

Model: Bass Fishing Contest

```
>  
>  
> restart;  
> l:=[14.5,12.5,17.25,14.5,12.625,17.75,14.125,12.625];  
w:=[27,17,41,26,17,49,23,16];
```

```
l:= [14.5, 12.5, 17.25, 14.5, 12.625, 17.75, 14.125, 12.625]
```

```
w:= [27, 17, 41, 26, 17, 49, 23, 16]
```

(1)

```
> makePoints:=proc(xlist,ylist)  
local p,i;  
p:=NULL;  
for i to nops(xlist) do  
p:=p,[xlist[i],ylist[i]]:  
od:  
[p];  
end;
```

```
makePoints := proc(xlist, ylist)
```

(2)

```
local p, i;
```

```
p := NULL; for i to nops(xlist) do p := p, [xlist[i], ylist[i]] end do; [p]
```

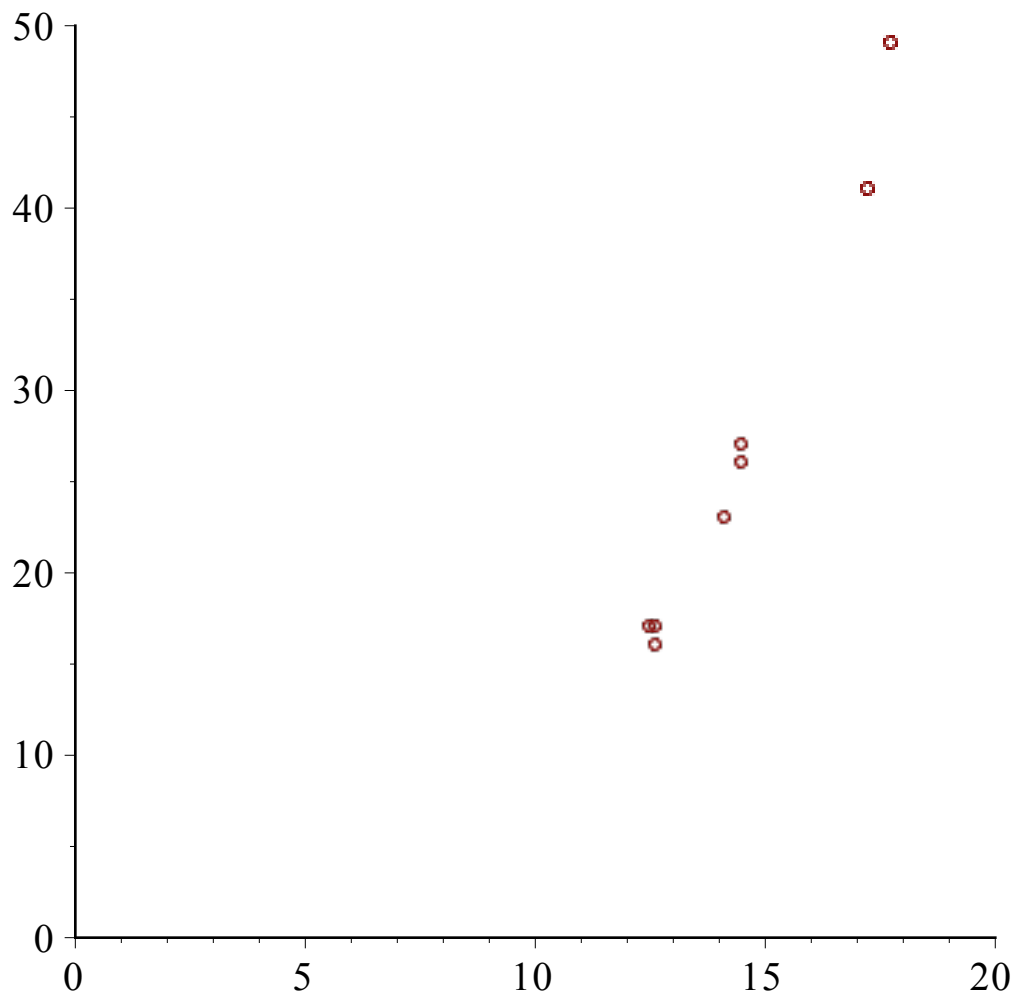
```
end proc
```

```
> pts:=makePoints(l,w);
```

```
pts := [[14.5, 27], [12.5, 17], [17.25, 41], [14.5, 26], [12.625, 17], [17.75, 49], [14.125, 23],  
[12.625, 16]]
```

(3)

```
> plot(pts,0..20,0..50,style=point,symbol=circle);
```



```
> functionToList:=proc(lst,f)
  local p,i;
  p:=NULL;
  for i to nops(lst) do
    p:=p,f(lst[i]);
  od;
  [p];
end;
```

```
functionToList := proc(lst,f)
```

(4)

```
  local p, i;
```

```
  p := NULL; for i to nops(lst) do p := p,f(lst[i]) end do; [p]
```

```
end proc
```

```
> f:=x->x^3;
```

$$f := x \rightarrow x^3$$

(5)

```
> lcubed:=functionToList(l,f);
```

```
lcubed := [3048.625, 1953.125, 5132.953125, 3048.625, 2012.306641, 5592.359375,
```

(6)

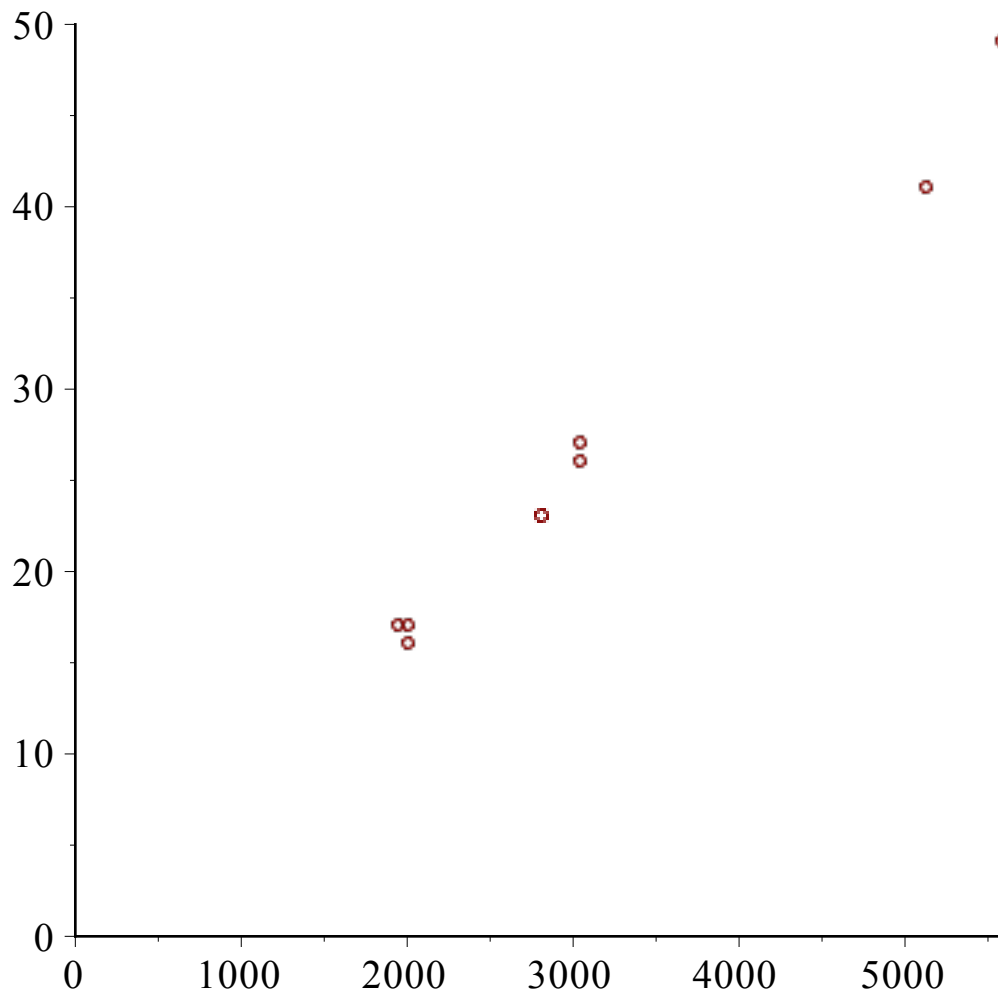
```
2818.158203, 2012.306641]
```

```
> newpnts:=makePoints(lcubed,w);
```

```
newpnts := [[3048.625, 27], [1953.125, 17], [5132.953125, 41], [3048.625, 26],
            [2012.306641, 17], [5592.359375, 49], [2818.158203, 23], [2012.306641, 16]]
```

(7)

```
> plot(newpnts, 0..5600, 0..50, style=point, symbol=circle);
```



```
> with(plots):
plotPropModel:=proc(p,i)
local slpe,liner,xmax,j,p1,p2:
slpe:=(p[i][2]-0)/(p[i][1]-0):
print(`Slope = `,evalf(slpe));
liner:=t->slpe*t:
xmax:=-infinity:
for j to nops(p) do
    if p[j][1] > xmax then
        xmax:=p[j][1]:
    fi:
od:
p1:=plot(p,style=point,symbol=circle):
p2:=plot(liner,0..xmax,color=navy):
display({p1,p2});
end;
```

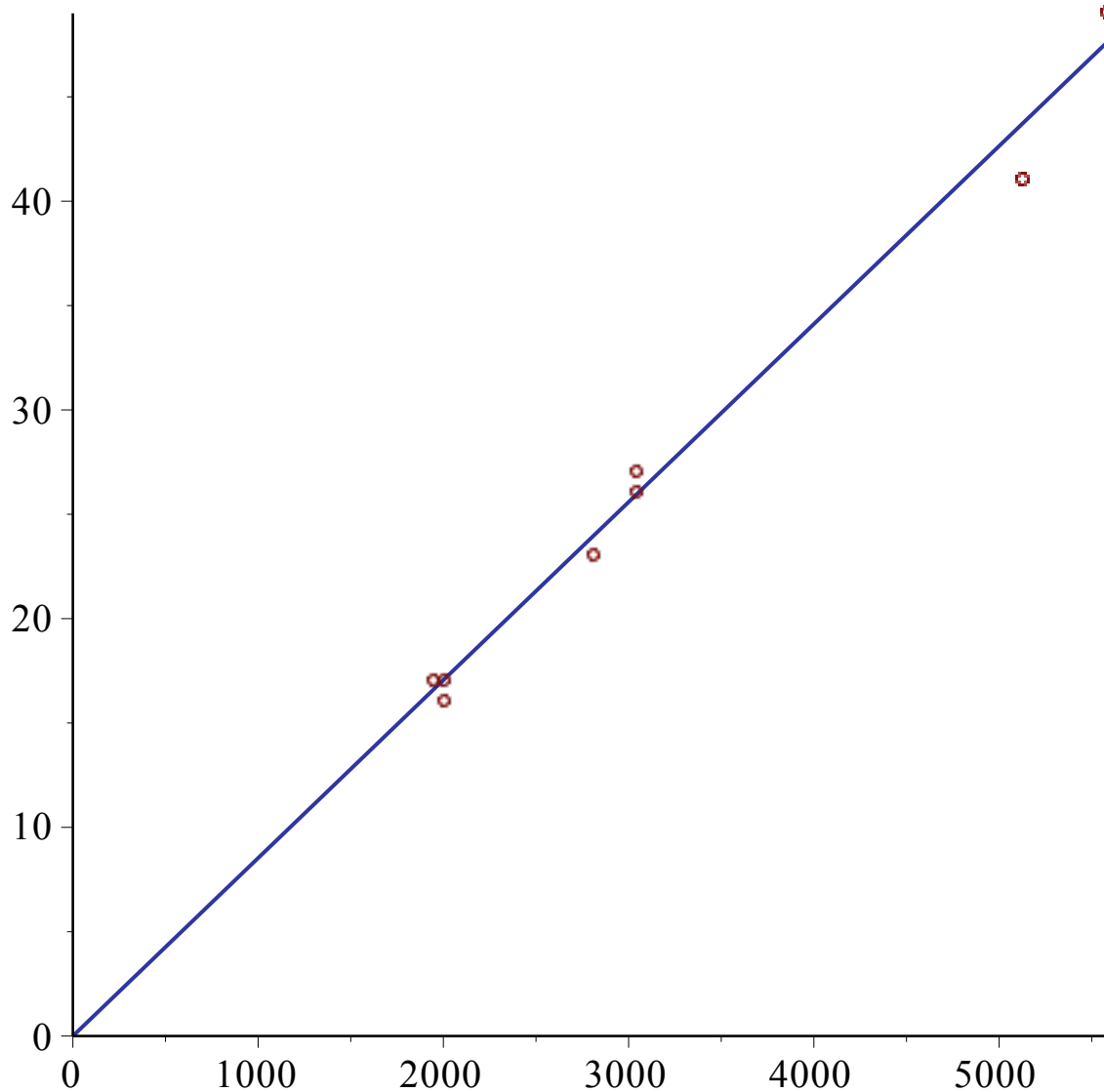
```
plotPropModel := proc(p, i)
```

(8)

```

local slpe, liner, xmax, j, p1, p2;
slpe := p[i][2]/p[i][1];
print(Slope = , evalf(slpe));
liner := t → slpe * t;
xmax := - ∞;
for j to nops(p) do if xmax < p[j][1] then xmax := p[j][1] end if end do;
p1 := plot(p, style = point, symbol = circle);
p2 := plot(liner, 0 ..xmax, color = navy);
plots:-display( {p1, p2} )
end proc
> plotPropModel(newpnts,4);
Slope = , 0.008528434950

```



```
> modelw:=x->0.00853*x^3
```

```
modelw := x → 0.00853 x3
```

(9)

```
> for i from 1 to nops(l) do
  print(l[i],w[i],modelw(l[i]));
od:
```

```
14.5, 27, 26.00477125
```

```
12.5, 17, 16.66015625
```

```
17.25, 41, 43.78409016
```

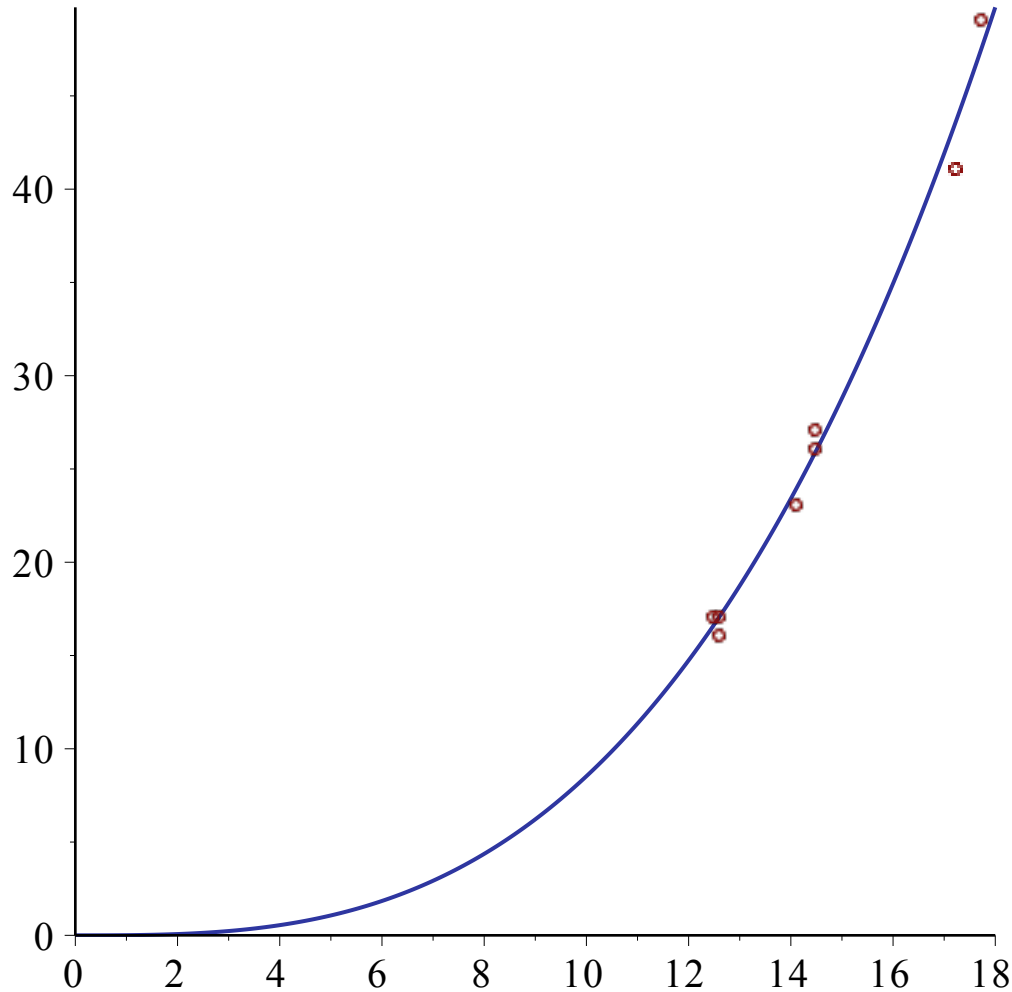
```
14.5, 26, 26.00477125
```

```
12.625, 17, 17.16497565
```

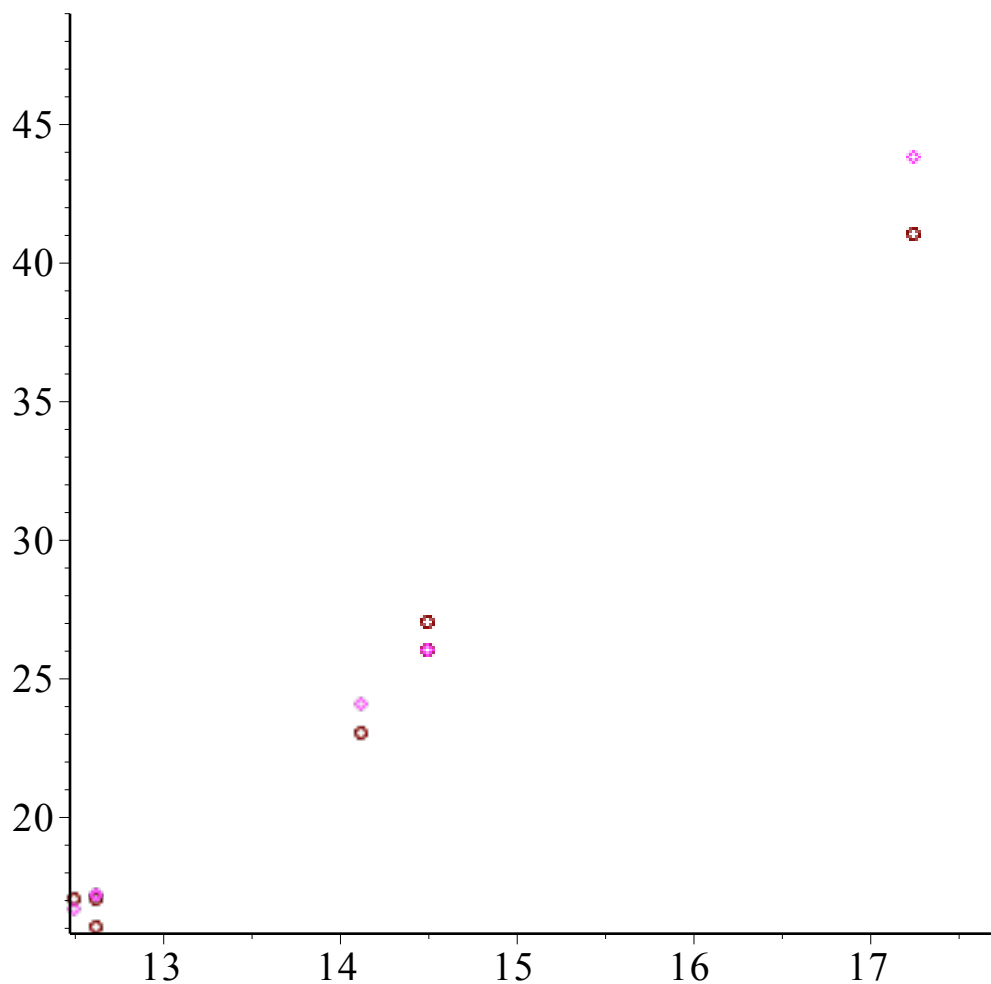
```
17.75, 49, 47.70282547
```

```
14.125, 23, 24.03888947
```

(10)

$$dta := [[14.5, 27], [12.5, 17], [17.25, 41], [14.5, 26], [12.625, 17], [17.75, 49], [14.125, 23], [12.625, 16]]$$


```
> p:=NULL:
  for i to nops(l) do
    p:=p,[l[i],modelw(l[i])]:
  od:
q3:=plot([p],style=point,symbol=diamond,colour=magenta):
display({q1,q3});
```



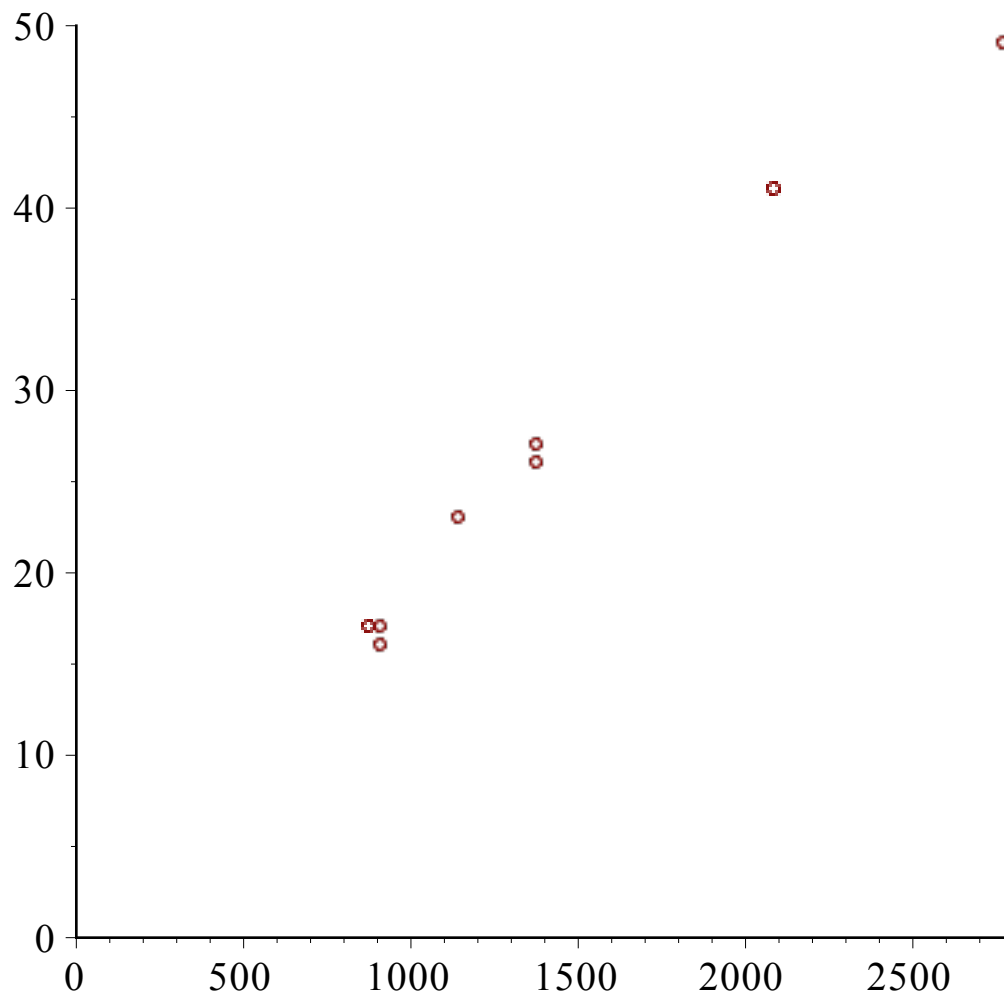
```
> g:=[9.75,8.375,11.0,9.75,8.5,12.5,9.0,8.5];
      g := [9.75, 8.375, 11.0, 9.75, 8.5, 12.5, 9.0, 8.5] (11)
```

```
> sq:=x->x^2:
g2:=functionToList(g,sq);
      g2 := [95.0625, 70.140625, 121.00, 95.0625, 72.25, 156.25, 81.00, 72.25] (12)
```

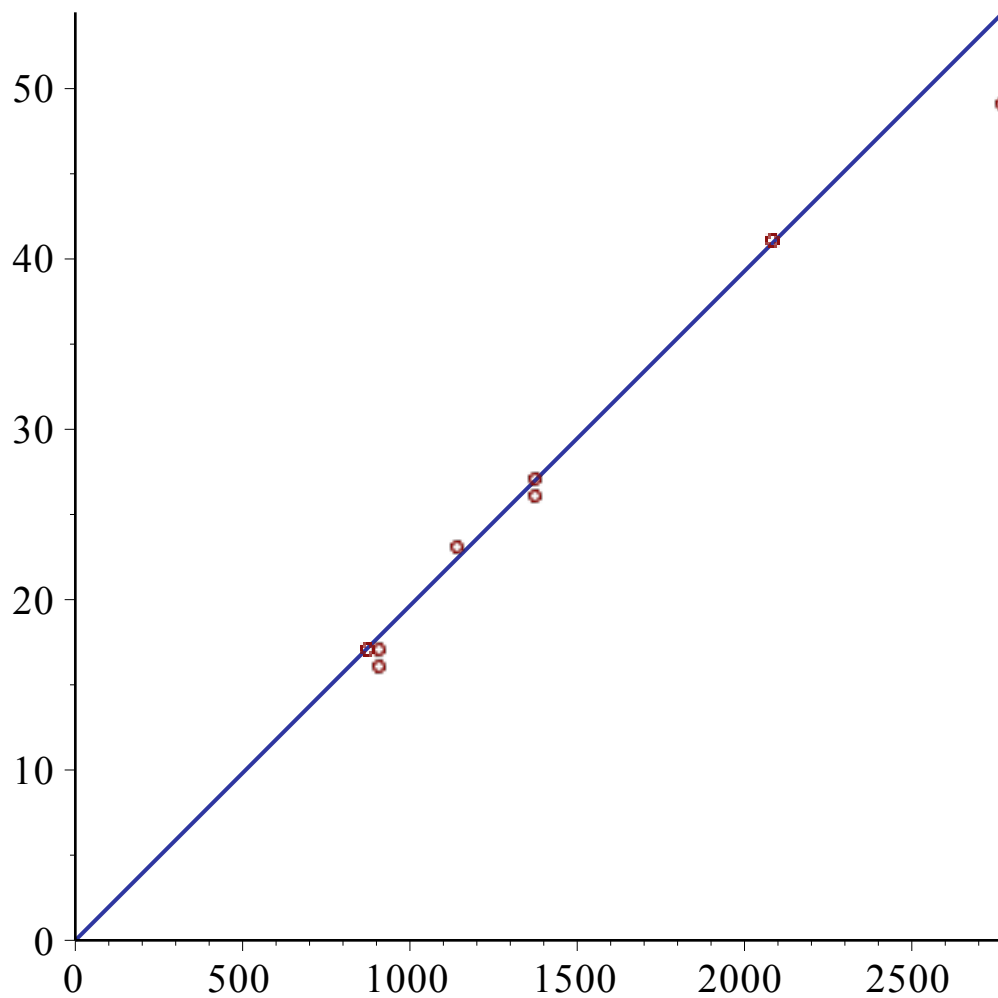
```
> lg2:=NULL:
  for i from 1 to nops(l) do
    lg2:=lg2,l[i]*g2[i]:
  od:
> lg2:=[lg2];
lg2 := [1378.40625, 876.7578125, 2087.2500, 1378.40625, 912.15625, 2773.4375,
        1144.12500, 912.15625] (13)
```

```
> model2pnts:=makePoints(lg2,w);
model2pnts := [[1378.40625, 27], [876.7578125, 17], [2087.2500, 41], [1378.40625, 26],
               [912.15625, 17], [2773.4375, 49], [1144.12500, 23], [912.15625, 16]] (14)
```

```
> plot(model2pnts,0..2800,0..50,style=point,symbol=circle);
```



```
> plotPropModel(model2pnts,3);  
      Slope = , 0.01964307103
```



```
> for i from 1 to nops(l) do
  print(l[i],g[i],w[i],0.00853*(l[i])^3,0.01964*l[i]*(g[i])^2);
od:
```

```
14.5, 9.75, 27, 26.00477125, 27.07189875
12.5, 8.375, 17, 16.66015625, 17.21952344
17.25, 11.0, 41, 43.78409016, 40.99359000
14.5, 9.75, 26, 26.00477125, 27.07189875
12.625, 8.5, 17, 17.16497565, 17.91474875
17.75, 12.5, 49, 47.70282547, 54.47031250
14.125, 9.0, 23, 24.03888947, 22.47061500
12.625, 8.5, 16, 17.16497565, 17.91474875
```

(15)

```
> #
# Now onto weight lifting
#
```

```
> lifts:=[534.6,578.7,628.3,677.9,738.5,804.7,843.3,881.8];
snatch:=[231.5,259,275.6,297.6,319.7,358.3,374.8,385.8];
jerk:=[303.1,319.7,352.7,380.3,418.9,446.4,468.5,496];
weights:=[114.5,123.5,132.5,149,165.5,182,198.5,242.5];
```

```

lifts := [534.6, 578.7, 628.3, 677.9, 738.5, 804.7, 843.3, 881.8]
snatch := [231.5, 259, 275.6, 297.6, 319.7, 358.3, 374.8, 385.8]
jerk := [303.1, 319.7, 352.7, 380.3, 418.9, 446.4, 468.5, 496]
weights := [114.5, 123.5, 132.5, 149, 165.5, 182, 198.5, 242.5]

```

(16)

```

> wl:=makePoints(weights,lifts);
wl := [[114.5, 534.6], [123.5, 578.7], [132.5, 628.3], [149, 677.9], [165.5, 738.5], [182,
804.7], [198.5, 843.3], [242.5, 881.8]]

```

(17)

```

> ws:=makePoints(weights,snatch);
ws := [[114.5, 231.5], [123.5, 259], [132.5, 275.6], [149, 297.6], [165.5, 319.7], [182,
358.3], [198.5, 374.8], [242.5, 385.8]]

```

(18)

```

> wj:=makePoints(weights,jerk);
wj := [[114.5, 303.1], [123.5, 319.7], [132.5, 352.7], [149, 380.3], [165.5, 418.9], [182,
446.4], [198.5, 468.5], [242.5, 496]]

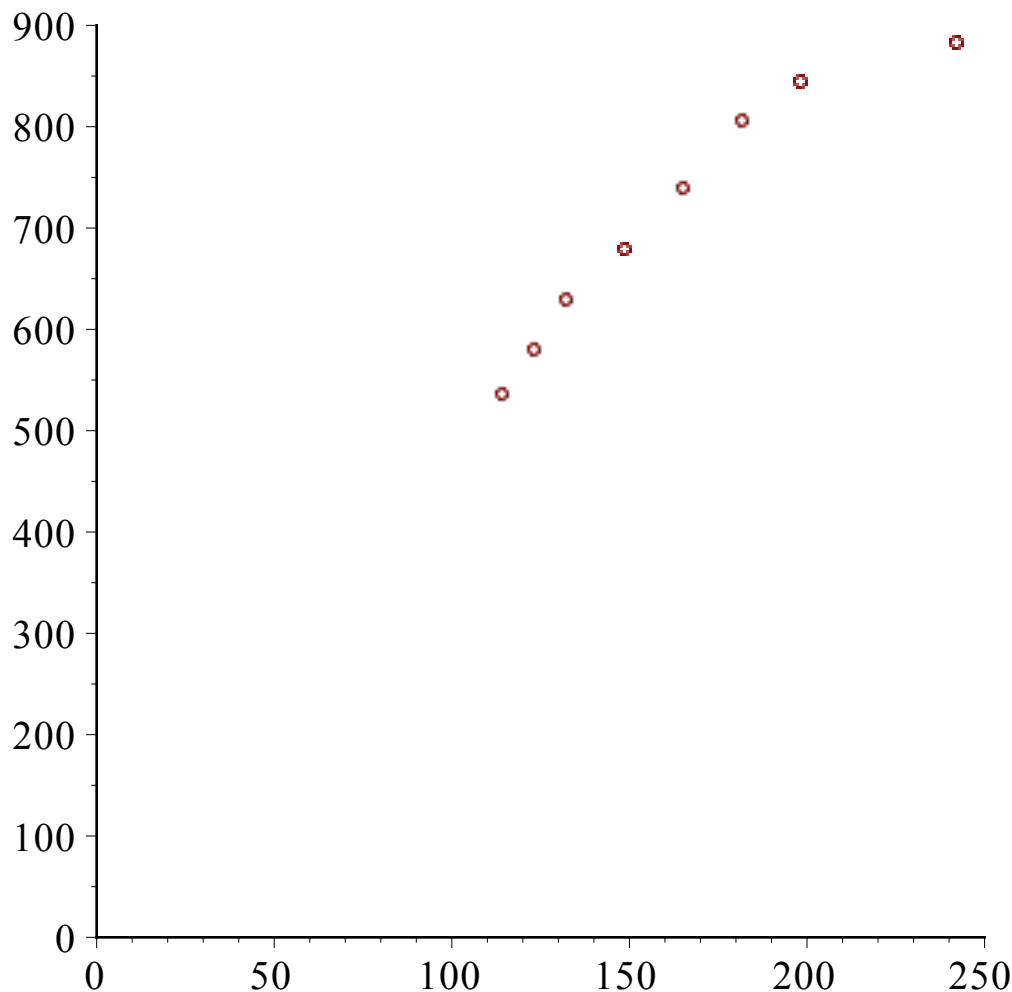
```

(19)

```

> plot(wl,0..250,0..900,style=point,symbol=circle);

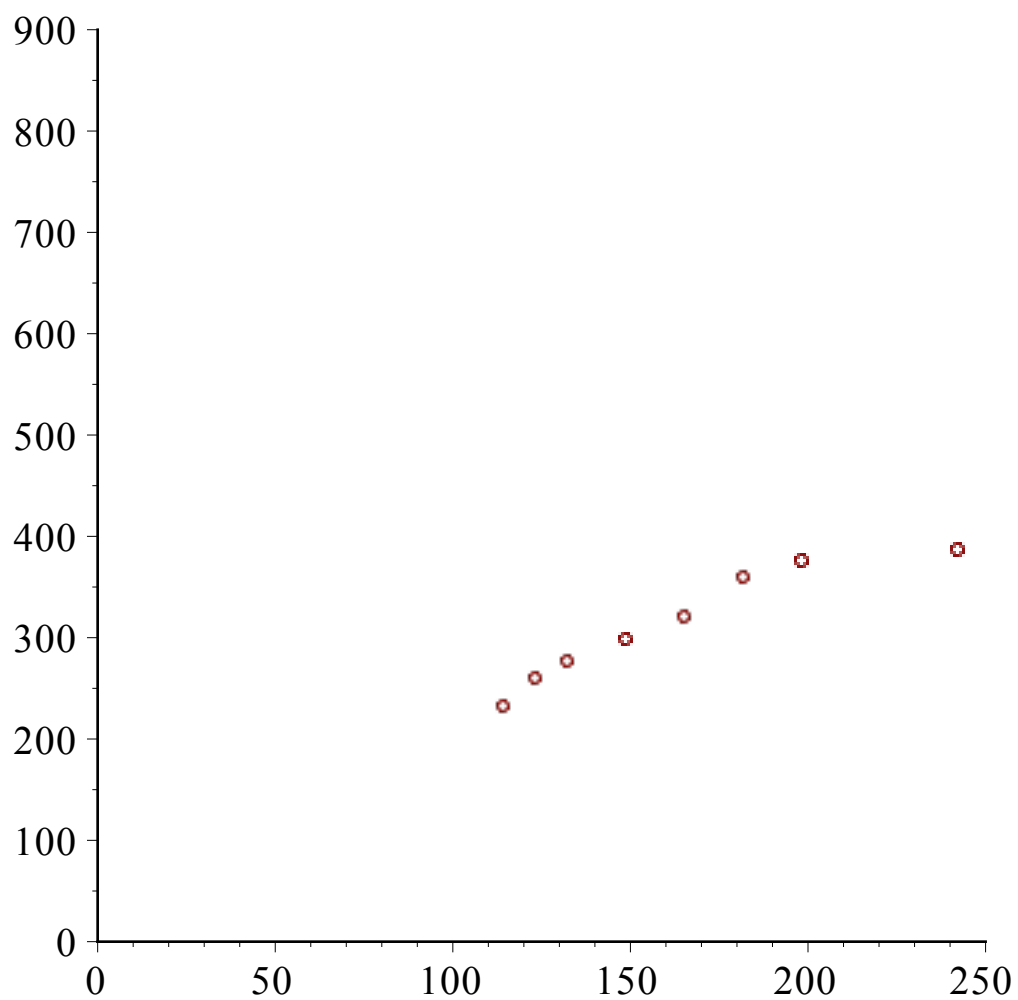
```



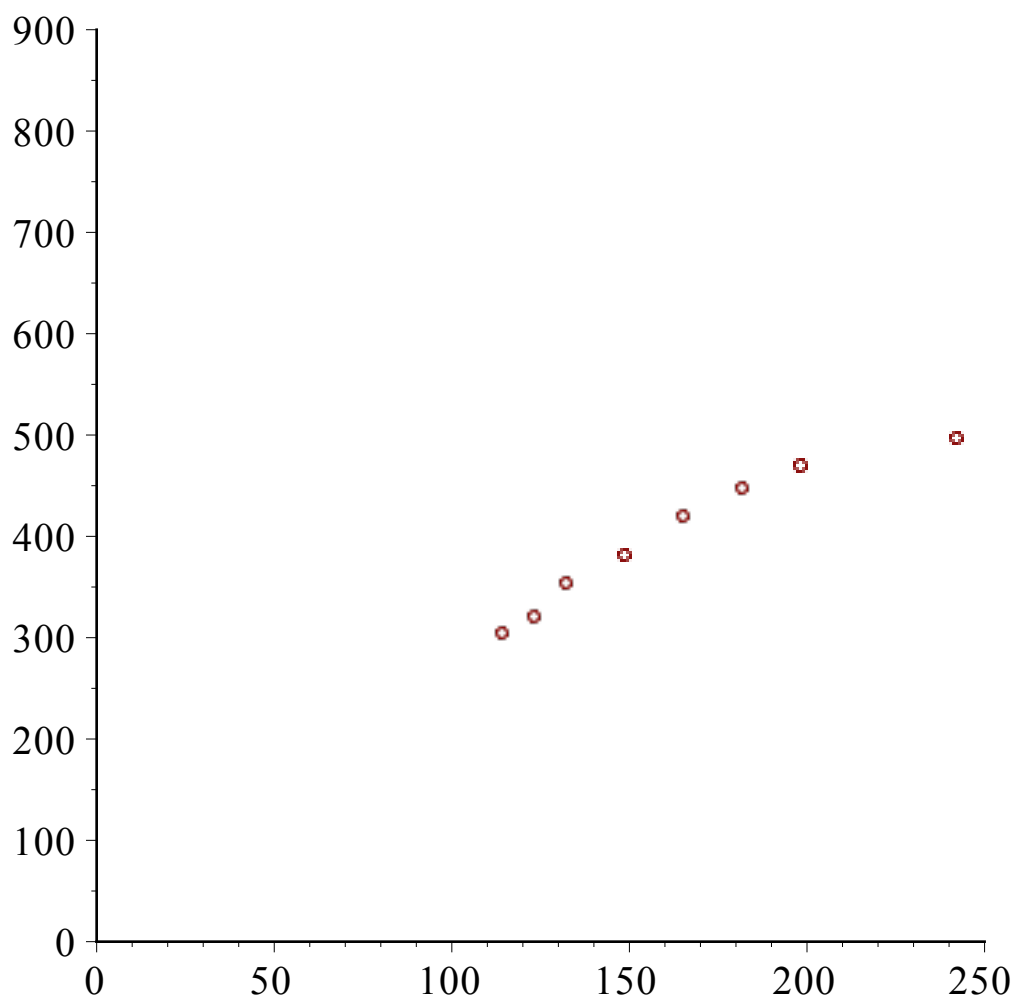
```

> plot(ws,0..250,0..900,style=point,symbol=circle);

```



```
> plot(wj,0..250,0..900,style=point,symbol=circle);
```



>