In[8]:=
```
Clear[c0];
cin = 3;
V = 28;
F = 50;
de1 = D[C[t], t] == (F / V) * (cin - C[t])
soln = DSolve[{de1, C[0] == c0}, C[t], t]
Plot1 = Plot[Evaluate[C[t] /. soln /. c0 → Range[0, 8]], {t, 0, 10}, PlotRange → {0, 6}]
```

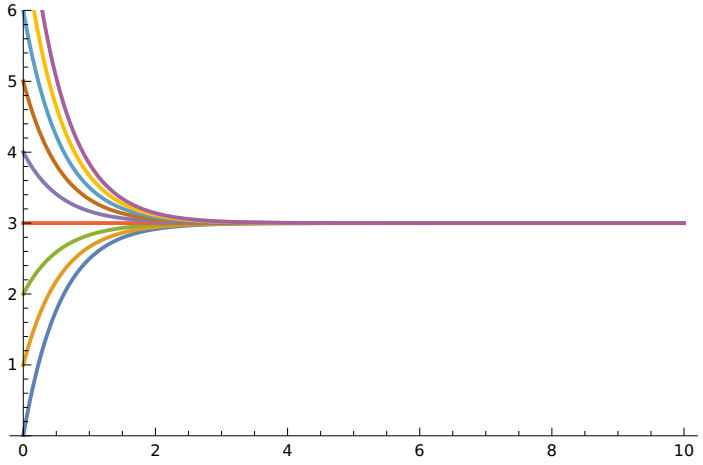
Out[12]=

$$C'[t] == \frac{25\ (3 - c_t)}{14}$$

Out[13]=

$$\left\{\left\{c_t \to e^{-25\,t/14}\left(-3 + c0 + 3\,e^{25\,t/14}\right)\right\}\right\}$$

Out[14]=



In[64]:=
```
Clear[x]
k1 = 1.386; k2 = 0.1386;
hours = 15;
de1 = D[x[t], t] == -k1 * x[t];
sol1 = DSolve[{de1, x[0] == x0}, x[t], t]
x0 = 1;
x[t] = First[x[t] /. sol1]
de2 = D[y[t], t] == k1 * x[t] - k2 * y[t];
sol2 = DSolve[{de2, y[0] == y0}, y[t], t]
y0 = 0;
plot1 = plot[x[t] /. sol1, {t, 0, hours}, PlotRange → {0, 1}, PlotLabel → "Plot1"];
plot2 = Plot[y[t] /. sol2, {t, 0, hours}, PlotRange → {0, 0.9}, PlotLabel → "Plot2"];
GraphicsGrid[{{plot1}, {plot2}}, Frame → True]
```

Out[68]=

$$\left\{\left\{x[t] \to 1.\, e^{-1.386\, t}\right\}\right\}$$

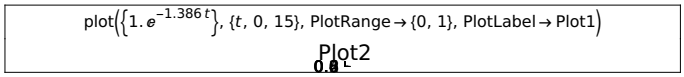
Out[70]=

$$1.\, e^{-1.386\, t}$$

Out[72]=

$$\left\{\left\{y[t] \to 1.11111\, e^{-1.5246\, t}\left(-1.\, e^{0.1386\, t} + 1.\, e^{1.386\, t}\right)\right\}\right\}$$

Out[76]=



In[35]:=
```
eqn = P[t] - P[0] * Exp[r t] == 0
So1 = Solve[eqn, P[t], {r, t}]
Plot[Evaluate[P[t] /. So1 /. {P[0] → 4 , r → 0.8}], {t, -5, 5}]
```

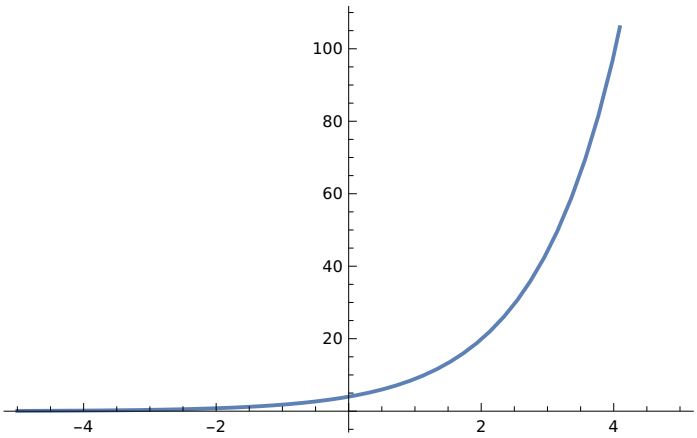
Out[35]=

$$-e^{r\,t}\,P[0] + P[t] == 0$$

Out[36]=

$$\{\{P[t] \to e^{r\,t}\,P[0]\}\}$$

Out[37]=



In[38]:=
```
eqn2 = D[P[t], t] - r * P[t] == 0
So1 = DSolve[{eqn2, P[0] == p0}, P[t], t]
Plot[Evaluate[P[t] /. So1 /. {p0 → 3, r → 0.02}], {t, -50, 50}]
```

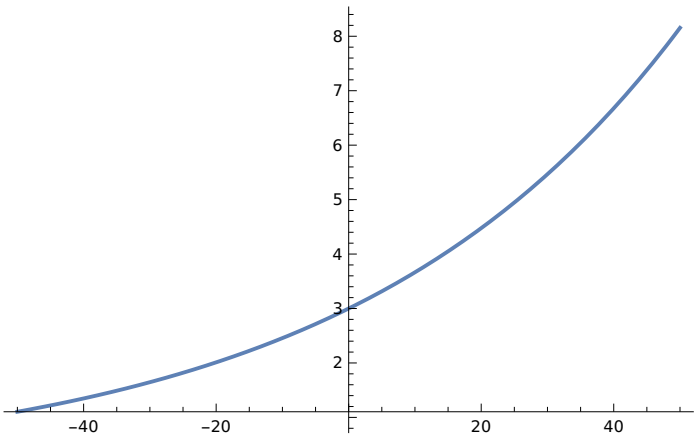
Out[38]=

$$-r\,P[t] + P'[t] == 0$$

Out[39]=

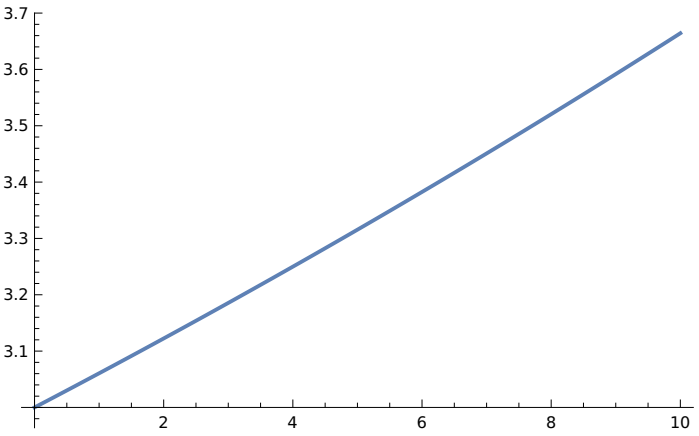
$$\{\{P[t] \to e^{r\,t}\,p0\}\}$$

Out[40]=



In[41]:=
```
Plot[Evaluate[P[t] /. So1 /. {p0 → 3, r → 0.02}], {t, 0, 10}]
```

Out[41]=



In[42]:=
```
Evaluate[P[t] /. So1 /. {p0 → 3, r → 0.02, t → 10}]
```

Out[42]=

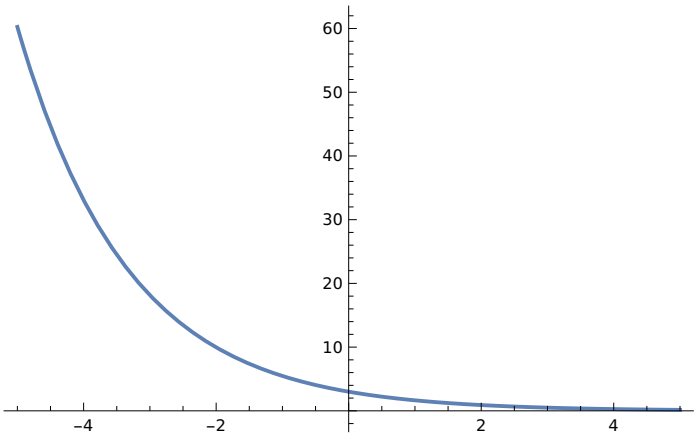
```
{3.66421}
```

In[1]:=
```
eqn = P[t] - P[0] * Exp[r t] == 0
Sol = Solve[eqn, P[t], {r, t}]
Plot[Evaluate[P[t] /. Sol /. {P[0] → 3, r → -0.6}], {t, -5, 5}]
```

Out[1]= $-e^{r\,t}\,P[0] + P[t] == 0$

Out[2]= $\{\{P[t] \to e^{r\,t}\,P[0]\}\}$

Out[3]=

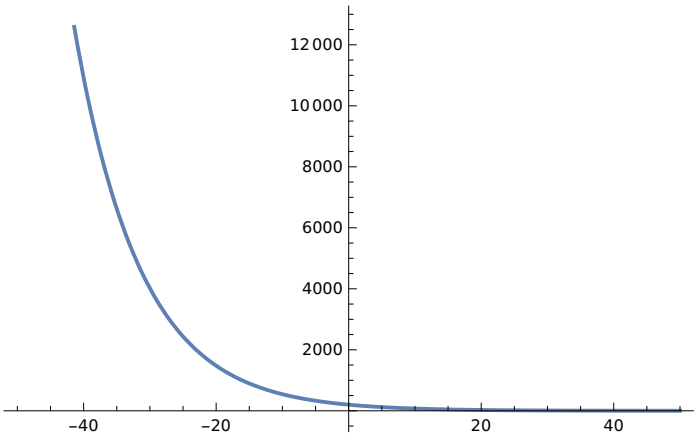


In[8]:=
```
eqn2 = D[P[t], t] - r * P[t] == 0
Sol = DSolve[{eqn2, P[0] == p0}, P[t], t]
Plot[Evaluate[P[t] /. Sol /. {p0 → 200, r → -0.1}], {t, -50, 50}]
```

Out[8]= $-r\,P[t] + P'[t] == 0$

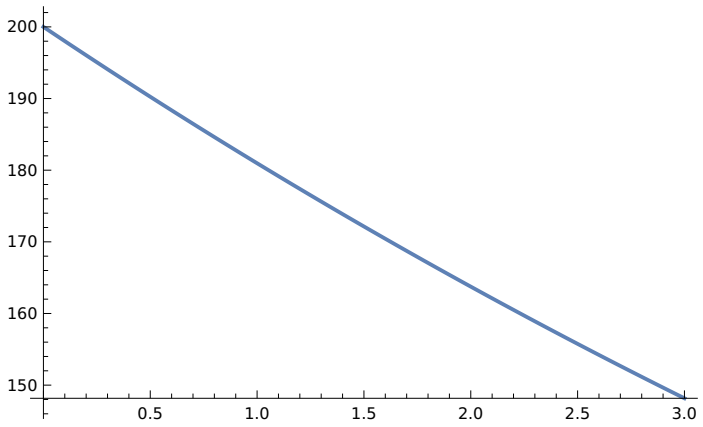
Out[9]= $\{\{P[t] \to e^{r\,t}\,p0\}\}$

Out[10]=



In[11]:=
```
Plot[Evaluate[P[t] /. Sol /. {p0 → 200, r → -0.1}], {t, 0, 3}]
```

Out[11]=



In[12]:=
```
Evaluate[P[t] /. Sol /. {p0 → 200, r → -0.1, t → 3}]
```

Out[12]=

```
{148.164}
```

In[101]:=

```
eqn := y'''[x] + 3 y''[x] + 4 y '[x] + 12 y[x];
s = DSolve[eqn == 0, y[x], x]
s1 = s /. {C[1] → 1, C[2] → 2, C[3] → 3}
Plot[s1[[1, 1, 2]], {x, -1, 1}]
```

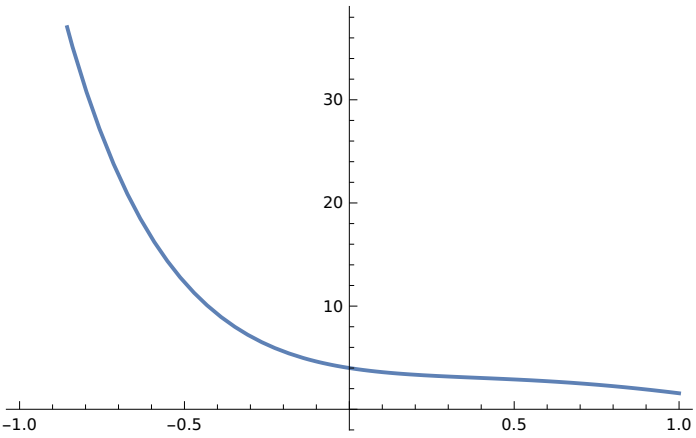
Out[102]=

$$\left\{\left\{y[x] \to e^{-3\,x}\ c_3 + c_1 \text{Cos}[2\,x] + c_2 \text{Sin}[2\,x]\right\}\right\}$$

Out[103]=

$$\left\{\left\{y[x] \to 3\,e^{-3\,x} + \text{Cos}[2\,x] + 2\,\text{Sin}[2\,x]\right\}\right\}$$

Out[104]=



In[105]:=

```
eqn; = y'''[x] + 3 y''[x] + 4 y'[x] + 12 y[x];
s = DSolve[{eqn == 0, y[0] == 0}, y[x], x]
s1 = s /. {C[1] → 1, C[2] → 2}
Plot[s1[[1, 1, 2]], {x, -2, 5}]
```

Set: Tag CompoundExpression in eqn; is Protected.

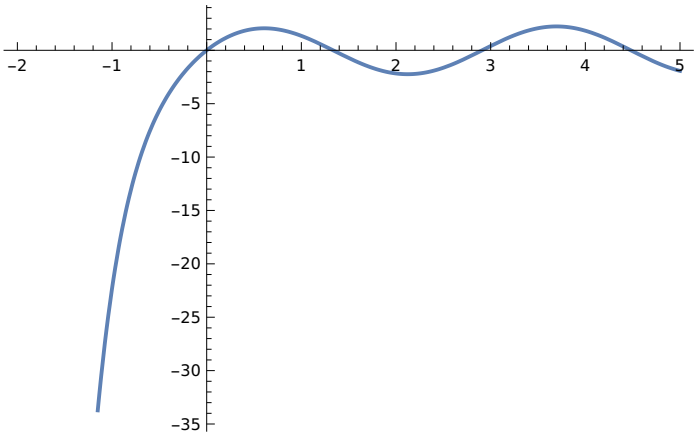
Out[106]=

$$\left\{\left\{y[x] \to e^{-3 x} \left(-c_1 + e^{3 x}\ c_1\ \text{Cos}[2 x] + e^{3 x}\ c_2\ \text{Sin}[2 x]\right)\right\}\right\}$$

Out[107]=

$$\left\{\left\{y[x] \to e^{-3 x} \left(-1 + e^{3 x}\ \text{Cos}[2 x] + 2\, e^{3 x}\ \text{Sin}[2 x]\right)\right\}\right\}$$

Out[108]=



In[109]:=

```
eqn; = y'''[x] + 3 y''[x] + 4 y'[x] + 12 y[x];
s = DSolve[{eqn == 0, y[0] == 0}, y[x], x]
s1 = s /. {C[1] → 1, C[2] → 2}
Plot[s1[[1, 1, 2]], {x, -1, 1}]
```

Set: Tag CompoundExpression in eqn; is Protected.

Out[110]=

$$\left\{\left\{y[x] \to e^{-3\,x}\left(-c_1 + e^{3\,x}\,c_1\,\text{Cos}[2\,x] + e^{3\,x}\,c_2\,\text{Sin}[2\,x]\right)\right\}\right\}$$

Out[111]=

$$\left\{\left\{y[x] \to e^{-3\,x}\left(-1 + e^{3\,x}\,\text{Cos}[2\,x] + 2\,e^{3\,x}\,\text{Sin}[2\,x]\right)\right\}\right\}$$

Out[112]=