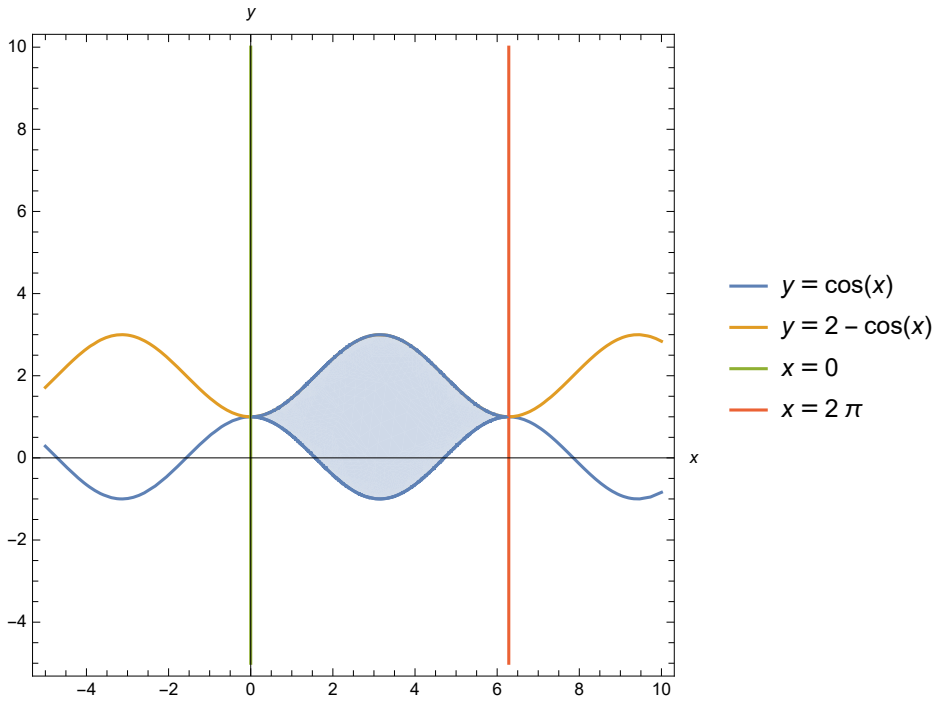
Answer for 6 (a)

In[1]:=
```
plot1 = ContourPlot[{y == Cos[x], y == 2 - Cos[x], x == 0, x == 2 π}, {x, -5, 10},
  {y, -5, 10}, Axes → True, AxesLabel → Automatic, PlotLegends → "Expressions"];
region1 = ImplicitRegion[y < Cos[x] && y > 2 - Cos[x] ||
   y > Cos[x] && y < 2 - Cos[x], {{x, 0, 2 π}, y}];
Show[plot1, RegionPlot[region1]]
```

Out[1]=



In[2]:=
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Area[region1] // N
```

Out[2]= 12.5664

Answer for 6(b)

In[3]:=
```
D[1 + 6 x^(3/2), x]
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Out[3]= $9\sqrt{x}$

In[4]:=
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L = ∫_0^1 √(1 + (9 √x)^2) dx // N
```

Out[4]= 6.10322

Answer for 6(c)(i)

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y = x^-2
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In[5]:=
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D[x^-2, x]
```

Out[5]= $-\frac{2}{x^3}$

In[6]:=
$$S1 = \int_1^2 2\pi x^{-2} \sqrt{1 + \left(-\frac{2}{x^3}\right)^2}\, dx \;//\; N$$

Out[6]= 4.45665

Answer for 6(c)(ii)

In[7]:=
$$S2 = \int_1^2 2\pi x \sqrt{1 + \left(-\frac{2}{x^3}\right)^2}\, dx \;//\; N$$

Out[7]= 11.7299