Maple

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# Honors Project 8b : Bezier Curves Again
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> restart : with(plots): with(plottools):
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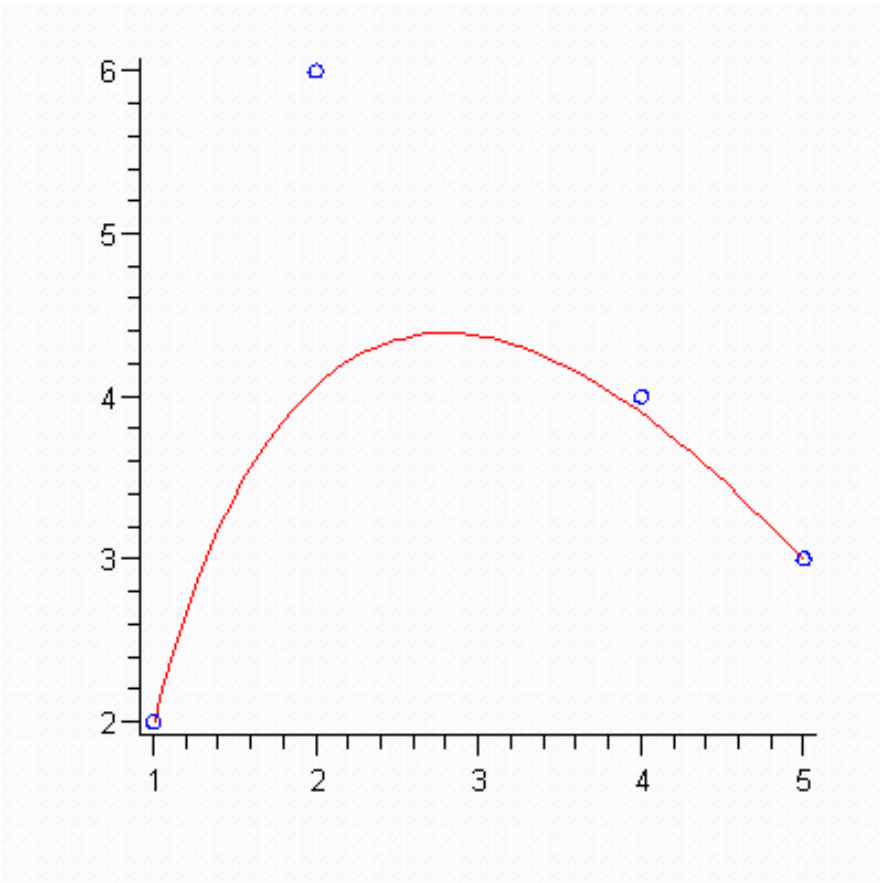
> Bezier:=proc(numpoints, P)
  local t, i, vvv , vvu , vuu, uuu, xdelta , Curve, bezierC, points;
  t := 0.0;
  Curve := array(1 ..numpoints + 1, 1 ..2);
  xdelta := 1/numpoints;
  for i from 0 by 1 to numpoints do
  vvv :=(1.0 - t)*(1.0 - t)*(1.0 - t);
  vvu := 3*(1.0 - t)*(1.0 - t)*t;
  vuu := 3*(1.0 - t)*t*t;
  uuu := t*t*t;
  Curve[i + 1, 1]:=P[1, 1]*vvv + P[2, 1]*vvu + P[3, 1]*vuu
   + P[4, 1]*uuu;
  Curve[i + 1, 2]:=P[1, 2]*vvv + P[2, 2]*vvu
   + P[3, 2]*vuu + P[4, 2]*uuu;
  t := t + xdelta;
  od;
  bezierC := plot(convert(Curve, listlist)):
  points := pointplot(P, color = blue, symbol = circle):

  RETURN : (display([bezierC, points])) :
   end:
```

```
> P :=[[1, 2],[2, 6],[4, 4],[5, 3]]; Bezier(50, P);
```

$$P := [[1, 2], [2, 6], [4, 4], [5, 3]]$$


6
5
4
3
2
1
2
3
4
5

>

Mathcad

$$\text{Bezier}(n, P) := \left| \begin{array}{l} t \leftarrow 0 \\ dt \leftarrow \dfrac{1}{n} \\ \text{for } i \in 0..n \\ \quad \left| \begin{array}{l} vvv \leftarrow (1-t)^3 \\ vvu \leftarrow 3\cdot(1-t)^2\cdot t \\ vuu \leftarrow 3\cdot(1-t)\cdot t^2 \\ uuu \leftarrow t^3 \\ C_{i,0} \leftarrow P_{0,0}\cdot vvv + P_{1,0}\cdot vvu + P_{2,0}\cdot vuu + P_{3,0}\cdot uuu \\ C_{i,1} \leftarrow P_{0,1}\cdot vvv + P_{1,1}\cdot vvu + P_{2,1}\cdot vuu + P_{3,1}\cdot uuu \\ t \leftarrow t + dt \end{array} \right. \\ C \end{array} \right.$$

$$P := \begin{pmatrix} 1 & 2 \\ 2 & 6 \\ 4 & 4 \\ 5 & 3 \end{pmatrix} \qquad X := \text{Bezier}(50, P)$$

Bezier 4 pontos