Exercise walk-through

Equivalent Representations of Polynomial and Rational Expressions ▪ 1.11

eXercise

You must be able to

- use the **factored form** 因式分解形式 to read off zeros, intercepts, asymptotes, and holes
- use the **standard form** 标准形式 to read off end behavior

Method — Two useful forms

- **Factored form** shows the **real zeros** directly, revealing x-intercepts, vertical asymptotes, holes, and domain.
- **Standard form** (expanded) shows the **leading term**, revealing **end behavior**.

Method — Example

$p(x) = (x-1)(x+3)$ has x-intercepts at 1 and -3; expanded, $p(x) = x^2 + 2x - 3$ shows an upward parabola (even degree, positive leading coefficient).

Practice 2.1 ▪ 1 mark

State what the factored form of a function reveals.

Solution 2.1

Method: Two useful forms

Worked steps

the real zeros, and hence x-intercepts, asymptotes, holes, and domain B1.

Practice 2.2 ▪ 1 mark

State what the standard (expanded) form reveals.

Solution 2.2

Method: Two useful forms

Worked steps

the end behavior (via the leading term) B1.

Practice 2.3 ▪ 2 marks

For $p(x) = (x-1)(x+3)$, state the x-intercepts.

Solution 2.3

Worked steps

$x = 1$ and $x = -3$ B1 B1.

Exam-style 3.1 ▪ 1 mark

The factored form of a polynomial readily shows its

A end behavior

B real zeros / x-intercepts

C leading coefficient only

D nothing useful

Solution 3.1

Method: Two useful forms

A end behavior

B real zeros / x-intercepts ✓

C leading coefficient only

D nothing useful

Worked steps

B.

Exam-style 3.2 ▪ 1 mark

The standard form best reveals a function's

A holes

B end behavior

C x-intercepts

D domain

Solution 3.2

Method: Two useful forms

A holes

B end behavior ✓

C x-intercepts

D domain

Worked steps

B.

Exam-style 3.3 ▪ 1 mark

$p(x) = (x-2)(x+5)$.
(a) State the x-intercepts.
(b) Expand to standard form.

Solution 3.3

Method: Two useful forms

Worked steps

(a) $x = 2$ and $x = -5$ B1. (b) $x^2 + 3x - 10$ M1 A1.