In[1]:=
```
SetDirectory[NotebookDirectory[]];
```

In[2]:=
```
(* from TIAA4.nb, Out[151].  Standard deviations and means.*)
CRTrad = {1.26199, 6.62993}
trad = %[[2]] / %[[1]]
```

Out[2]= {1.26199, 6.62993}

Out[3]= 5.25355

In[4]:=
```
CRCash = {1.386, 3.74172}
cash = %[[2]] / %[[1]]
```

Out[4]= {1.386, 3.74172}

Out[5]= 2.69965

In[6]:=
```
CRTotal = {1.56849, 6.54922}
total = %[[2]] / %[[1]]
```

Out[6]= {1.56849, 6.54922}

Out[7]= 4.17549

In[8]:=
```
CRTwot = {1.60911, 6.84686}
twot = %[[2]] / %[[1]]
```

Out[8]= {1.60911, 6.84686}

Out[9]= 4.25506

In[10]:=
```
CRThreet = {1.62603, 6.90543}
threet = %[[2]] / %[[1]]
```

Out[10]= {1.62603, 6.90543}

Out[11]= 4.2468

In[12]:=
```
CRFourmt = {1.65867, 7.10068}
fourmt = %[[2]] / %[[1]]
```

Out[12]= {1.65867, 7.10068}

Out[13]= 4.28095

In[14]:=
```
CRTwom = {1.68516, 7.24796}
twom = %[[2]] / %[[1]]
```

Out[14]= {1.68516, 7.24796}

Out[15]= 4.30105

In[16]:=
```
CRThreem = {1.6916, 7.2619}
threem = %[[2]] / %[[1]]
```

Out[16]= {1.6916, 7.2619}

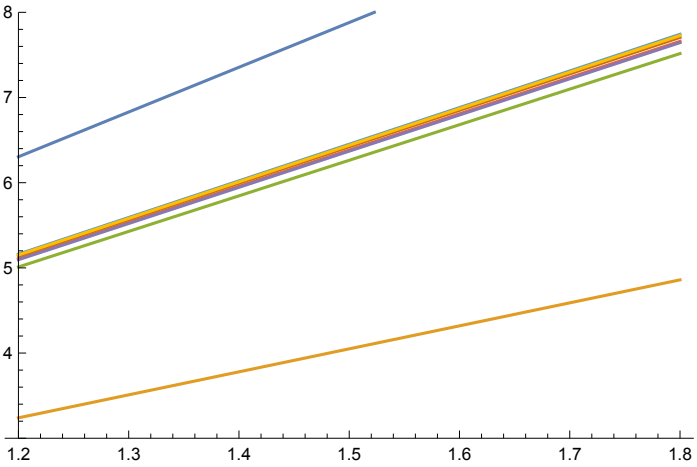
Out[17]= 4.29292

In[18]:=
```
sharpeline[instrument_, sd_] :=
 (instrument[[2]] / instrument[[1]]) * (sd - instrument[[1]]) + instrument[[2]]
```

In[19]:=
```
Plot[{sharpeline[CRTrad, sd], sharpeline[CRCash, sd],
  sharpeline[CRTotal, sd], sharpeline[CRTwot, sd], sharpeline[CRThreet, sd],
  sharpeline[CRFourmt, sd], sharpeline[CRTwom, sd], sharpeline[CRThreem, sd]},

 {sd, 1.2, 1.8}, PlotRange → {3, 8}]
```

Out[19]=



In[20]:=
```
inversesharpeline[instrument_, mean_] :=
 Solve[mean == sharpeline[instrument, sd], sd]
```

In[21]:=
```
inversesharpeline[CRCash, 3.5]
```

Out[21]=
```
{{sd → 1.29646}}
```

In[22]:=
```
sharpeline[CRCash, 1.8]
```

Out[22]=
```
4.85938
```

In[23]:=
```
inversesharpeline[CRTrad, 7.5]
```

Out[23]=
```
{{sd → 1.42761}}
```

In[24]:=
```
sharpeline[CRTrad, 1.2]
```

Out[24]=
```
6.30426
```

In[25]:=
```
{sharpeline[CRFourmt, 1.2], inversesharpeline[CRFourmt, 7.5]}
```

Out[25]=
```
{5.13714, {{sd → 1.75195}}}
```

(* show that the Sharpe ratio can contradict FDSD *)

In[26]:=
```
sharpe[data_] := Module[{temp},
  temp = Apply[{Mean[{##}], StandardDeviation[{##}]} &, data];
  {temp[[1]] / temp[[2]], Mean[data], StandardDeviation[data]}]
```

In[27]:=
```
sharpe[{.9, 1.1}]
```

Out[27]=
```
{7.07107, 1., 0.141421}
```

In[28]:= **sharpe[{1.2, 1.5}]**

Out[28]= {6.36396, 1.35, 0.212132}