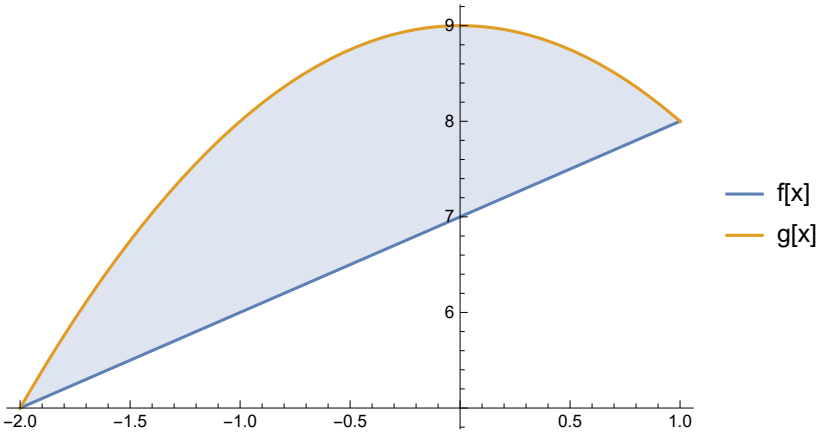
Question 2a

```
Clear[f, g];
f[x_] := x + 7;
g[x_] := 9 - x^2;

Solve[f[x] == g[x], x]
```

{{x → -2}, {x → 1}}

```
Plot[{f[x], g[x]}, {x, -2, 1}, Filling → {1 → {2}}, PlotLegends → {"f[x]", "g[x]"}]
```



Question 2b

```
2 * Pi * Integrate[(2 - x) (g[x] - f[x]), {x, -2, 1}]
```

$$\frac{45\,\pi}{2}$$

```
2 * Pi * Integrate[(2 - x) (g[x] - f[x]), {x, -2, 1}] // N
```

```
70.6858
```

Volume found using shell method