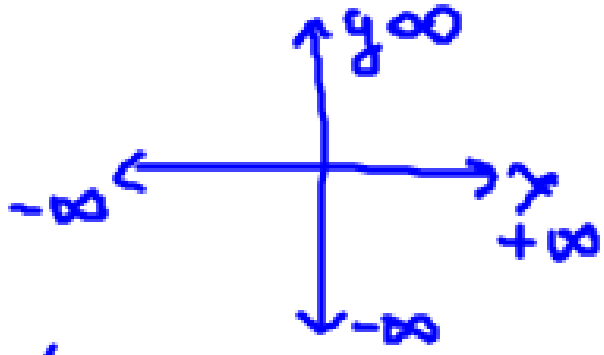
End Behaviour: (long term behaviour



In general:

highest exponent

If "n" is even and: $y = x^2$, $y = x^4$, $y = x^6$

"a" is positive ($\to R_x$)

{ Start high, end high

"a" is negative (R_x)

{ Start QII, end QI

as $x \to -\infty$, $y \to +\infty$

as $x \to +\infty$, $y \to +\infty$

as $x \to -\infty$, $y \to -\infty$

as $x \to +\infty$, $y \to -\infty$

{ Start slow, ends low

Start QIII, end QIV

If "n" is odd and

"a" is positive

start low, end high

start QIII, end QI

as $x \to -\infty$, $y \to -\infty$

as $x \to +\infty$, $y \to +\infty$

"a" is negative

R_x

Starts high, ends low

Start QII, end QIV

as $x \to -\infty$, $y \to +\infty$

as $x \to \infty$, $y \to -\infty$

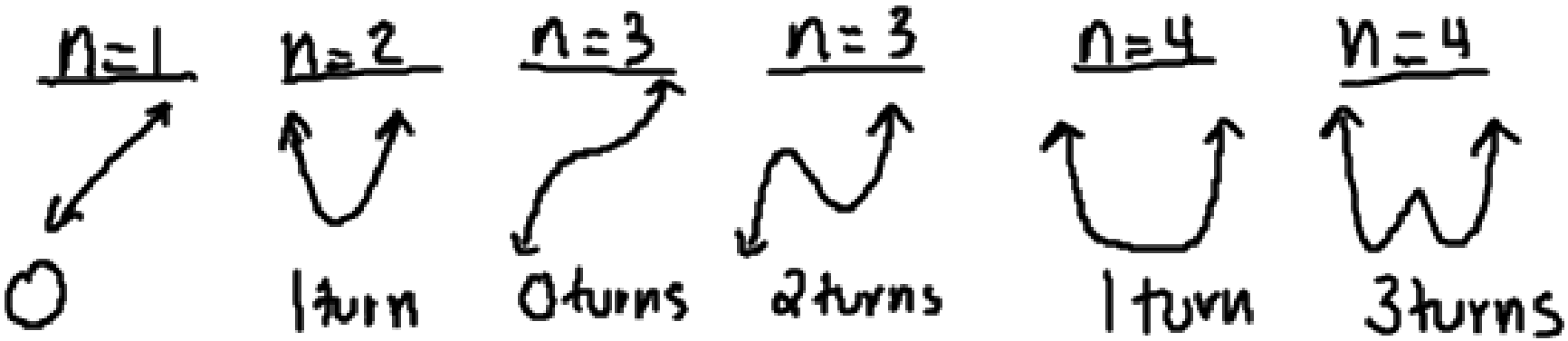
Chapter 3.1 Day 2

- The graph of a polynomial function
  - is continuous ⟶ never had to lift the pencil
  - has only smooth turns

$D: \{x \mid x \in \mathbb{R}\}$

nothing sharp

- A function of degree n has at most (n-1) turns (# vertices)



Even function: has to have at least 1 turn

odd function: doesn't have to have any turns

- The leading coefficient will
polynomial

- The constant term is the y- intercept of the polynomial

$y = 6x^2 - 5x + 3$ (0, 3)

$y = -x^3 + x^{15} + 0$ (0, 0)

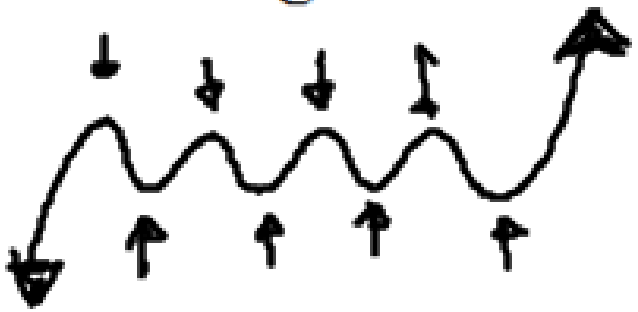
x-intercepts

n is even	n is odd
→ don't have to have an x-int  → can have up to "n" x-int	→ have to have at least one x-int  → can have up to "n" x-int.

Vertices

- Maximum number will be one less than the degree

8 vertices
minimum degree 9



n is even	n is odd
has to have at least 1 vertex	may not have a vertex

Sketch:

$y = (x-1)(x+2)(x-3)$

- degree: 3
- leading coefficient: 1
  $a > 0$ (No R_x)
- End behaviour
  Start low
  End high
- y-int ($x = 0$)

$y = (0-1)(0+2)(0-3)$
$= (-1)(2)(-3)$
$= 6$

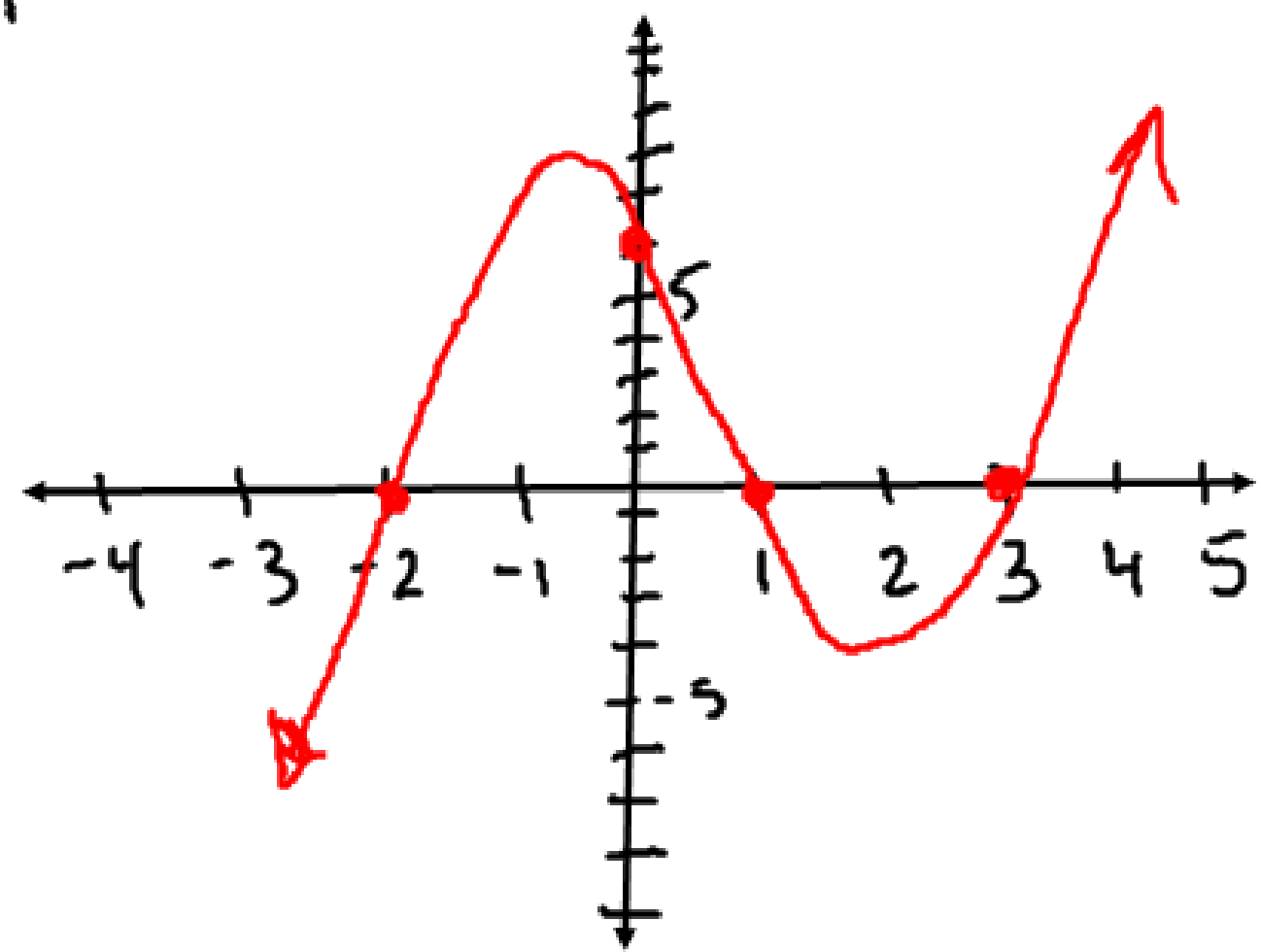
$(0, 6)$

x-int ($y = 0$)

$0 = (x-1)(x+2)(x-3)$

$x = 1 \quad x = -2 \quad x = 3$

$(1, 0) \quad (-2, 0) \quad (3, 0)$



$-(x-1)(x+2)^2$ ← Bounce

$$y = -(x-1)(x+2)(x+2)$$

hw: pg 114 # 1-4, 11, 12

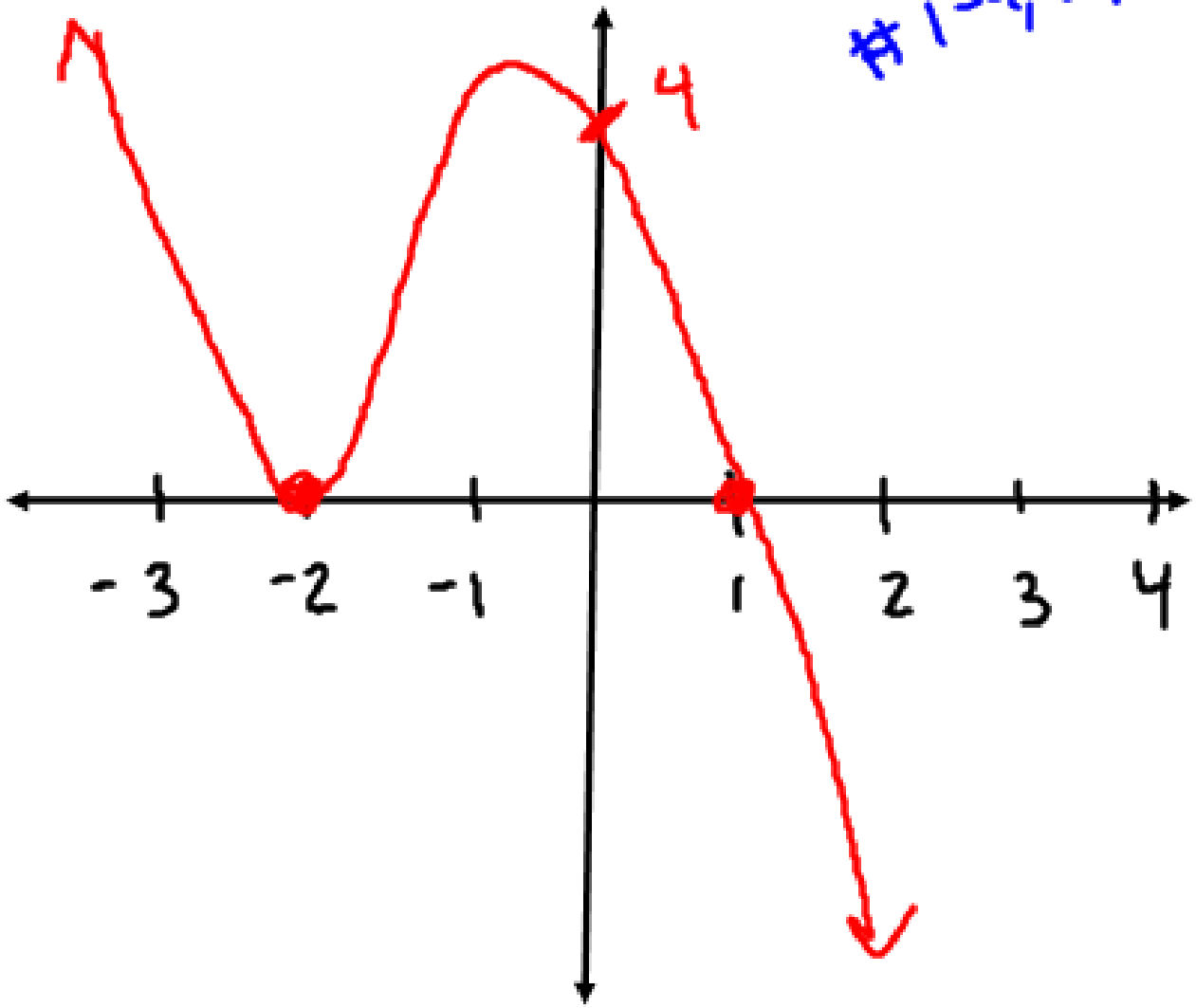
- degree 3
- leading coeff: -1

  $a<0$ R_x -

- End behaviour

  Start high

  end low



- y-int

  $y = -(-1)(2)(2)$

  $= 4$

  $(0, 4)$

- x-int

  $(1, 0), (-2, 0), (-2, 0)$ (bounce)

HW: pg 114 #1-4,11,12