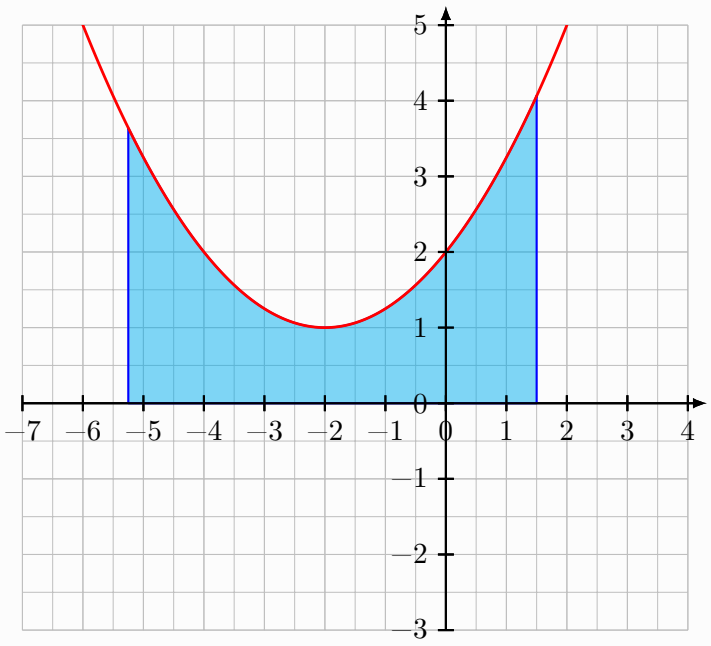
# Integrals examples

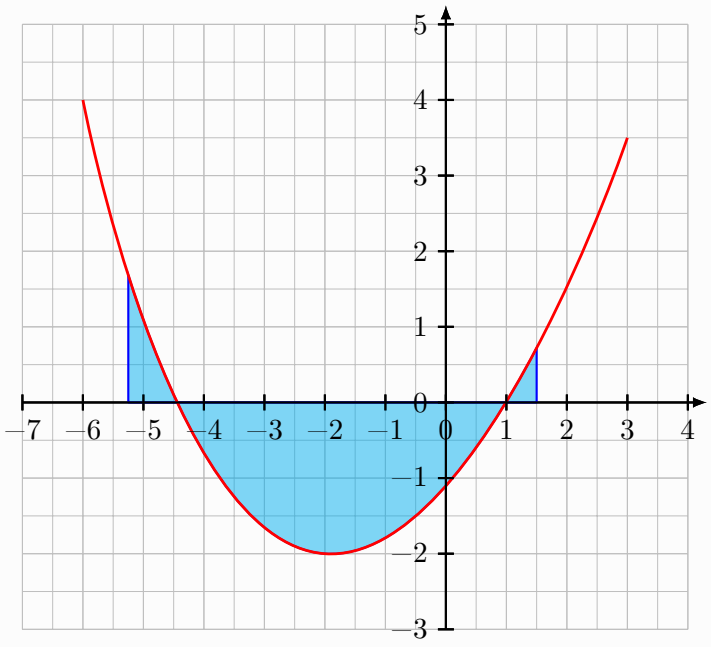
## 1 Below cruve, by default

```
\begin{GraphTikz}%
    [x=0.8cm,y=1cm,Xmin=-7,Xmax=4,Ymin=-3,Ymax=5]
  \DrawAxisGrids[Behind,Enlarge=2.5mm]{-7,-6,...,4}{-3,-2,...,5}
  \DefineCurve[Name=ch]<h>{0.25*(x+2)^2+1}
  \DrawIntegral%
    [Colors=blue/cyan,Style=fill]%
    {h(x)} %formula
    {-5.25}{1.5}
  \DrawCurve[Color=red]{h(x)}
  \DrawAxisGrids[Above,Enlarge=2.5mm]{-7,-6,...,4}{-3,-2,...,5}
\end{GraphTikz}
```



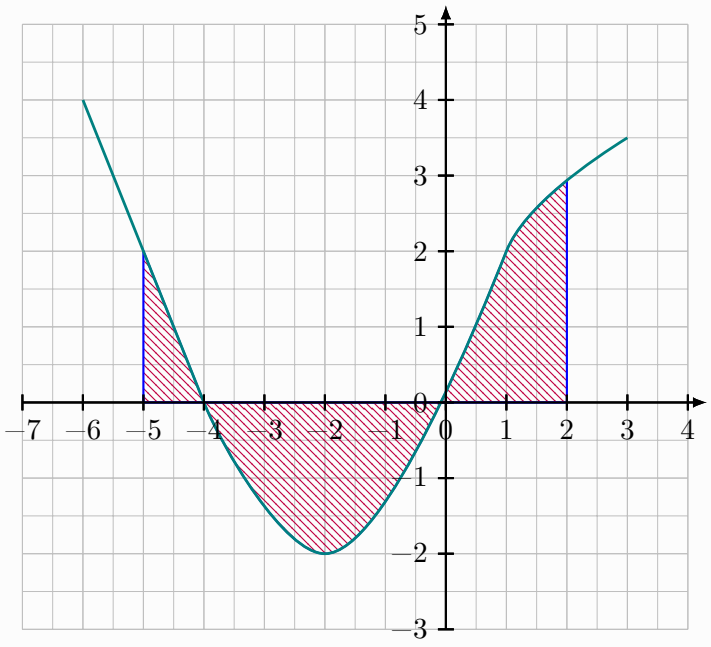
## 2 Behind interpolation curve

```
\begin{GraphTikz}%
    [x=0.8cm,y=1cm,Xmin=-7,Xmax=4,Ymin=-3,Ymax=5]
  \DrawAxisGrids[Grads=false,Enlarge=2.5mm]{-7,-6,...,4}{-3,-2,...,5}
  \DefineLstInterpol{(-6,4)(-2,-2)(3,3.5)}[\interpoA]
  \DefineInterpoCurve[Name=interpotest,Tension=1.05]{\interpoA}
  \DrawIntegral%
    [NameInterpo=interpotest,Colors=blue/cyan,Style=fill,Type=itp,Tension=1.05]%
    {\interpoA} %pointsinterpo
    {-5.25}{1.5}
  \DrawInterpoCurve[Color=red,Tension=1.05]{\interpoA}
  \DrawAxisGrids[Grid=false,Enlarge=2.5mm]{-7,-6,...,4}{-3,-2,...,5}
\end{GraphTikz}
```



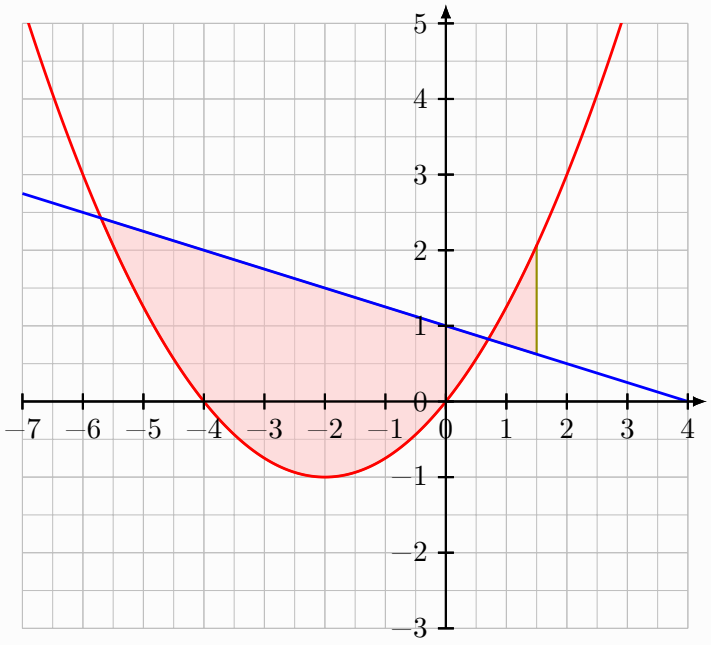
# 3 Behind cubic spline

```
\begin{GraphTikz}%
    [x=0.8cm,y=1cm,Xmin=-7,Xmax=4,Ymin=-3,Ymax=5]
  \DrawAxisGrids[Grads=false,Enlarge=2.5mm]{-7,-6,...,4}{-3,-2,...,5}
  \DefineLstSpline{-6/4/-2§-5/2/-2§-4/0/-2§-2/-2/0§1/2/2§3/3.5/0.5}[\lstsplineA]
  \DefineSplineCurve[Name=splinetest]{\lstsplineA}<\SplineTeal>
  \DrawIntegral%
    [NameSpline=\SplineTeal,Type=spl,Colors=blue/purple,Style=hatch]%
    {splinetest} %namesplinecurve
    {-5}{2}
  \DrawSplineCurve[Color=teal]{\lstsplineA}
  \DrawAxisGrids[Grid=false,Enlarge=2.5mm]{-7,-6,...,4}{-3,-2,...,5}
\end{GraphTikz}
```



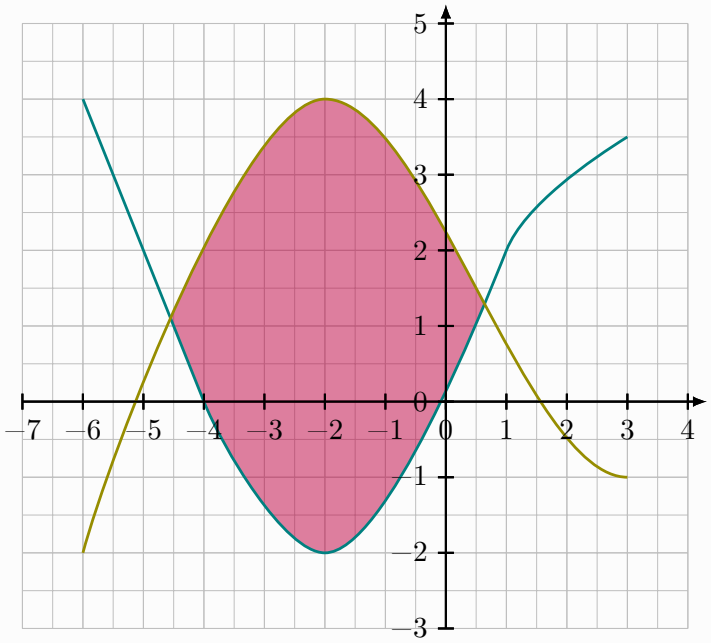
# 4 Between curves

```
\begin{GraphTikz}%
  [x=0.8cm,y=1cm,Xmin=-7,Xmax=4,Ymin=-3,Ymax=5]
  \DrawAxisGrids[Grads=false,Enlarge=2.5mm]{-7,-6,...,4}{-3,-2,...,5}
  \DefineCurve[Name=ch]<h>{0.25*(x+2)^2-1}
  \DefineCurve[Name=ck]<k>{-0.25*x+1}
  \FindIntersections[Name=ITSC,Disp=false]{ch}{ck}
  \DrawIntegral%
    [Colors=olive/pink,Style=fill,Type=fct/fct,Bounds=node/abs]%
    {h(x)}[k(x)] %formules
    {(ITSC-1)}{1.5}
  \DrawCurve[Color=red]{h(x)}
  \DrawCurve[Color=blue]{k(x)}
  \DrawAxisGrids[Grid=false,Enlarge=2.5mm]{-7,-6,...,4}{-3,-2,...,5}
\end{GraphTikz}
```



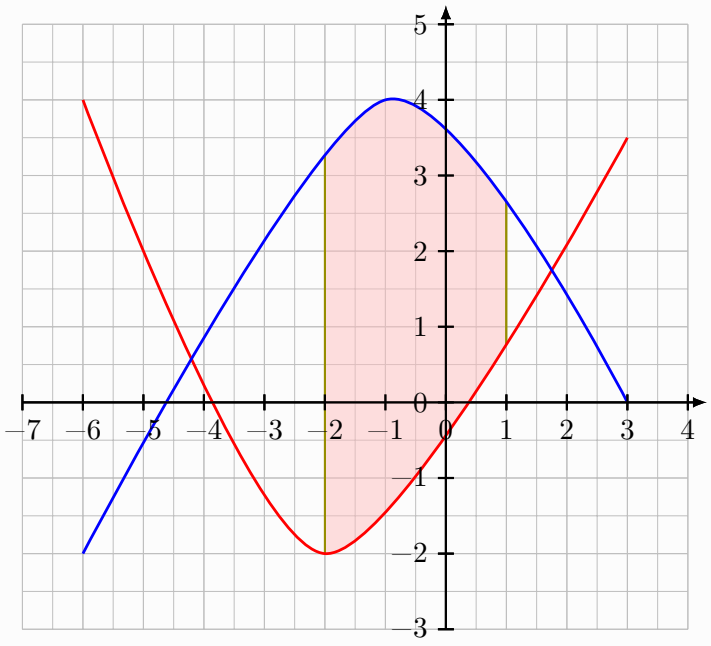
## 5 Between splines

```
\begin{GraphTikz}%
    [x=0.8cm,y=1cm,Xmin=-7,Xmax=4,Ymin=-3,Ymax=5]
  \DrawAxisGrids[Grads=false,Enlarge=2.5mm]{-7,-6,...,4}{-3,-2,...,5}
  \DefineLstSpline{-6/4/-2§-5/2/-2§-4/0/-2§-2/-2/0§1/2/2§3/3.5/0.5}[\lstsplineA]
  \DefineLstSpline{-6/-2/3§-2/4/0§3/-1/0}[\lstsplineB]
  \DefineSplineCurve[Name=splinetestolive]{\lstsplineA}<\SplineOlive>
  \DefineSplineCurve[Name=splinetestteal]{\lstsplineB}<\SplineTeal>
  \FindIntersections[Name=ITT,Disp=false]{splinetestteal}{splinetestolive}
  \DrawIntegral%
    [NameSpline=\SplineTeal,NameSplineB=\SplineOlive,Type=spl/spl,Colors=blue/purple,Bounds=nodes]%
    {splinetestolive} %Namecourbespline
    [splinetestteal]  %Namecourbespline
    {(ITT-1)}{(ITT-2)}
  \DrawSplineCurve[Color=teal]{\lstsplineA}
  \DrawSplineCurve[Color=olive]{\lstsplineB}
  \DrawAxisGrids[Grid=false,Enlarge=2.5mm]{-7,-6,...,4}{-3,-2,...,5}
\end{GraphTikz}
```



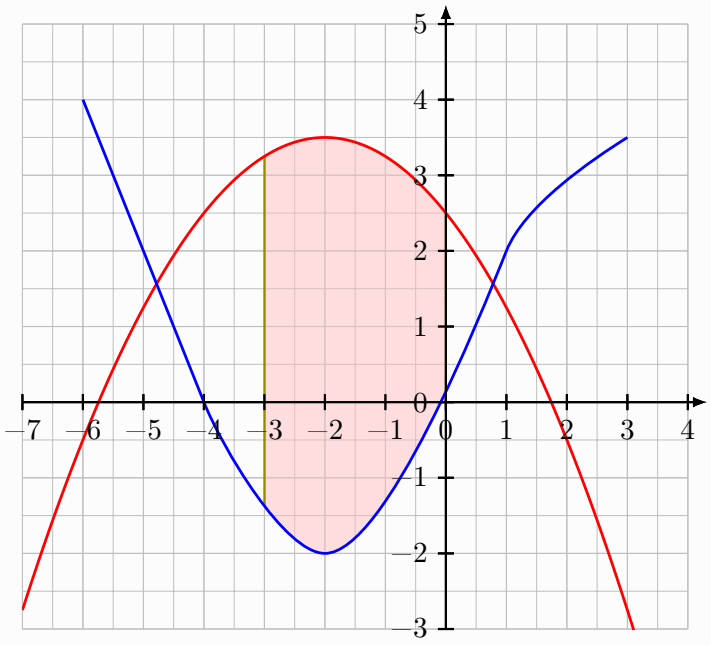
# 6 Between interpolations

```
\begin{GraphTikz}%
  [x=0.8cm,y=1cm,Xmin=-7,Xmax=4,Ymin=-3,Ymax=5]
  \DrawAxisGrids[Grads=false,Enlarge=2.5mm]{-7,-6,...,4}{-3,-2,...,5}
  \DefineLstInterpol{(-6,4)(-2,-2)(3,3.5)}[\interpoA]
  \DefineInterpoCurve[Name=interpotest]{\interpoA}
  \DefineLstInterpol{(-6,-2)(-1,4)(3,0)}[\interpoB]
  \DefineInterpoCurve[Name=interpotesta]{\interpoB}
  \DrawIntegral%
  [NameInterpo=interpotesta,NameInterpoB=interpotest,Type=itp/itp,Colors=olive/pink]%
    {\interpoB} %pointsinterpo
    [\interpoA] %pointsinterpo
    {-2}{1}
  \DrawInterpoCurve[Color=red]{\interpoA}
  \DrawInterpoCurve[Color=blue]{\interpoB}
  \DrawAxisGrids[Grid=false,Enlarge=2.5mm]{-7,-6,...,4}{-3,-2,...,5}
\end{GraphTikz}
```



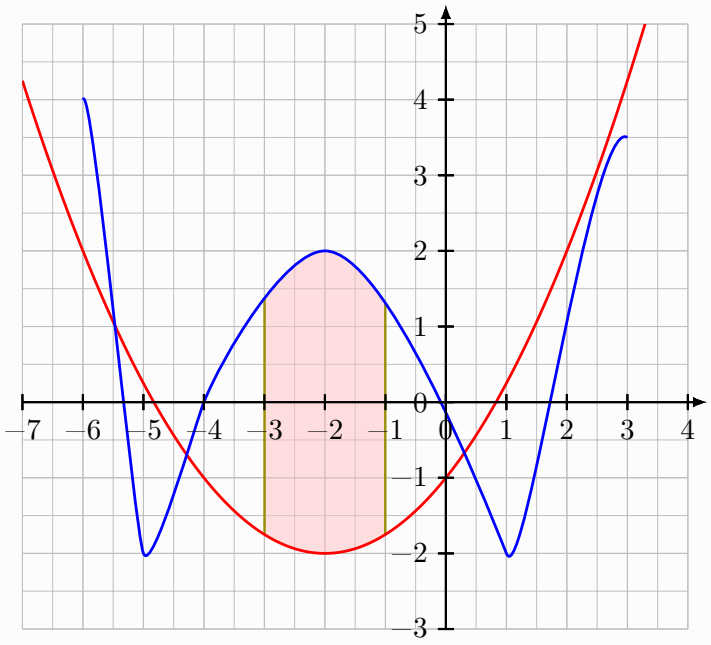
# 7 Betweend function and spline

```
\begin{GraphTikz}%
  [x=0.8cm,y=1cm,Xmin=-7,Xmax=4,Ymin=-3,Ymax=5]
  \DrawAxisGrids[Grads=false,Enlarge=2.5mm]{-7,-6,...,4}{-3,-2,...,5}
  \DefineCurve[Name=ch]<h>{-0.25*(x+2)^2+3.5}
  \DefineLstSpline{-6/4/-2§-5/2/-2§-4/0/-2§-2/-2/0§1/2/2§3/3.5/0.5}[\lstsplineA]
  \DefineSplineCurve[Name=splineblue]{\lstsplineA}<\Splineblue>
  \DrawIntegral%
    [NameSplineB=\Splineblue,Type=fct/spl,Colors=olive/pink]%
    {h(x)}        %formule
    [splineblue] %Namecourbespline
    {-3}{0}
  \DrawCurve[Color=red]{h(x)}
  \DrawSplineCurve[Color=blue]{\lstsplineA}
  \DrawAxisGrids[Grid=false,Enlarge=2.5mm]{-7,-6,...,4}{-3,-2,...,5}
\end{GraphTikz}
```



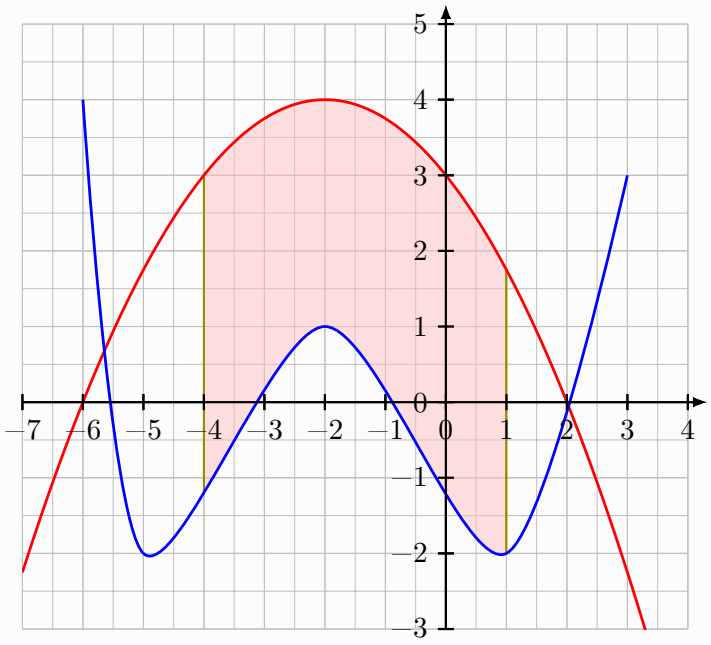
# 8 Between spline and function

```
\begin{GraphTikz}%
  [x=0.8cm,y=1cm,Xmin=-7,Xmax=4,Ymin=-3,Ymax=5]
  \DrawAxisGrids[Grads=false,Enlarge=2.5mm]{-7,-6,...,4}{-3,-2,...,5}
  \DefineCurve[Name=ch]<h>{0.25*(x+2)^2-2}
  \DefineLstSpline{-6/4/2§-5/-2/-2§-4/0/2§-2/2/0§1/-2/-2§3/3.5/-0.5}[\lstsplineA]
  \DefineSplineCurve[Name=splineblue]{\lstsplineA}<\Splineblue>
  \DrawIntegral%
    [NameSpline=\Splineblue,Type=spl/fct,Colors=olive/pink]%
    {splineblue} %Namecourbespline
    [h(x)]       %formule
    {-3}{-1}
  \DrawCurve[Color=red]{h(x)}
  \DrawSplineCurve[Color=blue]{\lstsplineA}
  \DrawAxisGrids[Grid=false,Enlarge=2.5mm]{-7,-6,...,4}{-3,-2,...,5}
\end{GraphTikz}
```



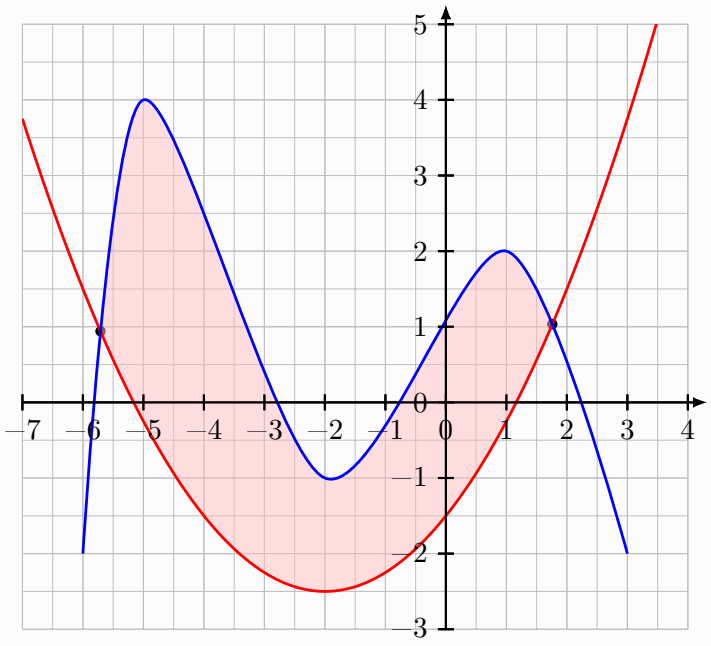
# 9 Between function and interpo

```
\begin{GraphTikz}%
  [x=0.8cm,y=1cm,Xmin=-7,Xmax=4,Ymin=-3,Ymax=5]
  \DrawAxisGrids[Grads=false,Enlarge=2.5mm]{-7,-6,...,4}{-3,-2,...,5}
  \DefineCurve[Name=cm]<m>{-0.25*(x+2)^2+4}
  \DefineLstInterpol{(-6,4)(-5,-2)(-2,1)(1,-2)(3,3)}[\interpoB]
  \DefineInterpoCurve[Name=interpotestb]{\interpoB}
  \DrawIntegral%
  [NameInterpoB=interpotestb,Type=fct/itp,Colors=olive/pink]%
    {m(x)}      %formule
    [\interpoB] %pointsinterpo
    {-4}{1}
  \DrawCurve[Color=red]{m(x)}
  \DrawInterpoCurve[Color=blue]{\interpoB}
  \DrawAxisGrids[Grid=false,Enlarge=2.5mm]{-7,-6,...,4}{-3,-2,...,5}
\end{GraphTikz}
```



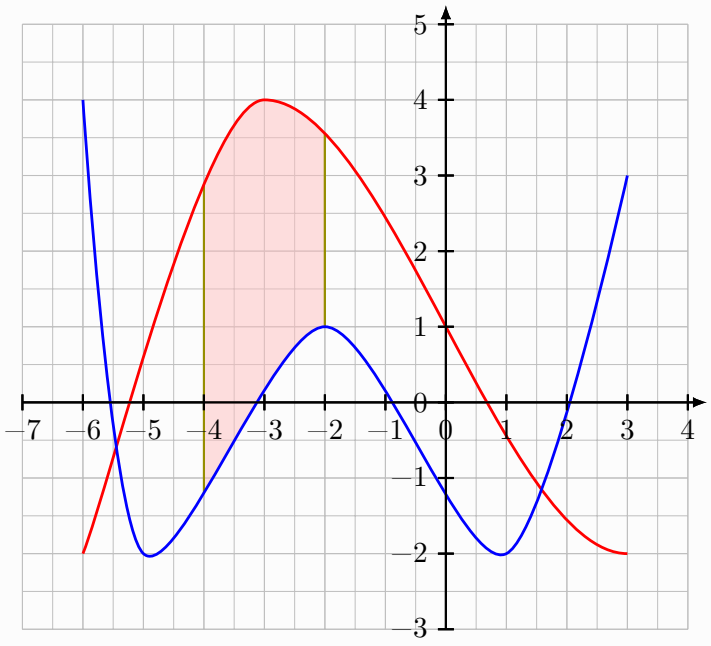
## 10 Between interpo and function

```
\begin{GraphTikz}%
  [x=0.8cm,y=1cm,Xmin=-7,Xmax=4,Ymin=-3,Ymax=5]
  \DrawAxisGrids[Grads=false,Enlarge=2.5mm]{-7,-6,...,4}{-3,-2,...,5}
  \DefineCurve[Name=courbeQ]<q>{0.25*(x+2)^2-2.5}
  \DefineLstInterpol{(-6,-2)(-5,4)(-2,-1)(1,2)(3,-2)}[\interpoA]
  \DefineInterpoCurve[Name=interpotest]{\interpoA}
  \FindIntersections[Name=FGH,Disp]{interpotest}{courbeQ}
  \DrawIntegral%
    [NameInterpo=interpotest,Type=itp/fct,Colors=olive/pink,Bounds=nodes]%
    {\interpoA} %pointsinterpo
    [q(x)]      %formule
    {(FGH-1)}{(FGH-2)}
  \DrawCurve[Color=red]{q(x)}
  \DrawInterpoCurve[Color=blue]{\interpoA}
  \DrawAxisGrids[Grid=false,Enlarge=2.5mm]{-7,-6,...,4}{-3,-2,...,5}
\end{GraphTikz}
```



# 11 Between spline and interpo

```
\begin{GraphTikz}%
  [x=0.8cm,y=1cm,Xmin=-7,Xmax=4,Ymin=-3,Ymax=5]
  \DrawAxisGrids[Grads=false,Enlarge=2.5mm]{-7,-6,...,4}{-3,-2,...,5}
  \DefineLstSpline{-6/-2/2§-3/4/0§3/-2/0}[\lstsplineA]
  \DefineSplineCurve[Name=splinered]{\lstsplineA}<\Splinered>
  \DefineLstInterpol{(-6,4)(-5,-2)(-2,1)(1,-2)(3,3)}[\interpoB]
  \DefineInterpoCurve[Name=interpotestb]{\interpoB}
  \DrawIntegral%
    [NameInterpoB=interpotestb,NameSpline=\Splinered,Type=spl/itp,Colors=olive/pink]%
    {splinered} %Namecourbespline
    [\interpoB] %pointsinterpo
    {-4}{-2}
  \DrawSplineCurve[Color=red]{\lstsplineA}
  \DrawInterpoCurve[Color=blue]{\interpoB}
  \DrawAxisGrids[Grid=false,Enlarge=2.5mm]{-7,-6,...,4}{-3,-2,...,5}
\end{GraphTikz}
```



## 12 Between interpo and spline

```
\begin{GraphTikz}%
  [x=0.8cm,y=1cm,Xmin=-7,Xmax=4,Ymin=-3,Ymax=5]
  \DrawAxisGrids[Grads=false,Enlarge=2.5mm]{-7,-6,...,4}{-3,-2,...,5}
  \DefineLstSpline{-6/4/-2§-3/-2.25/0§3/3/0}[\lstsplineB]
  \DefineSplineCurve[Name=splineblue]{\lstsplineB}<\Splineblue>
  \DefineLstInterpol{(-6,-2)(-5,4)(-2,-1)(1,2)(3,-2.5)}[\interpoA]
  \DefineInterpoCurve[Name=interpotest]{\interpoA}
  \FindIntersections[Name=UIO,Disp]{interpotest}{splineblue}
  \DrawIntegral%
    [NameInterpo=interpotest,NameSplineB=\Splineblue,Type=itp/spl,Colors=olive/pink,Bounds=nodes]%
    {\interpoA}  %pointsinterpo
    [splineblue] %Namecourbespline
    {(UIO-1)}{(UIO-2)}
  \DrawSplineCurve[Color=blue]{\lstsplineB}
  \DrawInterpoCurve[Color=red]{\interpoA}
  \DrawAxisGrids[Grid=false,Enlarge=2.5mm]{-7,-6,...,4}{-3,-2,...,5}
\end{GraphTikz}
```