

W6-P1a

In[1]:= **DSolve**[$y' [x] == 3 x^2 / y[x], y[x], x$]

Out[1]= $\left\{ \left\{ y[x] \rightarrow -\sqrt{2} \sqrt{x^3 + C[1]} \right\}, \left\{ y[x] \rightarrow \sqrt{2} \sqrt{x^3 + C[1]} \right\} \right\}$

W6-P1b

In[2]:= **DSolve**[$y' [x] == 4 x (y[x])^2, y[x], x$]

Out[2]= $\left\{ \left\{ y[x] \rightarrow \frac{1}{-2 x^2 - C[1]} \right\} \right\}$

W6-P2a

In[3]:= **DSolve**[$\{y' [x] == (y[x] + 1) / (x - 3), y[0] == 1\}, y[x], x$]

Out[3]= $\left\{ \left\{ y[x] \rightarrow \frac{1}{3} (3 - 2 x) \right\} \right\}$

W6-P2b

In[4]:= **DSolve**[$\{y' [x] == (x^2 - 1) / (2 y[x] + 1), y[0] == -1\}, y[x], x$]

 **DSolve**: For some branches of the general solution, the given boundary conditions lead to an empty solution.

Out[4]= $\left\{ \left\{ y[x] \rightarrow \frac{1}{6} \left(-3 - \sqrt{3} \sqrt{3 - 12 x + 4 x^3} \right) \right\} \right\}$

W6-P3

In[5]:= **Solve**[$\frac{A0}{2} == A0 \text{Exp}[-k t], t, \text{Reals}$]

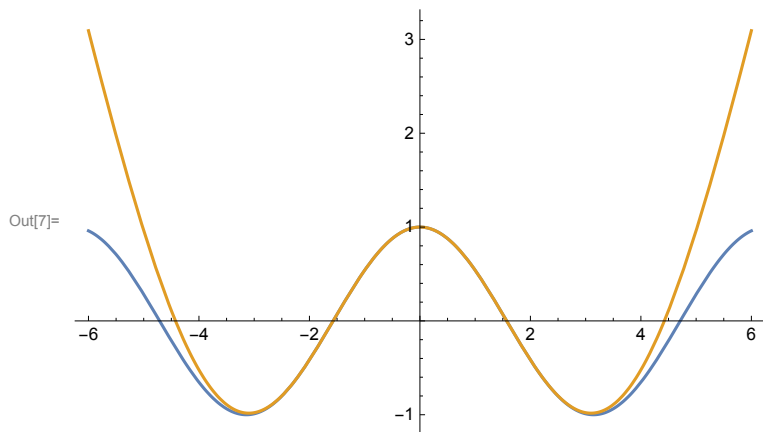
Out[5]= $\left\{ \left\{ t \rightarrow \frac{\text{Log}[2]}{k} \right\} \right\}$

W6-P4

In[6]:= **A[x_] = PadeApproximant[Cos[x], {x, 0, 5}]**

Out[6]=
$$\frac{1 - \frac{115 x^2}{252} + \frac{313 x^4}{15120}}{1 + \frac{11 x^2}{252} + \frac{13 x^4}{15120}}$$

In[7]:= `Plot[{Cos[x], A[x]}, {x, -6, 6}]`



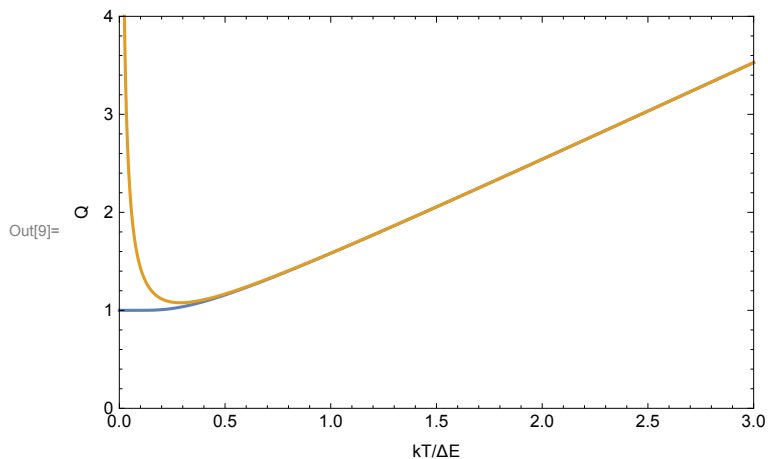
In[8]:= `Limit[A[x], x -> ∞]`

Out[8]= $\frac{313}{13}$

W6-P5

In[9]:= `Plot[{1 / (1 - Exp[-1/x]), x + 1/2 + 1/(12x)}, {x, 0, 3},`

`PlotRange -> {{0, 3}, {0, 4}}, Frame -> True, FrameLabel -> {"kT/ΔE", "Q"}]`



W6-P6

In[10]:= `$Assumptions = a ∈ Reals && b ∈ Reals && c ∈ Reals;`

$$y'[x] = f[ax + by[x] + c] /. \{y[x] \rightarrow \frac{u[x] - ax}{b}\}$$

Out[11]= `y'[x] == f[c + u[x]]`