LESSON MAKER PRO

# Polynomial Detectives

*Find the degree from an expression or graph.*

**HIGH SCHOOL · FA.A.31**

**FA.A.31** "Describe and identify a polynomial of degree one, two, three, and four by examining a polynomial expression or a graph."

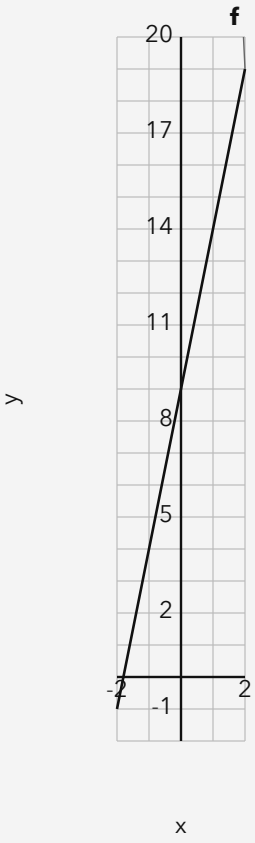
NAME _____ DATE _____

## FIND THE HIGHEST POWER

Combine like terms first, then find the greatest exponent of x. Degrees 1, 2, 3, and 4 are called linear, quadratic, cubic, and quartic. On a graph, turns and the directions of the ends can help you identify the degree.

**WORKED EXAMPLE**

What is the degree and name of the polynomial shown by the graph?




1. The graph is a straight, nonhorizontal line.
2. A straight, nonhorizontal line represents a degree 1 polynomial.

**Answer: Degree 1, linear**

## PRACTICE 6 problems

**1** Identify the degree and name of $x^2 + 4x - 1$.

**ANSWER** _____

**2** Identify the degree and name of $-3x^4 + x - 10$.

**ANSWER** _____

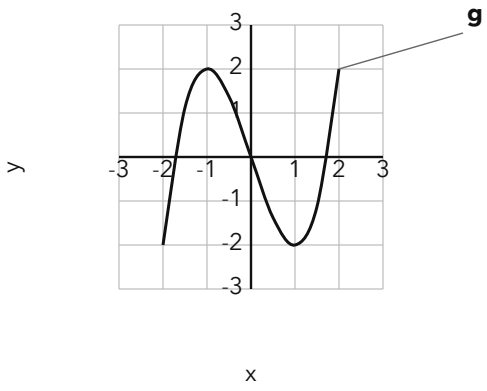
**3** Combine like terms. Then identify the degree and name of $x^4 - x^4 + 7x^3 + x$.

**ANSWER** _____

**4** Combine like terms. Then identify the degree and name of $12x - 11x + 4$.

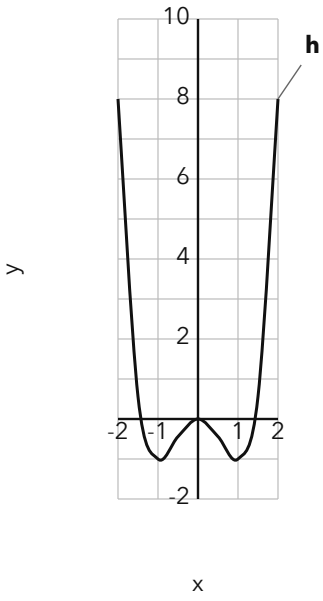
**ANSWER** _____

**5** Identify the degree and name of the polynomial shown by the graph. Explain how the graph helps you decide.




**ANSWER** _____

**6** Identify the degree and name of the polynomial shown by the graph. Explain how the graph helps you decide.




**ANSWER** _____

## APPLY IT Show your work

**1** A skate video uses $h(x) = -16x^2 + 24x + 3$ to model a skater's height in feet x seconds after a jump. Identify the degree and name of the polynomial. Which term tells you?

WORK SPACE

**ANSWER** _____

**2** A phone plan costs $P(x) = 14x + 30$ dollars for x months. Identify the degree and name of this cost polynomial. Which term tells you?

WORK SPACE

**ANSWER** _____

## CHALLENGE One step up

A student calls $x^4 - x^4 + 3x^3 - 3x^3 + 2x^2 - 8x + 1$ quartic because it contains $x^4$. Do you agree? Give the correct degree and name, and explain in one or two sentences.

WORK SPACE AND ANSWER

**ANSWER KEY**

# Polynomial Detectives



## PART 1 · PRACTICE

| # | PROBLEM | ANSWER |
|---|---|---|
| 1 | Identify the degree and name of $x^2 + 4x - 1$. | **Degree 2, quadratic** |
| 2 | Identify the degree and name of $-3x^4 + x - 10$. | **Degree 4, quartic** |
| 3 | Combine like terms. Then identify the degree and name of $x^4 - x^4 + 7x^3 + x$. | **Degree 3, cubic** |
| 4 | Combine like terms. Then identify the degree and name of $12x - 11x + 4$. | **Degree 1, linear** |
| 5 | Identify the degree and name of the polynomial shown by the graph. Explain how the graph helps you decide. | **Degree 3, cubic. The graph has two turns, and its ends go in opposite directions.** |
| 6 | Identify the degree and name of the polynomial shown by the graph. Explain how the graph helps you decide. | **Degree 4, quartic. The graph has three turns, so its degree must be at least 4; both ends rise.** |

## PART 2 · APPLY IT

1. **Degree 2, quadratic; the term $-16x^2$ tells you.** The greatest exponent of x is 2.
2. **Degree 1, linear; the term 14x tells you.** The greatest exponent of x is 1.

## CHALLENGE

**No. The fourth- and third-degree terms cancel, leaving $2x^2 - 8x + 1$, which is quadratic with degree 2.**

For graph explanations, accept descriptions of the number of turns and end directions. For expressions, accept an equivalent simplified form as evidence of the degree.