# Kirill Zakharov
# Pade Approximation

```
Clear[padeApprox]
```

```
funD[fun_, y_, k_, h_] := D[fun[y], {y, k}] /. y → h
```

```
padeApprox[fun_, x0_, m_] := Module[{t, x = x0, array = {}}, Do[t = -fun[x]/funD[k, i, x];
    x = x^2/(x - t);
    AppendTo[array, x], {i, 1, m}];
  N /@ array]
```

## Задаем функцию

```
fun[y_] := y^3 + 6 y^2 + 9 y - 4
```

```
lst = padeApprox[fun, 3.6, 3];
```

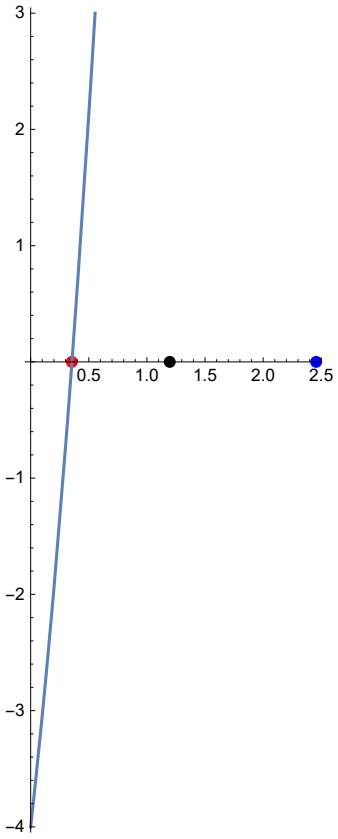
## Ответ

```
lst[[3]]
```

```
0.354205
```

## Визуальное представление

```
Show[Graphics[{PointSize[0.04], Blue, Point[{lst[[1]], 0}],
   Black, Point[{lst[[2]], 0}], Red, Point[{lst[[3]], 0}]}, Axes → True],
 Plot[x^3 + 6 x^2 + 9 x - 4, {x, -5, 5}, PlotRange → {Automatic, {-4, 3}}]]
```




## Проверка

```
Solve[x^3 + 6 x^2 + 9 x - 4 == 0, x]
```

$$\{\{x \to 0.355\ldots\}, \{x \to -3.18\ldots - 1.08\ldots\, i\}, \{x \to -3.18\ldots + 1.08\ldots\, i\}\}$$