Expressions: terms, coefficients and values — Teacher answers

Year 7, upper volume • text pp. 41–44 • foundation lessons 21–22

Use the prerequisite checks to choose support, project the worked and guided items, then let learners work on paper. Select supplements or extensions as needed. No learner answers are saved by this presentation.

Worked example 1

For the monomial below, find its degree. Explain which part of the term is counted.

$$-3x^2y$$

Reference answer

The degree is 3.

1. Add the exponents of the variables; do not include the numerical coefficient.
2. The exponent sum is 2 + 1 = 3.

- State the applicable definition or condition accurately.
- Support the conclusion with the given numbers, a check or a concrete counterexample.

Guided attempt 2

Find the value of 2x + 3 when x = −2. Keep the negative value in brackets during substitution.

$$2x + 3$$

1. x = ____, so 2x + 3 = 2 × (____) + 3.
2. The product is ____.
3. The final value is ____.

Reference answer

The value is −1.

$$-1$$

1. Replace x by −2: 2 × (−2) + 3.
2. Calculate −4 + 3 = −1.

- Keep each sign and collect only terms with the same variable powers.
- Substitute the stated values into the complete expression and calculate.

Prerequisite 3

For the monomial below, find its coefficient. Explain which part of the term is counted.

$$-x$$

Reference answer

The coefficient is −1.

1. The coefficient is the complete numerical factor, including its sign.
2. The numerical factor is −1.

- State the applicable definition or condition accurately.
- Support the conclusion with the given numbers, a check or a concrete counterexample.

Prerequisite 4

Evaluate a^2 when a = 3.

$$a^2$$

Reference answer

The value is 9.

$$9$$

1. Substitute 3 for a.
2. $3^2 = 3 \times 3 = 9$.

- Keep each sign and collect only terms with the same variable powers.
- Substitute the stated values into the complete expression and calculate.

Independent practice 5

For the monomial below, find its coefficient. Explain which part of the term is counted.

$$-5ab^2$$

Reference answer

The coefficient is −5.

1. The coefficient is the complete numerical factor, including its sign.
2. The numerical factor is −5.

- State the applicable definition or condition accurately.
- Support the conclusion with the given numbers, a check or a concrete counterexample.

Independent practice 6

For the monomial below, find its degree. Explain which part of the term is counted.

$$\frac{1}{2}x^2y^3$$

Reference answer

The degree is 5.

1. Add the exponents of the variables; do not include the numerical coefficient.
2. The exponent sum is 2 + 3 = 5.

- State the applicable definition or condition accurately.
- Support the conclusion with the given numbers, a check or a concrete counterexample.

Independent practice 7

Find 3a − 2b when a = −1 and b = 2.

$$3a - 2b$$

Reference answer

The value is −7.

$$-7$$

1. Substitute: $3 \times (-1) - 2 \times 2$.
2. −3 − 4 = −7.

- Keep each sign and collect only terms with the same variable powers.
- Substitute the stated values into the complete expression and calculate.

Independent practice 8

Each notebook costs 4 dollars and a single packing fee is 3 dollars. Write the total cost for n notebooks. Do not substitute a value for n.

Reference answer

4n+3.

$$4n + 3$$

1. The notebook cost is 4n.
2. Add the single packing fee once: 4n + 3.

- Keep each sign and collect only terms with the same variable powers.
- Give an equivalent simplified expression.

Exit question 9

For the monomial below, find its degree. Explain which part of the term is counted.

$$-2x^3y$$

Reference answer

The degree is 4.

1. Add the exponents of the variables; do not include the numerical coefficient.
2. The exponent sum is 3 + 1 = 4.

- State the applicable definition or condition accurately.
- Support the conclusion with the given numbers, a check or a concrete counterexample.

Exit question 10

Find $-x^2$ when x = −3. Explain why the answer is not 9.

$$-x^2$$

Reference answer

The value is −9.

$$-9$$

1. The expression is the negative of x^2.
2. At x = −3, $x^2 = 9$, so $-x^2 = -9$.

- Keep each sign and collect only terms with the same variable powers.
- Substitute the stated values into the complete expression and calculate.

Further practice 11

For the monomial below, find its coefficient. Explain which part of the term is counted.

$$6mn^2$$

Reference answer

The coefficient is 6.

1. The coefficient is the complete numerical factor, including its sign.
2. The numerical factor is 6.

- State the applicable definition or condition accurately.
- Support the conclusion with the given numbers, a check or a concrete counterexample.

Further practice 12

Find a/2 + b when a = −4 and b = 3.

$$\frac{a}{2} + b$$

Reference answer

The value is 1.

$$1$$

1. Substitute: (−4)/2 + 3.
2. −2 + 3 = 1.

- Keep each sign and collect only terms with the same variable powers.
- Substitute the stated values into the complete expression and calculate.

Further practice 13

Find $3x^2 - 2x + 1$ when x = 2.

$$3x^2 - 2x + 1$$

Reference answer

The value is 9.

$$9$$

1. $x^2 = 4$, so the expression becomes $3 \times 4 - 2 \times 2 + 1$.
2. 12 − 4 + 1 = 9.

- Keep each sign and collect only terms with the same variable powers.
- Substitute the stated values into the complete expression and calculate.

Further practice 14

For the monomial below, find its degree. Explain which part of the term is counted.

$$7$$

Reference answer

The degree is 0.

1. Add the exponents of the variables; do not include the numerical coefficient.
2. There are no variable factors. The nonzero constant 7 has degree 0.

- State the applicable definition or condition accurately.
- Support the conclusion with the given numbers, a check or a concrete counterexample.

Extension 15

Find $a^2 - 2ab + b^2$ when a = 3 and b = 1. Replace every occurrence of each letter.

$$a^2 - 2ab + b^2$$

Reference answer

The value is 4.

$$4$$

1. Substitute: $3^2 - 2 \times 3 \times 1 + 1^2$.
2. 9 − 6 + 1 = 4.

- Keep each sign and collect only terms with the same variable powers.
- Substitute the stated values into the complete expression and calculate.

Extension 16

A rectangle has width x cm and length (x + 3) cm. Write and simplify its perimeter.

Reference answer

(4x + 6) cm, for x > 0.

$$4x + 6$$

1. Two lengths contribute 2(x + 3); two widths contribute 2x.
2. The perimeter is 2x + 6 + 2x = 4x + 6 cm.

- Keep each sign and collect only terms with the same variable powers.
- Give an equivalent simplified expression.