

## 3.2 - Polynomial Functions

### Review problems

1. **Solving polynomial equations.** Solve the following:

(a)  $x^4 = 81x^2$       (b)  $(x - 2)^2(x + 4)(x - 10)^3 = 0$

2. **Finding intercepts.** Find x- and y-intercepts of:

(a)  $y = x^2 + 3x$       (b)  $y = 2(x - 3)^2$

### Basic knowledge

3. Find zeros, the multiplicity of each zero, end-behavior, and y-intercept, and then sketch the graph of each polynomial function:

(a)  $f(x) = 2x(x - 3)^2(x + 4)^7$       (b)  $f(x) = -3(x - 1)(x + 2)^2$

### Intermediate

4. Find zeros, the multiplicity of each zero, end-behavior, and y-intercept, and then sketch the graph of the given polynomial function:

$$f(x) = x - x^3$$

### Advanced

5. Find all real zeros, the multiplicity of each real zero, end-behavior, and y-intercept, and then sketch the graph of the given polynomial function:

$$f(x) = x(x^2 + 1)$$

6. Write an equation of a polynomial function of degree 4 that has a zero  $-1$  of multiplicity 2, a zero 4 of multiplicity 1, and a zero 2 of multiplicity 1 and the y-intercept at  $(0, -12)$ .