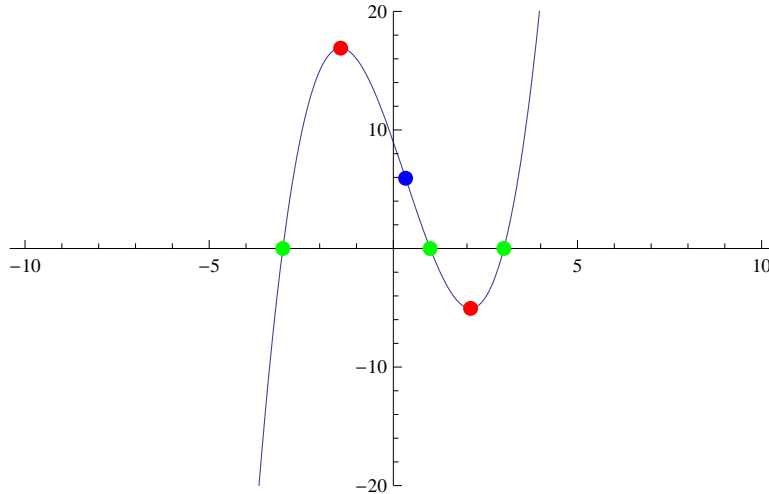


This will find the critical points, points of inflection, and the x-intercepts of a polynomial.

```

Plot[f[x], {x, -10, 10}, PlotRange -> 20,
  Epilog -> {PointSize[Large], RGBColor[1, 0, 0],
    (*Critical Point*)Point[
      If[Length[Select[Riffle[x /. Solve[f'[x] == 0, x], f[x] /. Solve[f'[x] == 0, x]],
        Im[#] == 0 &]] == 2, Select[Riffle[x /. Solve[f'[x] == 0, x],
        f[x] /. Solve[f'[x] == 0, x]], Im[#] == 0 &], Partition[
        Flatten[Select[Riffle[x /. Solve[f'[x] == 0, x], f[x] /. Solve[f'[x] == 0, x]],
        Im[#] == 0 &]], 2]]], RGBColor[0, 1, 0],
    (*X-Intercept*)Point[If[Length[Select[Riffle[x /. Solve[f[x] == 0, x],
        f[x] /. Solve[f[x] == 0, x]], Im[#] == 0 &]] == 2,
        Select[Riffle[x /. Solve[f[x] == 0, x], f[x] /. Solve[f[x] == 0, x]], Im[#] == 0 &],
        Partition[Flatten[Select[Riffle[x /. Solve[f[x] == 0, x],
        f[x] /. Solve[f[x] == 0, x]], Im[#] == 0 &]], 2]]], RGBColor[0, 0, 1],
    (*Point of Inflection*)Point[If[Length[Select[Riffle[
        x /. Solve[f''[x] == 0, x], f[x] /. Solve[f''[x] == 0, x]], Im[#] == 0 &]] == 2,
        Select[Riffle[x /. Solve[f''[x] == 0, x], f[x] /. Solve[f''[x] == 0, x]],
        Im[#] == 0 &], Partition[Flatten[Select[Riffle[x /. Solve[f''[x] == 0, x],
        f[x] /. Solve[f''[x] == 0, x]], Im[#] == 0 &]], 2]]]]]
  Row[{Text[Style["Critical Points ", RGBColor[1, 0, 0]]],
    Partition[Flatten[Select[Riffle[x /. Solve[f'[x] == 0, x],
      f[x] /. Solve[f'[x] == 0, x]], Im[#] == 0 &]], 2]]}
  Row[{Text[Style["Estimation of Critical Points ", RGBColor[1, 0, 0]]],
    N[Partition[Flatten[Select[Riffle[x /. Solve[f'[x] == 0, x],
      f[x] /. Solve[f'[x] == 0, x]], Im[#] == 0 &]], 2]]]}
  Row[{Text[Style["X-Intercepts ", RGBColor[0, 1, 0]]], Partition[Flatten[Select[
    Riffle[x /. Solve[f[x] == 0, x], f[x] /. Solve[f[x] == 0, x]], Im[#] == 0 &]], 2]]}
  Row[{Text[Style["Estimation of X-Intercepts ", RGBColor[0, 1, 0]]],
    N[Partition[Flatten[Select[Riffle[x /. Solve[f[x] == 0, x],
      f[x] /. Solve[f[x] == 0, x]], Im[#] == 0 &]], 2]]]}
  Row[{Text[Style["Points of Inflection ", RGBColor[0, 0, 1]]],
    Partition[Flatten[Select[Riffle[x /. Solve[f''[x] == 0, x],
      f[x] /. Solve[f''[x] == 0, x]], Im[#] == 0 &]], 2]]}
  Row[{Text[Style["Estimation of Points of Inflection ", RGBColor[0, 0, 1]]],
    N[Partition[Flatten[Select[Riffle[x /. Solve[f''[x] == 0, x],
      f[x] /. Solve[f''[x] == 0, x]], Im[#] == 0 &]], 2]]]}

```



Critical Points $\left\{ \left\{ \frac{1}{3} (1 - 2\sqrt{7}), \left(-3 + \frac{1}{3} (1 - 2\sqrt{7}) \right) \left(-1 + \frac{1}{3} (1 - 2\sqrt{7}) \right) \left(3 + \frac{1}{3} (1 - 2\sqrt{7}) \right) \right\}, \right.$
 $\left. \left\{ \frac{1}{3} (1 + 2\sqrt{7}), \left(-3 + \frac{1}{3} (1 + 2\sqrt{7}) \right) \left(-1 + \frac{1}{3} (1 + 2\sqrt{7}) \right) \left(3 + \frac{1}{3} (1 + 2\sqrt{7}) \right) \right\} \right\}$

Estimation of Critical Points $\{ \{-1.4305, 16.9009\}, \{2.09717, -5.04904\} \}$

X-Intercepts $\{ \{-3, 0\}, \{1, 0\}, \{3, 0\} \}$

Estimation of X-Intercepts $\{ \{-3., 0.\}, \{1., 0.\}, \{3., 0.\} \}$

Points of Inflection $\left\{ \left\{ \frac{1}{3}, \frac{160}{27} \right\} \right\}$

Estimation of Points of Inflection $\{ \{0.333333, 5.92593\} \}$