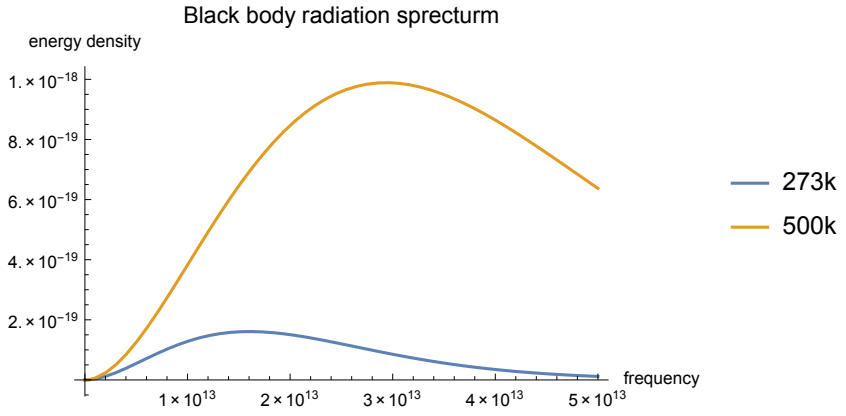
1. a) b)

```
h = 6.63 × 10^-34;
c = 3 × 10^8;
k = 1.38 × 10^-23;

t1 = 273;
t2 = 500;
c = 3 × 10^8;
planck[f_, t_] := 8 π h f^3 / ((c^3) * (E^(h f/(k t)) - 1));

Plot[{planck[f, t1], planck[f, t2]}, {f, 0, 5 × 10^13}, PlotRange → Full,
 PlotLegends → {"273k", "500k"}, AxesLabel → {"frequency", "energy density"},
 PlotLabel → "Black body radiation sprecturm"]
```



c)

```
i = Integrate[planck[f, t] * c / 4, {f, 0, Infinity}, Assumptions → t > 0]
```

$5.64185 \times 10^{-8}\ t^4$

2. left hand side

```
v = {x, x, x};
Integrate[{0, 0, 1}.Curl[v, {x, y, z}], {y, -1, 0}, {x, -y - 1, y + 1}] +
 Integrate[{0, 0, 1}.Curl[v, {x, y, z}], {y, 0, 1}, {x, y - 1, -y + 1}]
```

2

right hand side

```
Integrate[v.{1, -1, 0}, {x, 1, 0}] + Integrate[v.{1, 1, 0}, {x, 0, -1}] +
 Integrate[v.{1, -1, 0}, {x, -1, 0}] + Integrate[v.{1, 1, 0}, {x, 0, 1}]
```

2