Ques--1

In[21]:=
```
eqn := y'''[x] - 4 y''[x] - 25 y'[x] + 28 y[x];
s = DSolve[eqn == 0, y[x], x]
```

Out[22]=

$$\left\{\left\{y[x] \to e^{-4x} c_1 + e^{x} c_2 + e^{7x} c_3\right\}\right\}$$

In[23]:=
```
s1 = s /. {C[1] → -1, C[2] → 4, C[3] → 20}
```

Out[23]=

$$\left\{\left\{y[x] \to -e^{-4x} + 4e^{x} + 20e^{7x}\right\}\right\}$$

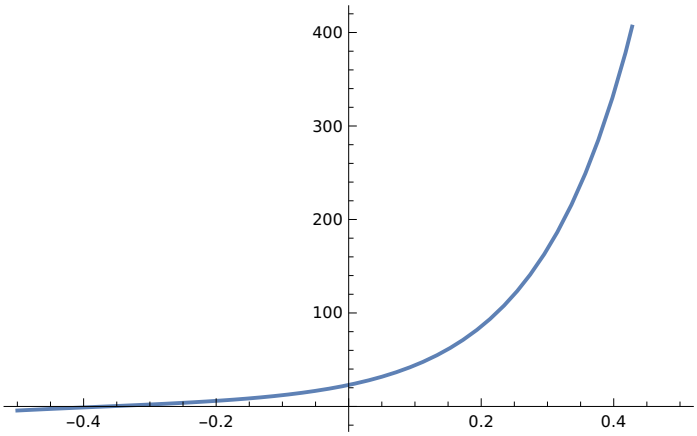
In[24]:=
```
s2 = s /. {C[1] → 1, C[2] → 0, C[3] → 2}
```

Out[24]=

$$\left\{\left\{y[x] \to e^{-4x} + 2e^{7x}\right\}\right\}$$

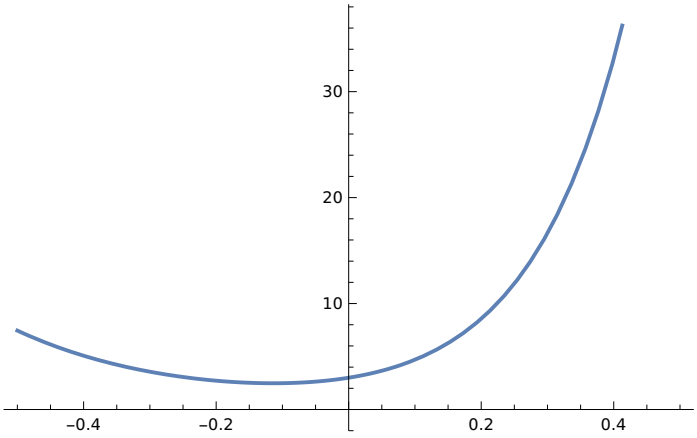
In[25]:=
```
Plot[s1[[1, 1, 2]], {x, -0.5, 0.5}]
```

Out[25]=



In[26]:=
```
Plot[s2[[1, 1, 2]], {x, -0.5, 0.5}]
```

Out[26]=



QUES--2

In[43]:=
```
eqn = y'''[x] - x^3 ;
sol = DSolve[eqn == 0, y[x], x]
s1 = sol /. {C[1] → 1, C[2] → 2, C[3] → 3}
```

Out[44]=

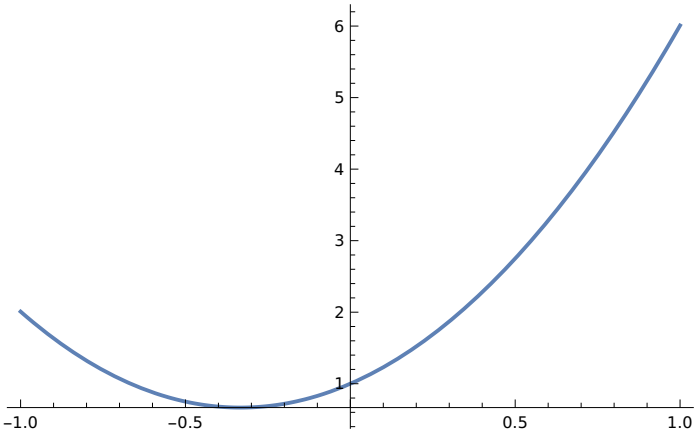
$$\left\{\left\{y[x] \to \frac{x^6}{120} + c_1 + x\ c_2 + x^2\ c_3\right\}\right\}$$

Out[45]=

$$\left\{\left\{y[x] \to 1 + 2\,x + 3\,x^2 + \frac{x^6}{120}\right\}\right\}$$

In[47]:=
```
Plot[s1[[1, 1, 2]], {x, -1, 1}]
```

Out[47]=



Ques--3

In[48]:=
```
eqn2 = D[P[t], t] - r * P[t] == 0
```

Out[48]=

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

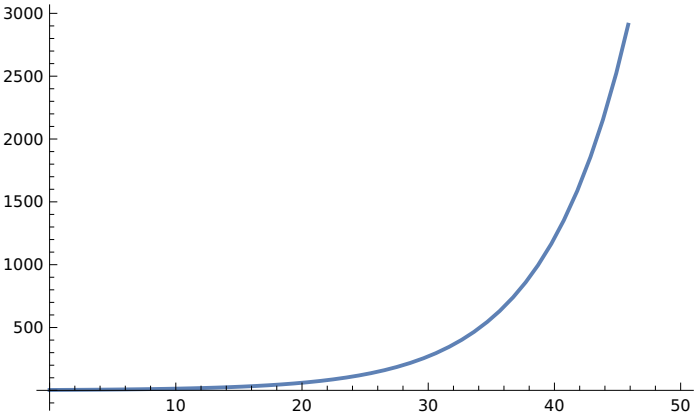
In[49]:=
```
sol = DSolve[{eqn2, P[0] == p0}, P[t], t]
```

Out[49]=

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

In[50]:=
```
Plot[Evaluate[P[t] /. sol /. {p0 → 3, r → 0.15}], {t, 0, 50}]
```

Out[50]=



Ques--4

In[51]:=
```
eqn2 = D[P[t], t] - r * P[t] == 0
```

Out[51]=

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

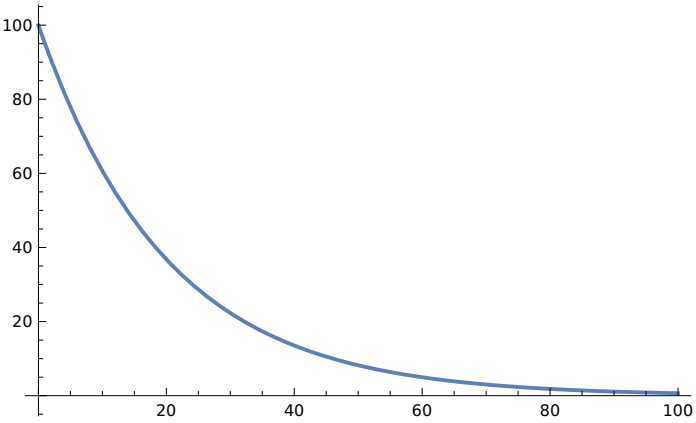
In[52]:=
```
Sol = DSolve [{eqn2, P[0] == p0}, P[t], t]
```

Out[52]=

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

In[53]:=
```
Plot[Evaluate[P[t] /. Sol /. {p0 → 100, r → -0.05}], {t, 0, 100}]
```

Out[53]=



Ques--5

In[55]:=
```
Clear[c0];
```

In[56]:=
```
cin = 3;
```

In[57]:=
```
V = 50;
```

In[58]:=
```
F = 80;
```

In[69]:=
```
de1 = D[c[t], t] == (f / v) * (cin - c[t])
```

Out[69]=

$$c'[t] == \frac{f\,(3 - c[t])}{v}$$

```
soln = DSolve[{de1, c[0] == c0}, c[t], t]
```

Out[60]=

$$\left\{\left\{c[t] \to e^{-\frac{f\,t}{v}}\left(-3 + c0 + 3\,e^{\frac{f\,t}{v}}\right)\right\}\right\}$$

In[85]:=
```
plot1 = Plot[Evaluate[c[t] /. soln /. c0 → Range[0, 8]], {t, 0, 10}, PlotRange → {0, 10}]
```

Out[85]=