

1. Take f to be the function that is given by

$$f(x) = 6(x - 2)^2 - 15.$$

a) Determine the axis of symmetry and vertex of f .

b) Find all roots (x -intercepts) of f .

c) Sketch f .

d) Solve $f > 0$.

2. Find and classify the extremal points of f , where

$$f(x) = -10x^2 + 10x + \frac{1}{2}.$$

3. Find polynomials q and r so that $\frac{r(x)}{x-4}$ is a proper fraction and

$$5x^3 + 10x^2 - 5 = q(x)(x - 4) + r(x).$$

4. Write $4x^3 - 32x^2 - 212x + 240$ as a product of linear factors given that $x = -5$ is a root or zero.

5. Take f to be the polynomial function that is given by

$$f(x) = 20(x + 11)^5(x + 6)^3(x - 1)^2(x - 3)^4(2x - 7)^5.$$

List the zeros of f together with their orders.

6. Determine the leading term of the polynomial f that is given by

$$f(x) = 20(x + 11)^5(x + 6)^3(x - 1)^2(x - 3)^4(2x - 7)^5.$$

Describe the asymptotic behavior of f .

7. Sketch the polynomial f , where

$$f(x) = 20(x + 11)^5(x + 6)^3(x - 1)^2(x - 3)^4(2x - 7)^5.$$