

lesson thirty seven - student resource sheet

Lesson Objective: Factor polynomials by using the greatest common factor and by recognizing special patterns (difference of squares and perfect square trinomial).

Vocabulary Box

factor – One of two or more expressions that are multiplied to get a product; also, the process of finding these expressions.



Guided Practice

You will complete the following practice problems with your partner. Then your teacher will review the answers. Make sure that you show all important work.

Directions: Factor each expression.

1. $w^2 - 81$

2. $7r^2 - 21r + 14$

3. $y^2 - 8y + 16$

4. $4u^3 + 6u^2 + 10u$

5. $25p^2 - 9$

6. $9a^2 + 24a + 16$



Summary/Closure

A. Vocabulary Words

Directions: Fill in the blanks to make a correct definition.

A _____ is one of _____ or more _____ that are
_____ together to get a _____. Also, the _____ of
finding these expressions is called _____.

B. Summarize What We Learned Today

Directions: Write and factor a trinomial that has a greatest common factor, and factor out the greatest common factor. Next, write and factor a difference of squares. Then, write and factor a perfect square trinomial. Finally, write a few sentences to explain how to perform each type of factoring. You will use this explanation as a personal reminder.

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Lesson Objective: Factor polynomials by using the greatest common factor and by recognizing special patterns (difference of squares and perfect trinomial square).

Vocabulary Box

factor – One of two or more expressions that are multiplied to get a product; also, the process of finding these expressions.



Independent Practice

Please complete the following practice problems on your own. Your teacher will review the answers. Make sure that you show all of your work.


Directions: Factor each expression.

1. $11m^2 - 44m - 55$

2. $n^2 - 4$

3. $b^2 + 6b + 9$

4. $9v^3 + 21v^2 + 6v$



5. $c^2 - 16c + 64$


6. $18x^4 - 10x^3 + 2x^2$

7. $4z^2 - 81$

8. $100k^2 + 60k + 9$

9. $-14h^2 - 7h - 21$

10. $36 - f^2$



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Directions: Factor each expression.

1. $49d^2 - 64a^2$

2. $4p^2 + 28py + 49y^2$

3. $u^6 - 9$

Problem Solving

Make an (x, y) table of values for the function $y = x^2 + 8x + 16$. For your values of x , choose $-7, -6, -5, -4, -3, -2$, and -1 .

Now factor the expression $x^2 + 8x + 16$.

Rewrite the function $y = x^2 + 8x + 16$ using the factored expression you just found.

Make another (x, y) table of values, and evaluate the factored expression for the same values of x as above.

Discuss which way was easier, the original expression or the factored expression.

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Now make a table of values for the following functions. Choose the easier way.

1. $y = x^2 - 6x + 9$ (For values of x , choose 0, 1, 2, 3, 4, 5, and 6)

2. $y = 9x^2 + 12x + 4$ (For values of x , choose -3 , -2 , -1 , $-\frac{2}{3}$, $-\frac{1}{3}$, 0 , $\frac{1}{3}$, $\frac{2}{3}$, 1 , 2 , and 3)



Directions: Factor each expression.

1. $6a^3 - 18a^2 + 30a$

2. $b^2 - 64$

3. $c^2 + 10c + 25$

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Lesson Objective: Explore quadratic functions in standard form and their essential characteristics by graphing (describe effect of changes in "a" and "c" using $f(x) = ax^2 + c$). Determine vertex, root, axis of symmetry, and maximum or minimum point.

Vocabulary Box

quadratic function – An equation in the form $f(x) = ax^2 + bx + c$, where a, b, and c are constants and $a \neq 0$. Example: $f(x) = x^2 + 4x - 12$.

parabola – The u-shape of the graph of a quadratic function.

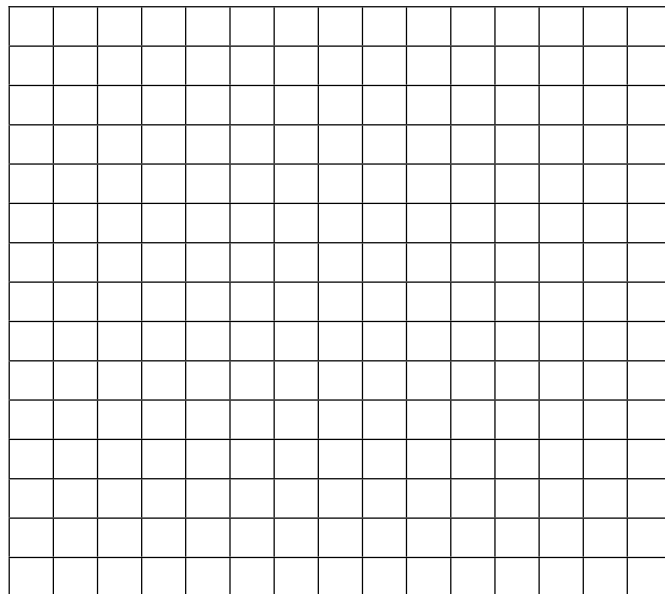
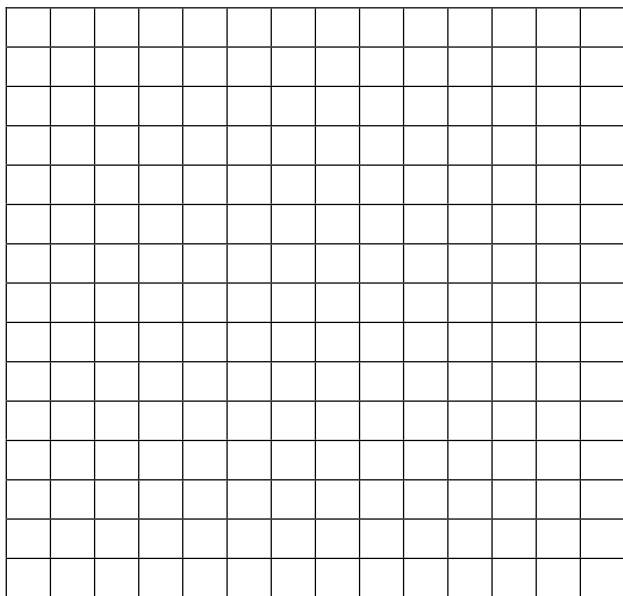
vertex of the graph of a quadratic function – The maximum or highest point of a parabola when $a < 0$, or the minimum or lowest point of a parabola when $a > 0$.

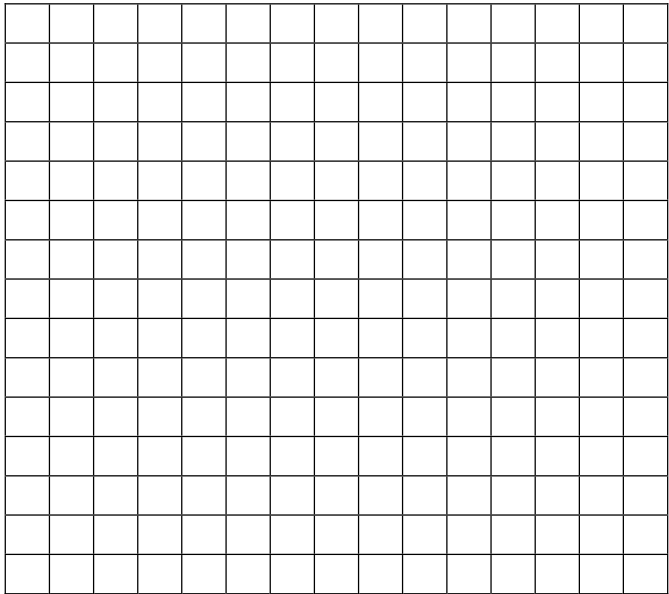
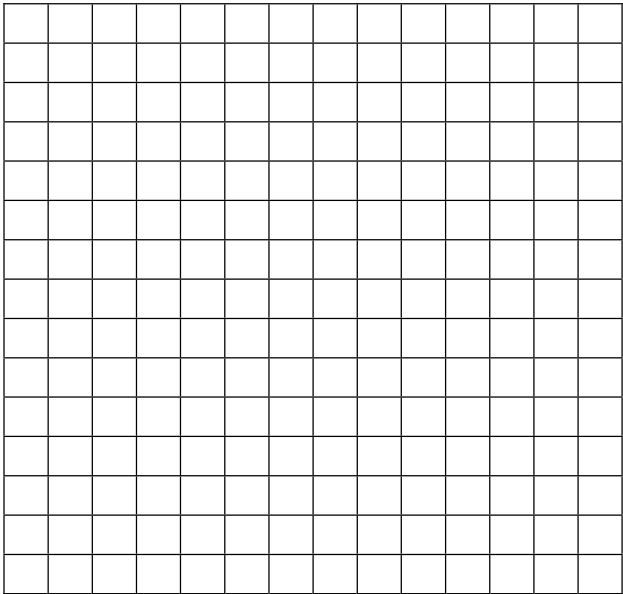
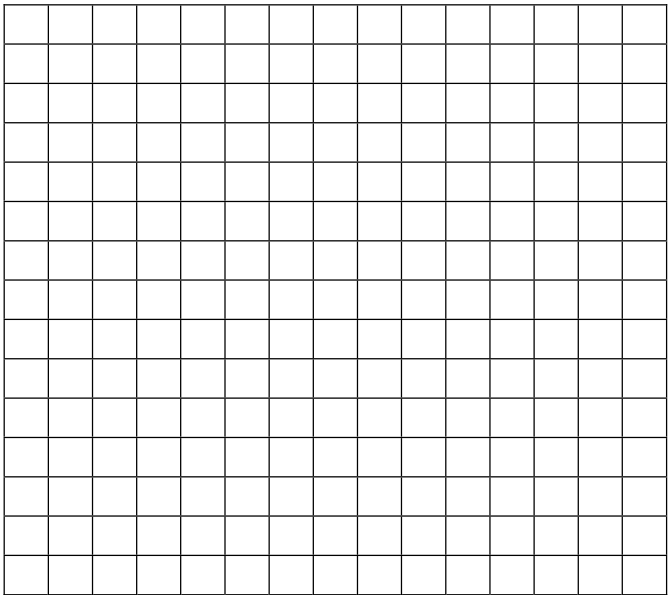
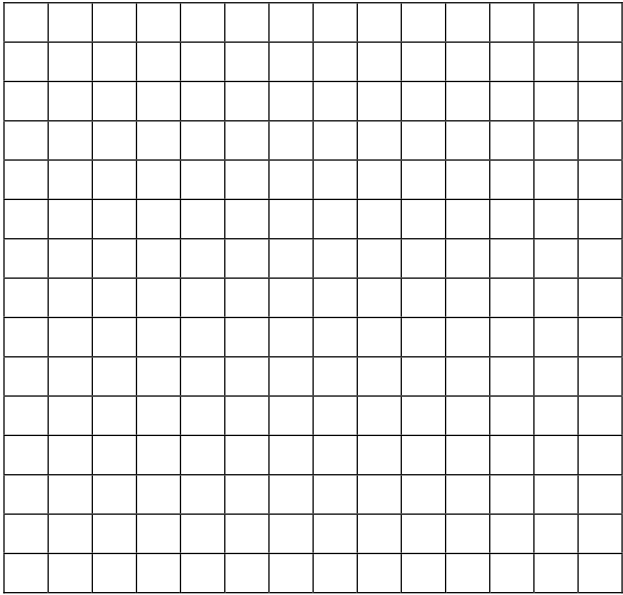
root – The roots of an equation are the same as the solutions to the equation. They are also the same as the x-intercepts of the graph of the equation.

axis of symmetry – A line that passes through a figure in such a way that the part of the figure on one side of the line is a mirror reflection of the part on the other side of the line.

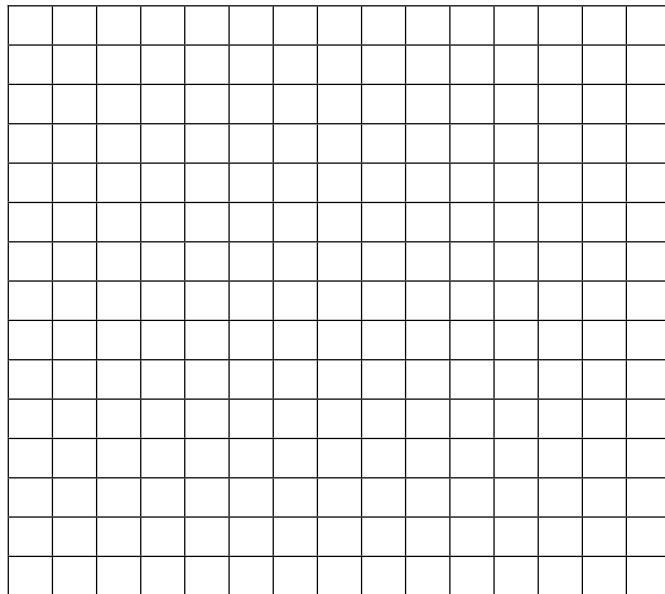
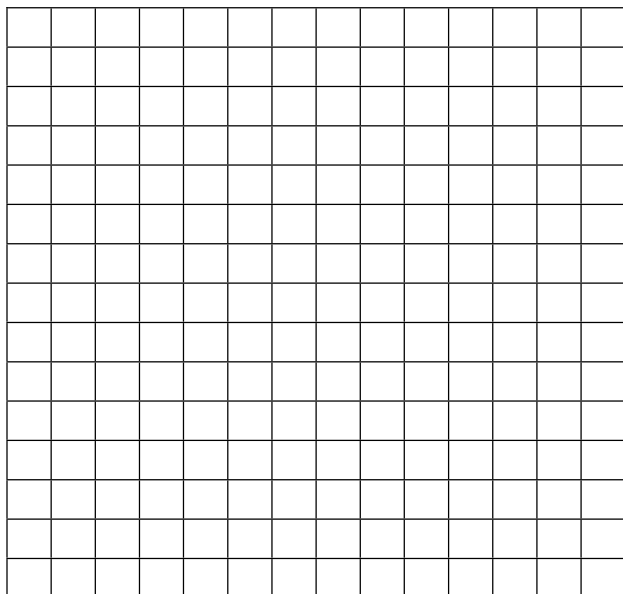
maximum point – The highest point on the graph of a function.

minimum point – The lowest point on the graph of a function.





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Guided Practice

You will complete the following practice problems with your partner. Then your teacher will review the answers.

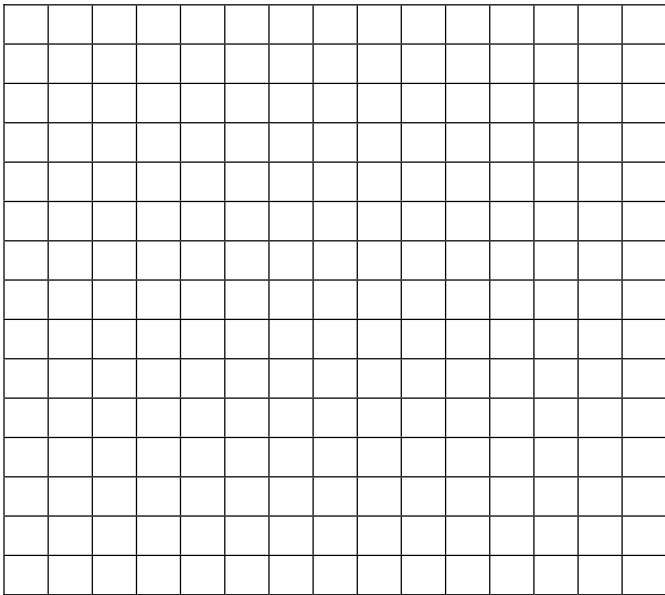
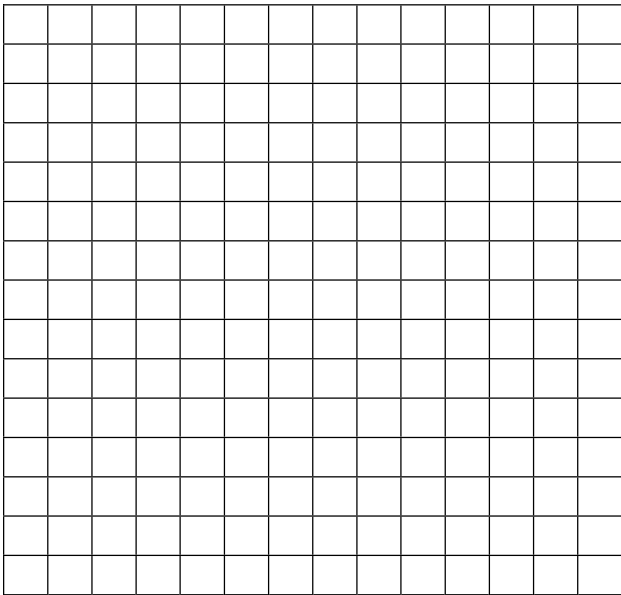
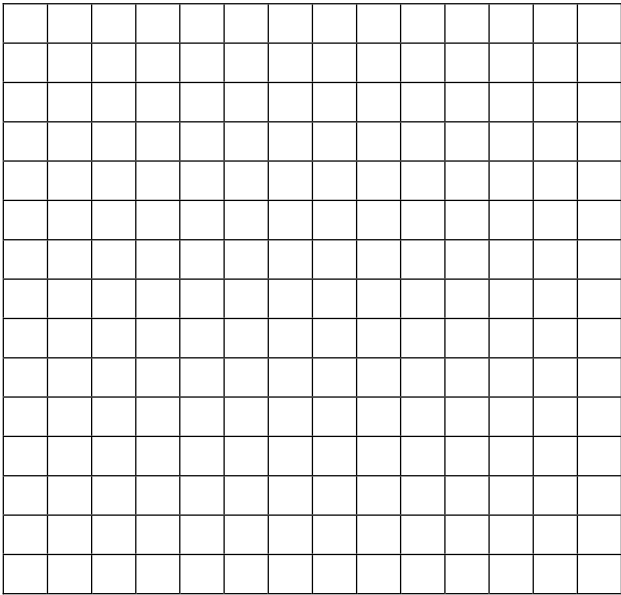
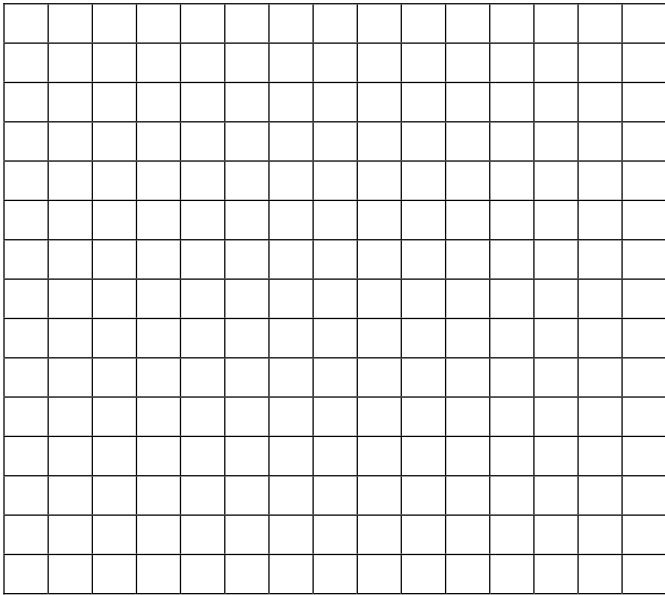
Directions: Graph each function. Identify its roots, its axis of symmetry, its vertex, and whether its vertex is a maximum point or a minimum point.

1. $f(x) = 3x^2$

2. $f(x) = -x^2 + 4$

3. $f(x) = x^2 - 9$

4. $f(x) = -2x^2 - 1$



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Summary/Closure

A. Vocabulary Words

Directions: Fill in each blank with the appropriate term.

1. The _____ of a parabola is its line of reflection.
2. The _____ of the graph of a function is its highest point.
3. The _____ of the graph of a function is its lowest point.
4. The graph of a quadratic function is in the shape of a _____.
5. The equation $f(x) = 4x^2 - 16$ represents a _____.
6. The _____ of a quadratic function is a maximum point when $a > 0$ and a minimum point when $a < 0$.

B. Summarize What We Learned Today

Directions: Write an example of a quadratic function where $a \neq 1$ and $c \neq 0$. Then graph the function and identify its roots, its axis of symmetry, its vertex, and whether its vertex is a maximum point or a minimum point. Then explain how to graph a quadratic function and how to identify its characteristics. You will use this explanation as a personal reference sheet.

