

Polynomial Graph-Matching Worksheet

The same three card-sort levels in a no-cut, write-the-letter format.

EXPANDED EQUATION

FACTORED FORM

GRAPH

ZEROS

MULTIPLICITY

END BEHAVIOR

DEGREE

LEADING COEFF.

Inside this file

- Use this version when there is no time to cut cards, when students work independently, or when you need a substitute-ready handout.
- Each level starts with the graphs labeled by letter. Students write the graph letter beside every matching representation.
- The option order is scrambled separately in every category, so a correct row cannot be found by following one repeated number pattern.
- Students finish by defending two matches in writing instead of relying on a visual guess.

ACCURACY NOTE

Every graph in this file was plotted directly from its listed polynomial. All 14 expanded forms were recomputed from their factors, and every zero, multiplicity, degree, leading coefficient, and end-behavior card was checked against the key before this file was published.

CHECK YOUR WORK WITH A TEST POINT

Zeros line up with the x-intercepts. Multiplicity matches the cross-or-touch behavior. End behavior agrees with the degree and the leading sign.

Then test it. Pick one or two x-values between the turns, put them into the equation, and check that the points you get land on the curve. A point in the wrong region means the match is wrong.

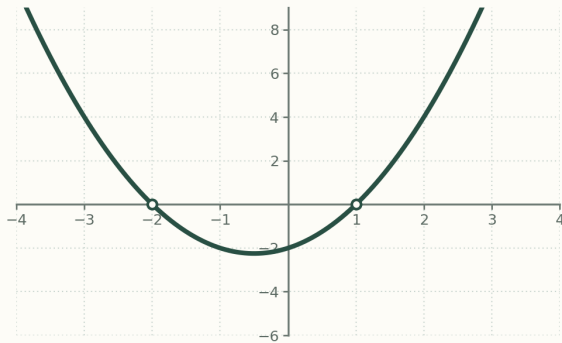
Introductory - Match Each Representation

UNCUT WORKSHEET

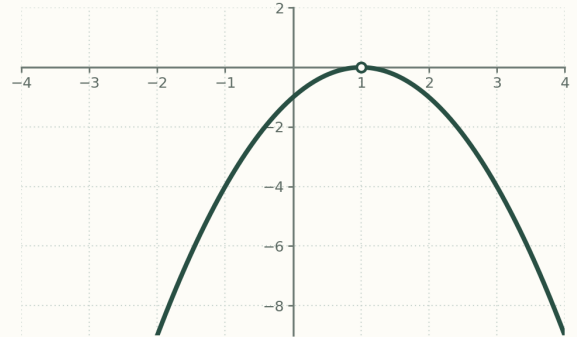
Write the graph letter A-D in every answer box

Name: _____ Date: _____

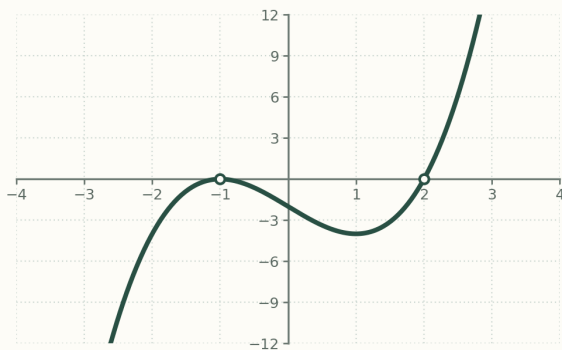
A



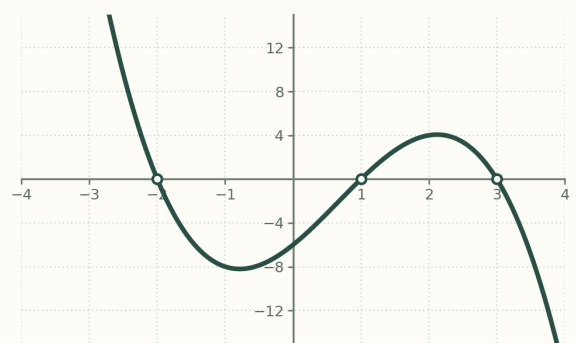
B



C



D



EXPANDED EQUATION

1. $y = x^3 - 3x - 2$

☐

2. $y = -x^3 + 2x^2 + 5x - 6$

☐

3. $y = -x^2 + 2x - 1$

☐

4. $y = x^2 + x - 2$

☐

FACTORED FORM

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

☐

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

☐

3. $y = -(x - 1)^2$

☐

4. $y = (x + 1)^2(x - 2)$

☐

CHECK BEFORE YOU FINISH

Zeros line up with the x-intercepts. Multiplicity matches the cross-or-touch behavior. End behavior agrees with the degree and the leading sign.

Then test it. Pick one or two x-values between the turns, put them into the equation, and check that the points you get land on the curve. A point in the wrong region means the match is wrong.

Introductory - Match the Graph Properties

UNCUT WORKSHEET

Keep using the graph letters A-D from the previous page

For each option write the graph letter that has that property. Use every graph once in each category.

ZEROS

1. $\{-1, 2\}$

2. $\{-2, 1, 3\}$

3. $\{1\}$

4. $\{-2, 1\}$

DEGREE

1. 2

2. 3

3. 2

4. 3

MULTIPLICITY

1. $x = -2: m = 1; x = 1: m = 1; x = 3: m = 1$

2. $x = -2: m = 1; x = 1: m = 1$

3. $x = 1: m = 2$

4. $x = -1: m = 2; x = 2: m = 1$

END BEHAVIOR

1. left up; right up

2. left up; right down

3. left down; right up

4. left down; right down

LEADING COEFFICIENT

1. +1

2. -1

3. -1

4. +1

IF TWO OPTIONS LOOK IDENTICAL

Some degrees, leading coefficients, and end behaviors repeat inside a level. Identical options are interchangeable, so either order is correct as long as each graph letter is used once.

Justify two matches

1. A repeated zero: how does the graph show its multiplicity?

2. One end-behavior match: use the degree and the leading sign, then confirm with a test point.

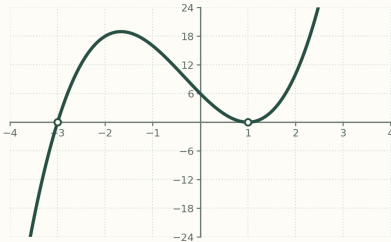
Standard Algebra 2 - Match Each Representation

UNCUT WORKSHEET

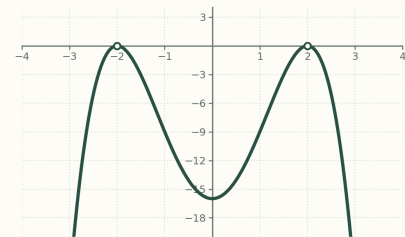
Write the graph letter A-E in every answer box

Name: _____ Date: _____

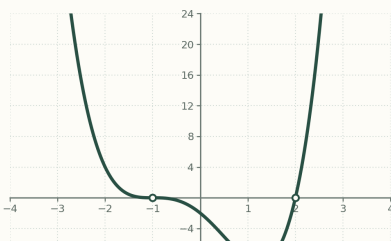
A



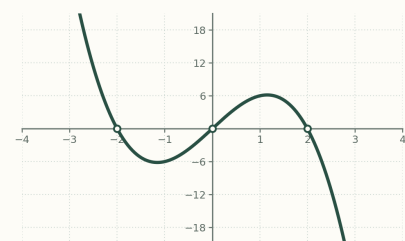
B



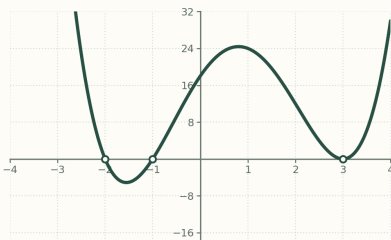
C



D



E



EXPANDED EQUATION

1. $y = x^4 + x^3 - 3x^2 - 5x - 2$ ☐

2. $y = -x^4 + 8x^2 - 16$ ☐

3. $y = 2x^3 + 2x^2 - 10x + 6$ ☐

4. $y = x^4 - 3x^3 - 7x^2 + 15x + 18$ ☐

5. $y = -2x^3 + 8x$ ☐

FACTORED FORM

1. $y = -(x + 2)^2(x - 2)^2$ ☐

2. $y = (x - 3)^2(x + 1)(x + 2)$ ☐

3. $y = 2(x + 3)(x - 1)^2$ ☐

4. $y = -2x(x - 2)(x + 2)$ ☐

5. $y = (x + 1)^3(x - 2)$ ☐

CHECK BEFORE YOU FINISH

Zeros line up with the x-intercepts. Multiplicity matches the cross-or-touch behavior. End behavior agrees with the degree and the leading sign.

Then test it. Pick one or two x-values between the turns, put them into the equation, and check that the points you get land on the curve. A point in the wrong region means the match is wrong.

Standard Algebra 2 - Match the Graph Properties

UNCUT WORKSHEET

Keep using the graph letters A-E from the previous page

For each option write the graph letter that has that property. Use every graph once in each category.

ZEROS

1. $\{-2, 0, 2\}$

2. $\{-1, 2\}$

3. $\{-3, 1\}$

4. $\{-2, -1, 3\}$

5. $\{-2, 2\}$

DEGREE

1. 3

2. 4

3. 4

4. 3

5. 4

MULTIPLICITY

1. $x = -2: m = 1; x = 0: m = 1; x = 2: m = 1$

2. $x = -1: m = 3; x = 2: m = 1$

3. $x = -2: m = 2; x = 2: m = 2$

4. $x = -2: m = 1; x = -1: m = 1; x = 3: m = 2$

5. $x = -3: m = 1; x = 1: m = 2$

END BEHAVIOR

1. left up; right down

2. left down; right down

3. left up; right up

4. left up; right up

5. left down; right up

LEADING COEFFICIENT

1. +1

2. -1

3. +1

4. +2

5. -2

IF TWO OPTIONS LOOK IDENTICAL

Some degrees, leading coefficients, and end behaviors repeat inside a level. Identical options are interchangeable, so either order is correct as long as each graph letter is used once.

Justify two matches

1. A repeated zero: how does the graph show its multiplicity?

2. One end-behavior match: use the degree and the leading sign, then confirm with a test point.

Challenge - Match Each Representation

UNCUT WORKSHEET

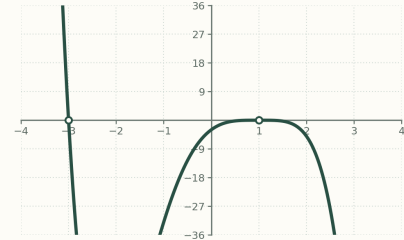
Write the graph letter A-E in every answer box

Name: _____ Date: _____

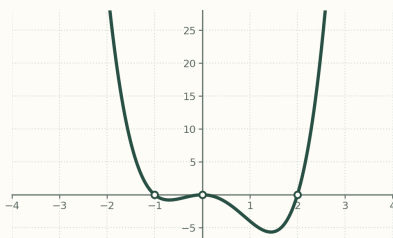
A



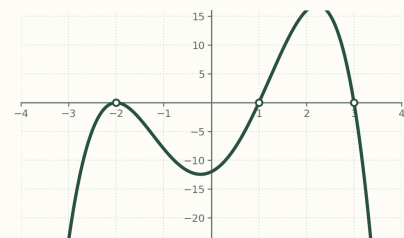
B



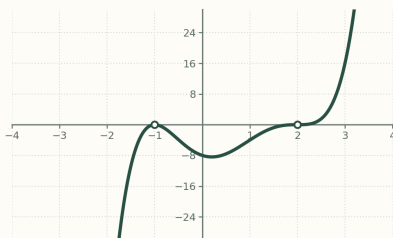
C



D



E



EXPANDED EQUATION

1. $y = x^5 - 4x^4 + x^3 + 10x^2 - 4x - 8$ ☐
2. $y = -x^4 + 9x^2 + 4x - 12$ ☐
3. $y = -x^5 + x^4 + 6x^3 - 14x^2 + 11x - 3$ ☐
4. $y = 0.5x^5 + 2x^4 + 0.5x^3 - 5x^2 - 2x + 4$ ☐
5. $y = 2x^4 - 2x^3 - 4x^2$ ☐

FACTORED FORM

1. $y = -(x + 2)^2(x - 1)(x - 3)$ ☐
2. $y = 2x^2(x - 2)(x + 1)$ ☐
3. $y = (x + 1)^2(x - 2)^3$ ☐
4. $y = -(x + 3)(x - 1)^4$ ☐
5. $y = 0.5(x + 2)^3(x - 1)^2$ ☐

CHECK BEFORE YOU FINISH

Zeros line up with the x-intercepts. Multiplicity matches the cross-or-touch behavior. End behavior agrees with the degree and the leading sign.

Then test it. Pick one or two x-values between the turns, put them into the equation, and check that the points you get land on the curve. A point in the wrong region means the match is wrong.

Challenge - Match the Graph Properties

UNCUT WORKSHEET

Keep using the graph letters A-E from the previous page

For each option write the graph letter that has that property. Use every graph once in each category.

ZEROS

1. $\{-2, 1\}$

2. $\{-2, 1, 3\}$

3. $\{-1, 0, 2\}$

4. $\{-1, 2\}$

5. $\{-3, 1\}$

DEGREE

1. 4

2. 5

3. 4

4. 5

5. 5

MULTIPLICITY

1. $x = -3: m = 1; x = 1: m = 4$

2. $x = -2: m = 2; x = 1: m = 1; x = 3: m = 1$

3. $x = -1: m = 1; x = 0: m = 2; x = 2: m = 1$

4. $x = -1: m = 2; x = 2: m = 3$

5. $x = -2: m = 3; x = 1: m = 2$

END BEHAVIOR

1. left up; right down

2. left down; right up

3. left down; right up

4. left up; right up

5. left down; right down

LEADING COEFFICIENT

1. -1

2. $+1/2$

3. +1

4. +2

5. -1

IF TWO OPTIONS LOOK IDENTICAL

Some degrees, leading coefficients, and end behaviors repeat inside a level. Identical options are interchangeable, so either order is correct as long as each graph letter is used once.

Justify two matches

1. A repeated zero: how does the graph show its multiplicity?

2. One end-behavior match: use the degree and the leading sign, then confirm with a test point.
