Evidence of H_1, $P(D \mid H_1)$

In[18]:=
```
t = w0 + w1 x;
```

In[84]:=
```
w1 = 0; 1/(2 π) Exp[-(y)^2/2] 1/(2 π) /. y → {8, 10, 11} // N
```

Out[84]=
$$\left\{3.20787 \times 10^{-16},\ 4.88558 \times 10^{-24},\ 1.34532 \times 10^{-28}\right\}$$

In[88]:=
```
L1 = {4.062500444221496`*^-30, 9.423062528246402`*^-46, 7.145094103642068`*^-55};
```

In[95]:=
```
evidence1 = Product[L1[[i]], {i, 1, 3}]
```

Out[95]=
$$2.73523 \times 10^{-129}$$

Evidence of H_2, $P(D \mid H_2)$

In[26]:=
```
Clear[w1, y]
```

In[27]:=
```
1/(2 π) Exp[-w1^2] 1/(2 π) Exp[-(t - y)^2] 1/(2 π)
```

Out[27]=
$$\frac{e^{-w1^2-(w0+w1\,x-y)^2}}{8\,\pi^3}$$

In[28]:=
```
∫_-∞^∞ 1/(2 π) Exp[-w1^2] 1/(2 π) Exp[-(t - y)^2] 1/(2 π) dw1
```

In[29]:=
```
ConditionalExpression[e^-((w0-y)^2/(1+x^2))/(8 π^(5/2) Sqrt[1 + x^2]),
  (Re[x^2] ≥ -1 && Re[x (w0 - y)] < 0 && Re[x (-w0 + y)] < 0) || Re[x^2] > -1] /. x → {-8, -2, 6}
```

In[33]:=
```
e^-((w0-y)^2/(1+x^2))/(8 π^(5/2) Sqrt[1 + x^2]) /. {{x → -8, y → 8}, {x → -2, y → 10}, {x → 6, y → 11}}
```

In[35]:=
```
{e^-(1/65 (-8+w0)^2)/(8 Sqrt[65] π^(5/2)), e^-(1/5 (-10+w0)^2)/(8 Sqrt[5] π^(5/2)), e^-(1/37 (-11+w0)^2)/(8 Sqrt[37] π^(5/2))} /. w0 → 0 // N
```

Out[35]=
$$\left\{0.000331105,\ 6.58659 \times 10^{-12},\ 0.0000446349\right\}$$

In[91]:=
```
L2 = {0.0003311049127474417`, 6.586590918832033`*^-12, 0.000044634855848698545`};
```

In[96]:=
```
evidence2 = Product[L2[[i]], {i, 1, 3}]
```

Out[96]=
$$9.7342 \times 10^{-20}$$

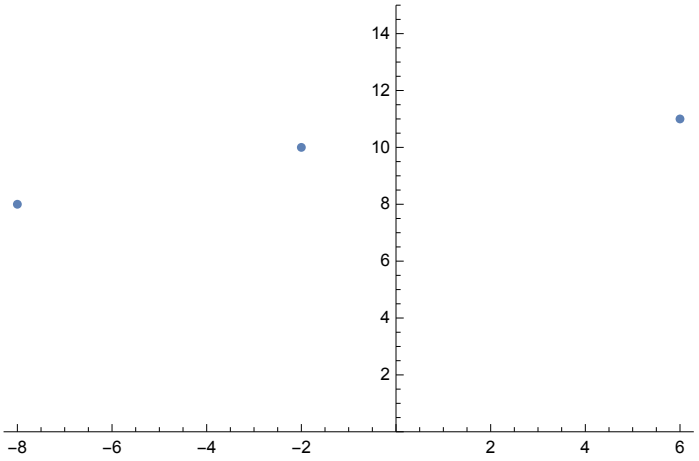
Linear Regression and evidence from the best fit

In[38]:=
```
data = {{-8, 8}, {-2, 10}, {6, 11}}
```

Out[38]=
```
{{-8, 8}, {-2, 10}, {6, 11}}
```

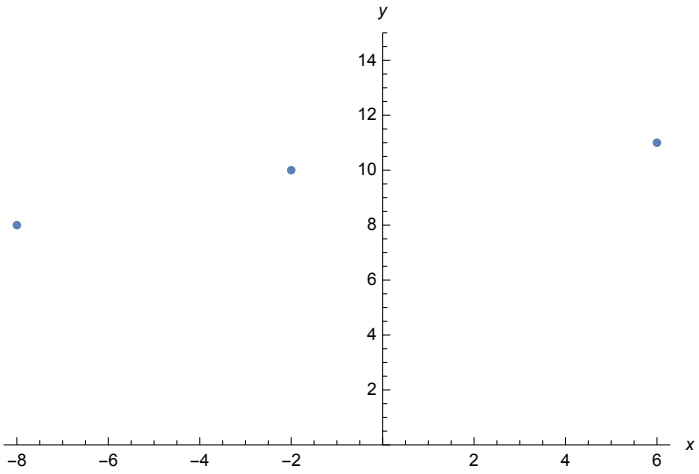
In[115]:=
```
P1 = ListPlot[data, PlotRange → {0, 15}]
```

Out[115]=



In[116]:=
```
Show[P1, AxesLabel → {HoldForm[x], HoldForm[y]},
 PlotRange → {0, 15}, PlotLabel → None, LabelStyle → {GrayLevel[0]}]
```

Out[116]=



In[54]:=
```
model = LinearModelFit[data, x, x]
```

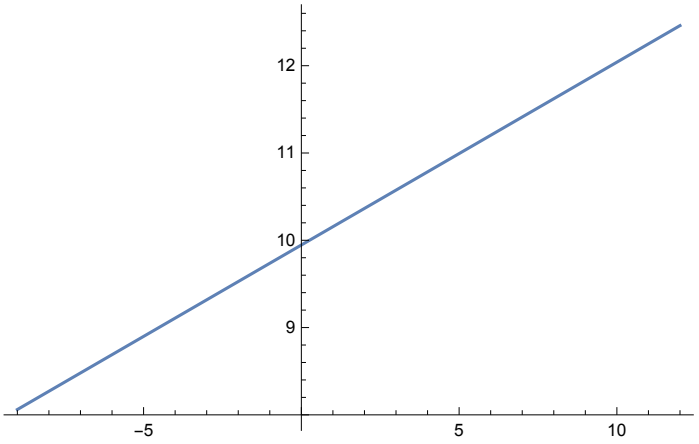
Out[54]=
```
FittedModel[ 9.94595 + 0.209459 x ]
```

In[40]:=
```
model["BestFit"]
```

Out[40]=
```
9.94595 + 0.209459 x
```

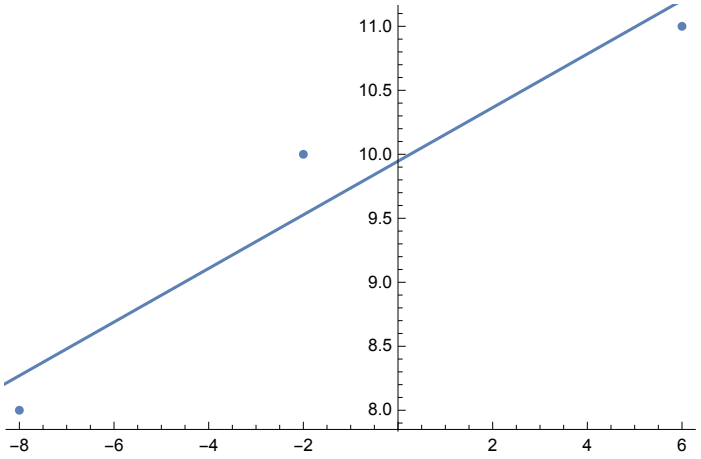
In[74]:=
```
P2 = Plot[9.945945945945946` + 0.20945945945945946` x, {x, -9, 12}]
```

Out[74]=



In[75]:=
```
Show[P1, P2]
```

Out[75]=



In[78]:=
```
9.945945945945946` + 0.20945945945945946` x /. x → {-8, -2, 6}
```

Out[78]=
```
{8.27027, 9.52703, 11.2027}
```

In[79]:=
```
{8.27027027027027`, 9.527027027027026`, 11.202702702702702`} - {8, 10, 11}
```

Out[79]=
```
{0.27027, -0.472973, 0.202703}
```

In[103]:=
$$\frac{1}{2\pi}\,\text{Exp}\left[-(y)^2\right]\,\frac{1}{2\pi}\;/.$$
```
  y → {0.2702702702702702`, -0.4729729729729737`, 0.20270270270270174`} // N
```

Out[103]=
```
{0.023546, 0.0202529, 0.0243106}
```

In[104]:=
```
L0 = {0.02354598051605746`, 0.02025289432564488`, 0.0243106070806057`};
```

In[105]:=
```
evidence0 = Product[L0[[i]], {i, 1, 3}]
```

Out[105]=
```
0.0000115931
```

Ratio of evidences

In[106]:=
$$\frac{\text{evidence0}}{\text{evidence1}}$$

Out[106]= 4.23844×10^{123}

In[107]:=
$$\frac{\text{evidence0}}{\text{evidence2}}$$

Out[107]= 1.19097×10^{14}

In[108]:=
$$\frac{\text{evidence2}}{\text{evidence1}}$$

Out[108]= 3.55883×10^{109}