

Polynomial Division

Printable teaching and practice sheet

Module 2 | Student Book pages 10-13 | Suggested time: 50 minutes | 20 marks



Name: _____ Class: _____ Date: _____

Learning goals

- Explain and apply long division with valid conditions and clear reasoning.
- Explain and apply division identity with valid conditions and clear reasoning.
- Explain and apply missing powers with valid conditions and clear reasoning.

Quick reference

Long division	Polynomial long division repeatedly cancels the current leading term.
Division identity	For dividend A and nonzero divisor B, $A=BQ+R$ with $\deg(R)<\deg(B)$.
Missing powers	A zero coefficient preserves the correct place value when a polynomial skips a degree.

Worked example

What is the remainder when $P(x) = x^2 + x + 2$ is divided by $x - 2$? Worked solution: By the Remainder Theorem, substitute $x=2$: $P(2)=8$.

Graduated practice

Answer without viewing the key. Show complete working for short-response questions.

1. What is the remainder when $P(x) = x^2 + x + 2$ is divided by $x - 2$? [1 marks]

- A) -8
B) 10
C) 8
D) 5

2. What is the remainder when $P(x) = x^2 + x - 22$ is divided by $x - 5$? [1 marks]

- A) 8
B) -8
C) 13
D) 2

3. What is the remainder when $P(x) = x^2 + 3x - 2$ is divided by $x - 1$? [1 marks]

- A) -2
B) 3
C) 2
D) $2 + 1$

4. What is the remainder when $P(x) = x^2 + x - 7$ is divided by $x - 3$? [1 marks]

- A) 5
B) -5
C) 8
D) 1

5. What is the remainder when $P(x) = x^2 + 5x + 1$ is divided by $x - 1$? [1 marks]

- A) -7
B) 8
C) 7
D) 1

6. What is the remainder when $P(x) = x^2 + 2x - 23$ is divided by $x - 4$? [1 marks]

- A) 1
B) -1
C) 5
D) -5

7. True or false: Polynomial long division repeatedly cancels the current leading term. [1 marks]

☐ True ☐ False

8. True or false: The remainder may have the same degree as the divisor. [1 marks]

☐ True ☐ False

9. What is the remainder when $P(x) = x^2 + x + 4$ is divided by $x - 1$? Show a complete method. [3 marks]

10. What is the remainder when $P(x) = x^2 + x - 16$ is divided by $x - 3$? Show a complete method. [3 marks]

11. What is the remainder when $P(x) = x^2 - x - 4$ is divided by $x - 3$? Show a complete method. [3 marks]

12. What is the remainder when $P(x) = x^2 + 3x - 1$ is divided by $x - 1$? Show a complete method. [3 marks]

Challenge and review

1. Write the polynomial division identity and state the degree condition on the remainder.
2. Create a polynomial with a missing power and explain how to prepare it for long division.
3. Error analysis: a student wrote $A=Q+BR$. Explain the error and write the correct identity.

Follow-up plan

Below 14/20: revisit the division identity and power ordering, then retry Questions 1-4 and 9. At 14 or above: continue to the online module challenge.