Name/nombre _____

Let's get ready for grade 9 math!

¡Preparémonos para las Matemáticas de noveno grado!

Due: Wednesday, August 26, 2026 (1st day of school)

Fecha de entrega: miércoles 26 de agosto de 2026 (primer día de clases)

Complete ONE assignment based on the math course you are taking in the fall. Doing this work will help you to feel ready to start Grade 9 math!

Completa UNA tarea basada en el curso de matemáticas que cursarás en otoño. ¡Realizar este trabajo te ayudará a sentirte preparado para comenzar las matemáticas de 9.º grado!

❑ **For students taking ALGEBRA 1 in the fall/Para los estudiantes que cursarán ÁLGEBRA 1 en el otoño.:**

Complete the pages labeled ALGEBRA 1 in this packet. These pages will help you to review solving equations.

Completa las páginas etiquetadas como ALGEBRA 1 *en este cuadernillo. Estas páginas te ayudarán a repasar la resolución de ecuaciones.*

❑ **For students taking GEOMETRY in the fall/Para los estudiantes que cursarán GEOMETRÍA en el otoño.:**

Complete the pages labeled GEOMETRY in this packet. These pages are on graphing and solving quadratic equations, a topic we did not get to finish in your 8th-grade Algebra 1 course.

Completa las páginas etiquetadas como GEOMETRY *en este cuadernillo. Estas páginas tratan sobre la representación gráfica y la resolución de ecuaciones cuadráticas, un tema que no llegamos a terminar en su curso de Álgebra 1 de octavo grado.*

After you complete the assignment above, you can also work on your **iReady Math My Path** online lessons. iReady lessons do not work on a phone, so you will need access to a computer. The computers at the Chelsea Public Library are an option. Go your school's launch page to access i-Ready: https://browne.chelseaschools.com/s-launcher

Después de completar la tarea anterior, también puedes trabajar en tus lecciones en línea de iReady Math My Path. Las lecciones de iReady no funcionan en teléfonos, así que necesitarás una computadora. Las computadoras de la Biblioteca Pública de Chelsea son una opción. Visita la página de inicio de tu escuela para acceder a iReady: https://browne.chelseaschools.com/s-launcher

Questions? Email your Chelsea High School Principal, Alan Beausoleil:

¿Preguntas? Envíe un correo electrónico al director de Chelsea High School, Alan Beausoleil: beausoleila@chelseaschools.com

ALGEBRA 1

Example 1/ *Ejemplo 1* Solving an equation with variable on each side *Resolver ecuaciones con la variable en cada lado*	
Solve/ *Resuelve*	**Check your solution/ *Verifica tu solución***
$5 + 7a = 4a - 13$ $-4a \quad -4a$ $5 + 3a = -13$ $-5 \quad -5$ $3a = -18$ $\div 3 \quad \div 3$ $a = -6$	original: $5 + 7a = 4a - 13$ substitution/ *sustitución*, $a = -6$: $5 + 7(-6) = 4(-6) - 13$ $5 - 42 = -24 - 13$ $-37 = -37$ ✅

Solve each equation/ *resuelve las ecuaciones*. Check your solution/ *verifica tu solución*.

1.) $7c + 12 = -4c + 78$	
Solve/ *Resuelve*	**Check your solution/ *Verifica tu solución***

2.) $2m - 13 = -8m + 27$	
Solve/ *Resuelve*	**Check your solution/ *Verifica tu solución***

ALGEBRA 1

3.) $9x - 4 = 2x + 3$

Solve/ *Resuelve*	Check your solution/ *Verifica tu solución*

4.) $6 + 3t = 8t - 14$

Solve/ *Resuelve*	Check your solution/ *Verifica tu solución*

5.) $7n + 6 = 4n - 9$

Solve/ *Resuelve*	Check your solution/ *Verifica tu solución*

ALGEBRA 1

Example 2/ *Ejemplo 2*
Solving an equation with grouping symbols
Resolver una ecuación con símbolos de agrupación

Solve/ *Resuelve*	**Check your solution/ *Verifica tu solución***
$7(n-1) = -2(3+n)$ $7n - 7 = -6 - 2n$ $+2n \qquad +2n$ $9n - 7 = -6$ $+7 \quad +7$ $9n = 1$ $\div 9 \quad \div 9$ $n = \frac{1}{9}$	original: $7(n-1) = -2(3+n)$ substitution/ *sustitución*, $n = \frac{1}{9}$: $7(\frac{1}{9} - 1) = -2(3 + \frac{1}{9})$ $\frac{7}{9} - 7 = -6 - \frac{2}{9}$ $\frac{7}{9} - \frac{63}{9} = -\frac{54}{9} - \frac{2}{9}$ $-\frac{56}{9} = -\frac{56}{9}$ ✅

Solve each equation/ *resuelve las ecuaciones*. Check your solution/ *verifica tu solución*.

6.) $2(r + 6) = 4(r + 4)$

Solve/ *Resuelve*	**Check your solution/ *Verifica tu solución***

7.) $6(n + 5) = 3(n + 16)$

Solve/ *Resuelve*	**Check your solution/ *Verifica tu solución***

ALGEBRA 1

8.) $3(3m - 2) = 2(3m + 3)$

Solve/ *Resuelve*	Check your solution/ *Verifica tu solución*

9.) $-6(2r + 8) = -10(r - 3)$

Solve/ *Resuelve*	Check your solution/ *Verifica tu solución*

10.) $6(3a + 1) - 30 = 3(2a - 4)$

Solve/ *Resuelve*	Check your solution/ *Verifica tu solución*

ALGEBRA 1

Example 3/ *Ejemplo 3*
Solving an equation with a fraction bar
Resolver una ecuación con una barra de fracción

Solve/ *Resuelve*

$$5y = \frac{12y + 16}{4}$$

$$4(5y) = 4\left(\frac{12y + 16}{4}\right)$$

$$\begin{array}{rcl} 20y & = & 12y + 16 \\ -12y & & -12y \\ \hline 8y & = & 16 \\ \div 8 & & \div 8 \\ \hline y & = & 2 \end{array}$$

Check your solution/ *Verifica tu solución*

original:

$$5y = \frac{12y + 16}{4}$$

substitution/ *sustitución, y = 2*

$$5(2) = \frac{12(2) + 16}{4}$$

$$10 = \frac{24 + 16}{4}$$

$$10 = \frac{40}{4}$$

$10 = 10$ ✅

Solve each equation/ *resuelve las ecuaciones*. Check your solution/ *verifica tu solución*.

11.) $m - 9 = \frac{2m - 12}{3}$

Solve/ *Resuelve*	Check your solution/ *Verifica tu solución*

12.) $\frac{b-4}{6} = \frac{b}{2}$

Solve/ *Resuelve*	Check your solution/ *Verifica tu solución*

ALGEBRA 1

Example 4/ *Ejemplo 4*
Write an equation with the variable on each side
Escribir una ecuación con la variable en cada lado

OLYMPICS In the 2010 Winter Olympic Games, the United States won 1 more than 4 times the number of gold medals France won. The United States won 7 more gold metals than France. Write and solve an equation to find the number of gold medals each country won.

JUEGOS OLÍMPICOS En los Juegos Olímpicos de Invierno de 2010, Estados Unidos ganó 1 más de 4 por la cantidad de medallas de oro de las que ganó Francia. Estados Unidos ganó 7 medallas de oro más que Francia. Escribe y resuelve una ecuación para hallar la cantidad de medallas de oro que ganó cada país.

f = number of gold medals France won
= la cantidad de medallas de ora de las que ganó Francia

$$\begin{array}{r} 4f + 1 = 7 + f \\ -f \qquad\qquad -f \\ \hline 3f + 1 = 7 \\ -1 \quad -1 \\ \hline 3f = 6 \\ \div 3 \qquad \div 3 \\ \hline f = 2 \end{array}$$

France/ *Francia*: 2 medals/ *medallas*
United States/ *Estados Unidos:* 7 + 2 = 9 medals/ *medallas*

13.)

WEIGHT A dog weighs two pounds less than three times the weight of a cat. The dog also weighs twenty-two more pounds than the cat. Write and solve an equation to find the weights of the dog and the cat.

PESO Un perro pesa dos libras menos que tres por el peso de un gato. El perro también pesa veintidós libras más que el gato. Escribe y resuelve una ecuación para hallar los pesos del perro y el gato.

14.)

REASONING Diego's sister is twice his age minus 9 years. She is also as old as half the sum of the ages of Diego and both of his 12-year-old twin brothers. Write and solve an equation to find the ages of Diego and his sister.

RAZONAMIENTO La hermana de Diego tiene el doble de la edad de él menos 9 años. Su edad también es la mitad de la suma de las edades de Diego y sus dos hermanos gemelos de 12 años. Escribe y resuelve una ecuación para hallar las edades de Diego y su hermana.	

15.) Two times the quantity of eight times a number plus two is equal to three times the quantity of two times the same number minus seven. **a.** Write an equation to find the number. **b.** Solve the equation to find the number. Dos por la cantidad de ocho por un número más dos es igual a tres por la cantidad de dos por el mismo número menos siete. **a.** Escribe una ecuación para hallar el número. **b.** Resuelve la ecuación para hallar el número.	

ALGEBRA 1

Example 5/ *Ejemplo 5* Solve an equation with no solution *Resolver una ecuación sin solución*	Example 6/ *Ejemplo 6* Solve an equation with infinite solutions (identity) *Resolver una ecuación con infinitas soluciones (identidad)*
Solve/ *Resuelve* $6(y - 5) = 2(10 + 3y)$ $6y - 30 = 20 + 6y$ $-6y \qquad\qquad -6y$ $-30 \neq 20$ never true → no solution *nunca es cierto → sin solución*	Solve/ *Resuelve* $7x + 5(x - 1) = 12x - 5$ $7x + 5x - 5 = 12x - 5$ $12x - 5 = 12x - 5$ $-12x \qquad\qquad -12x$ $-5 = -5$ always true → identity *siempre verdadero → identidad*

Solve each equation and state whether the equation has one solution, no solution, or is an identity.
Resuelve cada ecuación e indica si tiene una solución, si es una ecuación sin solución o si es una identidad.

16.) $-6y - 3 = 3 - 6y$

17.) $8q + 12 = 4(3 + 2q)$

ALGEBRA 1

18.) $12y + 48 - 4y = 8(y - 6)$

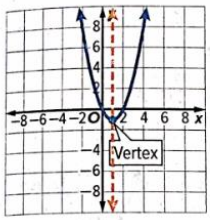
19.) $2a + 2 = 3(a + 2)$

20.) $7(c + 9) = 7c + 63$

GEOMETRY

Learn Analyzing Graphs of Quadratic Functions

A second-degree polynomial, for example $x^2 + 2x - 8$, is a quadratic polynomial, which has a related quadratic function $f(x) = x^2 + 2x - 8$. A **quadratic function** has an equation of the form $y = ax^2 + bx + c$, where $a \neq 0$. The graph of a quadratic function is called a **parabola**.



Parabolas are symmetric about a central line called the **axis of symmetry**. Every point on the parabola to the left of the axis of symmetry has a corresponding point on the right half.

The axis of symmetry intersects a parabola at the vertex. The vertex is either the lowest point or the highest point on a parabola.

When $a > 0$, the graph of $y = ax^2 + bx + c$ opens up. In this case, the graph has a **minimum** at the lowest point. When $a < 0$, the graph opens down. In this case, the graph has a **maximum** at the highest point.

The leading coefficient determines the end behavior of a quadratic function.

Learn Graphing Quadratic Functions

Key Concept • Standard Form of a Quadratic Function	
Words	The **standard form of a quadratic function** is $f(x) = ax^2 + bx + c$, where $a \neq 0$.
Examples	In $f(x) = 3x^2 - 2x + 9$, $a = 3$, $b = -2$, and $c = 9$. In $f(x) = -16x^2$, $a = -16$, $b = 0$, and $c = 0$.

Key Concept • Graphing Quadratic Functions
Step 1 Find the equation of the axis of symmetry, $x = -\frac{b}{2a}$.
Step 2 Find the vertex, and determine whether it is a maximum or minimum.
Step 3 Find the y-intercept.
Step 4 Use symmetry to find additional points on the graph, if necessary.
Step 5 Connect the points with a smooth curve.

Example 1
Graph: $f(x) = x^2 + 2x - 6$

Step 1: Find the axis of symmetry

$f(x) = x^2 + 2x - 6$

$a = 1$, $b = 2$

$x = -\frac{b}{2a}$

Step 2: Find the vertex

The axis of symmetry passes through the vertex. From Step 1, we know $x = -1$, so substitute it into the original equation:

$f(x) = x^2 + 2x - 6$

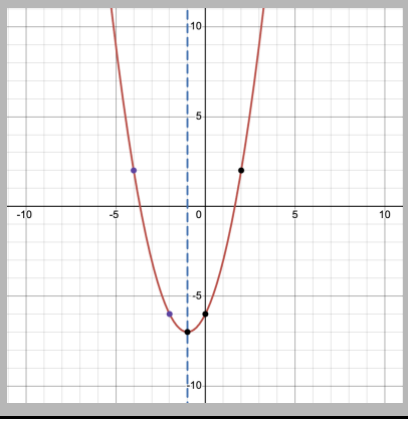
$x = -\frac{2}{2(1)}$
$x = -\frac{2}{2}$
$x = -1$

$= (-1)^2 + 2(-1) - 6$
$= 1 - 2 - 6$
$= -7$
The vertex lies at (-1, -7)

Step 3: Find the *y*-intercept (the value of *y* when $x = 0$)
$f(x) = x^2 + 2x - 6$
$= (-0)^2 + 2(0) - 6$
$= 0 + 0 - 6$
$= -6$
The *y*-intercept is (0, -6)

Step 4: Find additional points
For example, let $x = 2$
$f(x) = x^2 + 2x - 6$
$= (-2)^2 + 2(2) - 6$
$= 4 + 4 - 6$
$= 2$
The point (2, 2) lies on the graph.

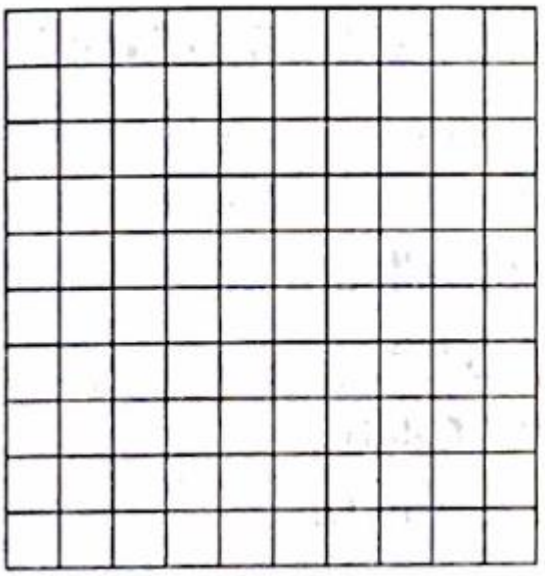
Step 5: connect the points.
Because $a > 0$, the parabola opens up.
Use the axis of symmetry to find corresponding points, like (-2, -6) and (-4, 2).



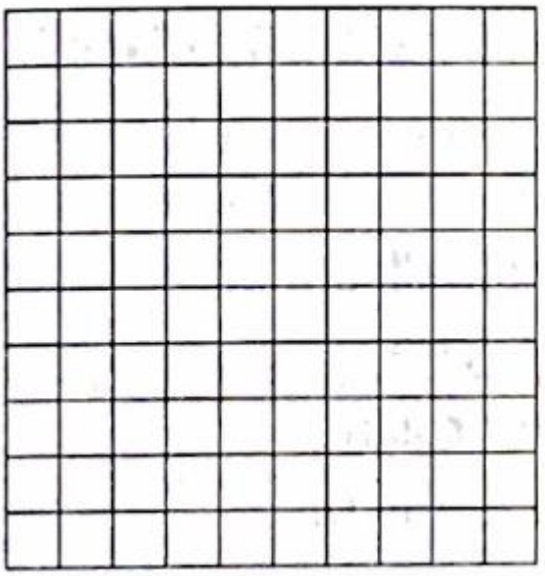
GEOMETRY

Graph each function.

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

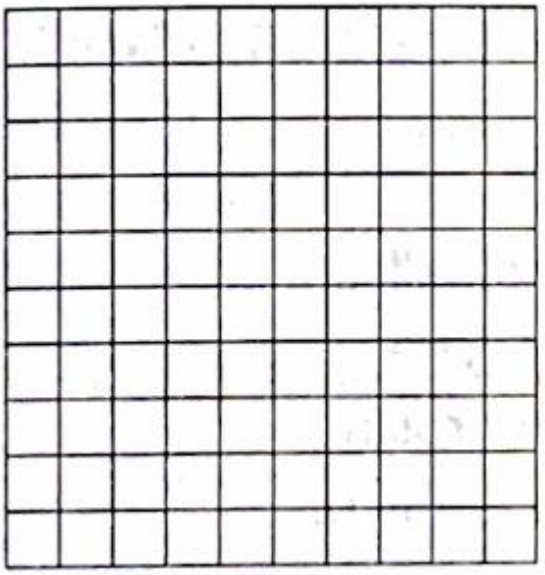


2.) $y = x^2 + 6x - 6$

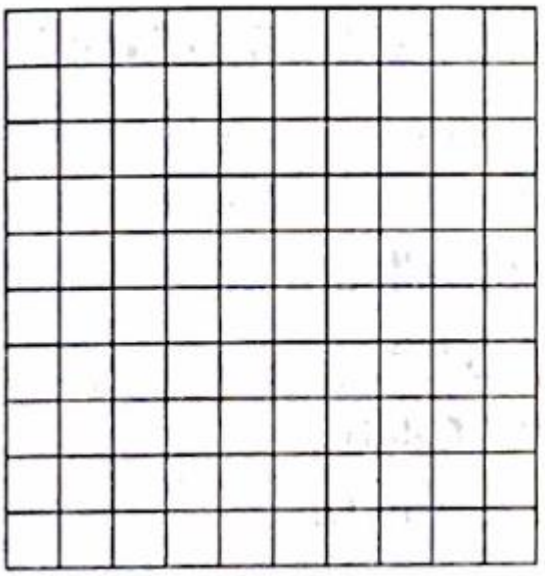


GEOMETRY

3.) $y = 3x^2 - 12x + 5$



4.) $y = -2x^2 - 4x - 3$



GEOMETRY

5.)

STRUCTURE DeMarcus is sitting in a lifeguard's chair at the beach. He tosses a beanbag into the air and lets it land on the beach below him. The function $h(t) = -16t^2 + 8t + 12$ models the beanbag's height in feet, t seconds after DeMarcus tosses it into the air.

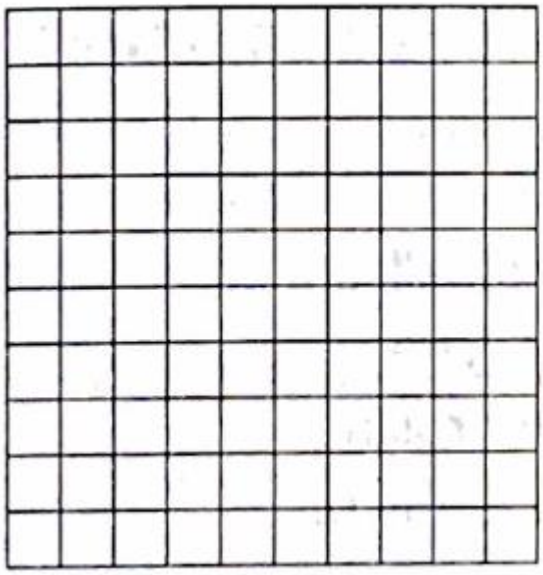
a. Graph the function on a coordinate plane. Be sure to label the x- and y-axes and provide a scale for each axis.

b. Find the intercepts of the graph. Describe what they represent in the context of the situation.

c. What is the maximum value of the function, and what does it represent? At what time is the maximum reached?

d. What is the value of $h(0.5)$? Describe its meaning in the context of the situation.

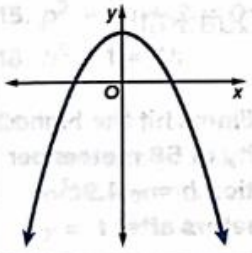
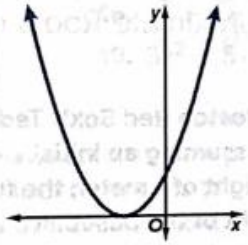
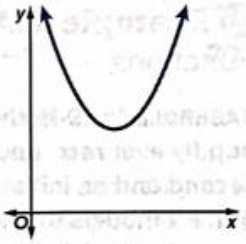
e. State a reasonable domain for this function. What does it represent in the context of the situation?



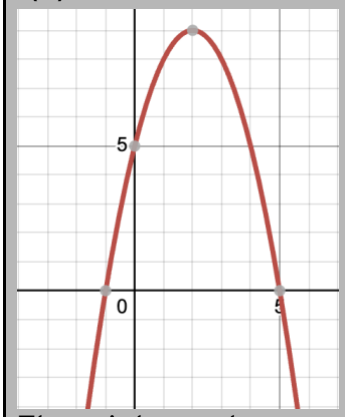
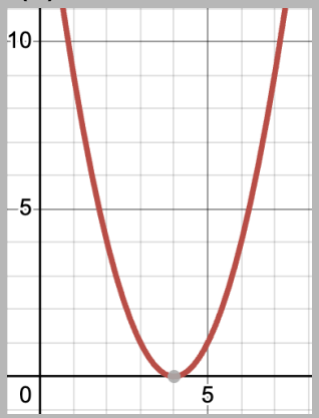
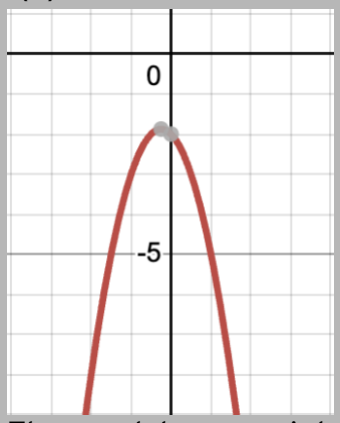
Learn Solving Quadratic Equations by Graphing

A **quadratic equation** can be written in the standard form $ax^2 + bx + c = 0$, where $a \neq 0$. Because the graphs of quadratic functions have zero, one, or two zeros, the corresponding quadratic equations also have zero, one, or two solutions.

Key Concept • Solutions of Quadratic Equations

two unique real solutions	*one* unique real solution	*no* real solutions
		

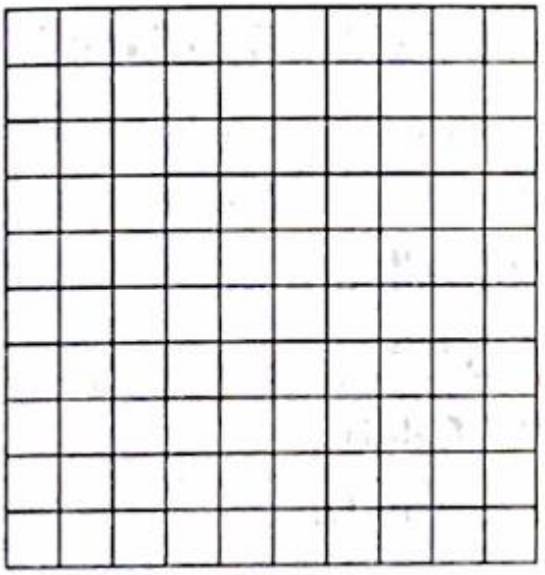
When the vertex of the related quadratic function lies on the x-axis, the solution is a **double root**, which means that there are two roots of a quadratic equation that are the same number.

Example 2: Solve a quadratic equation with 2 roots	**Example 3: Solve a quadratic equation with a double root**	**Example 4: Solve a quadratic equation with no real roots**
Solve $-x^2 + 4x + 5 = 0$ by graphing. Graph the related function: $f(x) = -x^2 + 4x + 5$.  The x-intercepts appear to be at $x = -1$ and $x = 5$, so the **solutions are -1 and 5**.	Solve $x^2 - 8x = -16$ by graphing. Rewrite the equation in standard form and then graph the related function: $f(x) = x^2 - 8x + 16$  Notice that the vertex of the parabola is the only x-intercept, so there is **only one solution, 4**.	Solve $-2x^2 - x - 2 = 0$ by graphing. Graph the related function: $f(x) = -2x^2 - x - 2$.  The graph has no x-intercepts. Therefore, this equations has **no real number solutions.**

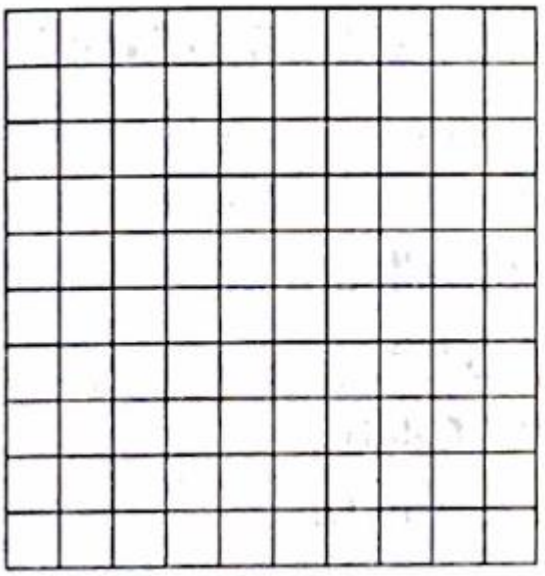
GEOMETRY

Solve each equation by graphing.

6.) $x^2 + 7x + 14 = 0$

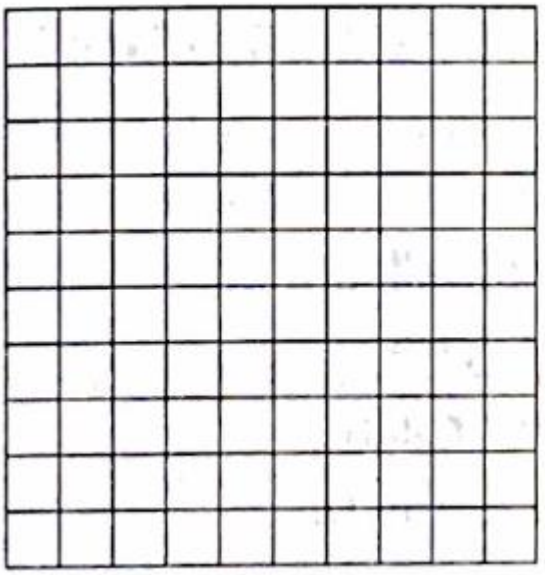


7.) $x^2 + 16x + 64 = 0$

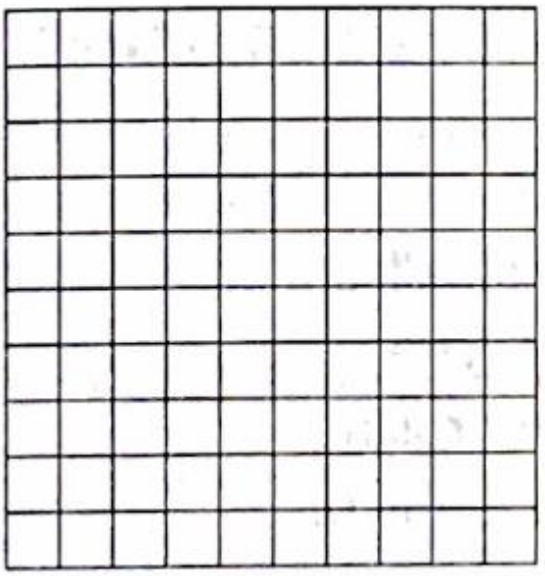


GEOMETRY

8.) $x^2 + 14x = -49$



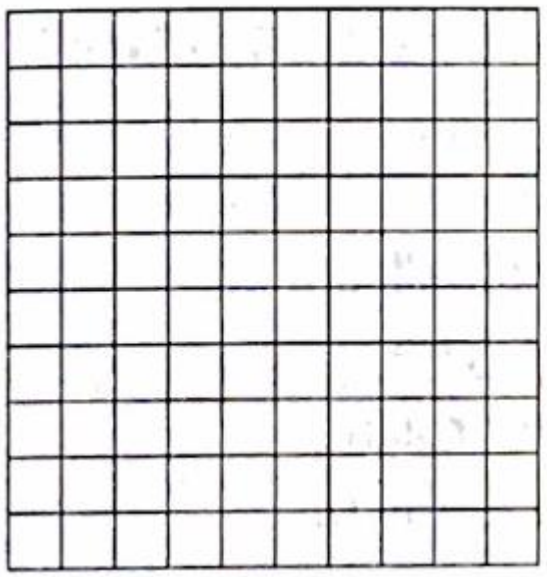
9.) $-3x^2 + 2x = 15$



GEOMETRY

10.)

SOCCER Claudia kicked a soccer ball off of a platform. The equation $y = -x^2 + 3x + 12$ models the height of the ball y in feet after x seconds. Approximately how long is the ball in the air?

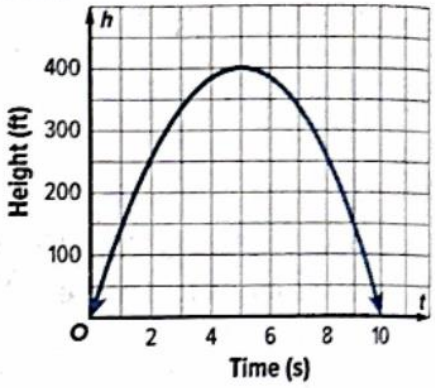


11.)

ROCKETS The height h of a model rocket launched from ground level into the air after t seconds can be modeled by the equation $h = -16t^2 + 160t$. The equation is graphed on the coordinate grid.

a. Where does the graph intersect the x-axis? What do these points represent?

b. How long does it take the rocket to reach its maximum height? Explain your reasoning.



GEOMETRY

Learn Solving Quadratic Equations by Using the Square Root Property

Key Concept • Square Root Property

Words: To solve a quadratic equation in the form $x^2 = n$, take the square root of each side.

Symbols: For any number $n \geq 0$, if $x^2 = n$, then $x = \pm\sqrt{n}$.

Example:

$x^2 = 49$

$x = \pm\sqrt{49}$ or $x = \pm 7$

In the equation $x^2 = n$, if n is a perfect square, you will have an integer answer. If n is not a perfect square, you will need to keep your answer in radical form or approximate the square root. You can use a calculator or estimation to find an approximation.

Example 5
Use the Square Root Property

Solve: $(y + 5)^2 = 21$

$$\begin{aligned} (y+5)^2 &= 21 \\ \sqrt{(y+5)^2} &= \pm\sqrt{21} \\ y + 5 &= \pm\sqrt{21} \\ -5 \quad & \quad -5 \\ \hline y &= -5 \pm\sqrt{21} \end{aligned}$$

The solutions are $-5 + \sqrt{21}$ or $-5 - \sqrt{21}$.

Solve each equation.

12.) $x^2 = 36$

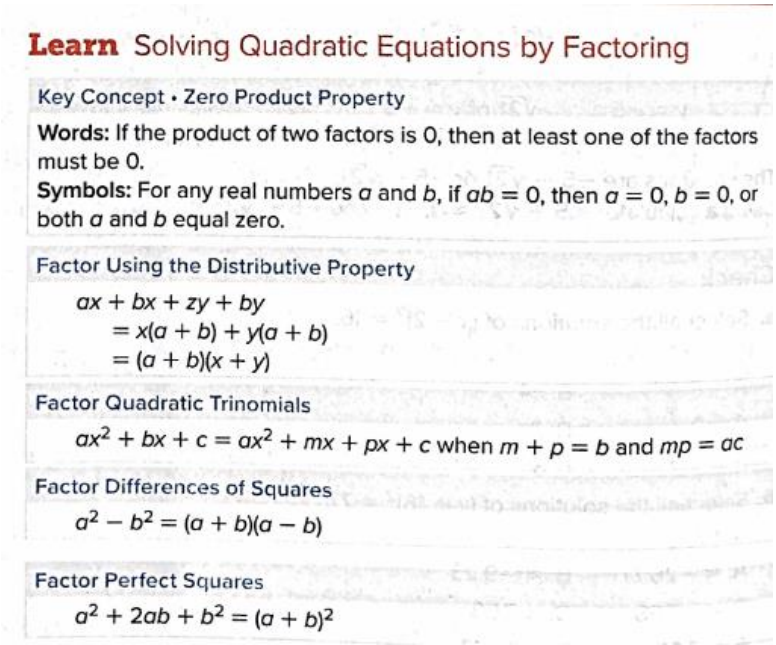
GEOMETRY

13.) $x^2 = 81$

14.) $(k + 1)^2 = 9$

15.) $36w^2 = 121$

GEOMETRY



Learn Solving Quadratic Equations by Factoring

Key Concept • Zero Product Property

Words: If the product of two factors is 0, then at least one of the factors must be 0.

Symbols: For any real numbers a and b, if $ab = 0$, then $a = 0$, $b = 0$, or both a and b equal zero.

Factor Using the Distributive Property

$$\begin{aligned} ax + bx + zy + by \\ &= x(a + b) + y(a + b) \\ &= (a + b)(x + y) \end{aligned}$$

Factor Quadratic Trinomials

$ax^2 + bx + c = ax^2 + mx + px + c$ when $m + p = b$ and $mp = ac$

Factor Differences of Squares

$a^2 - b^2 = (a + b)(a - b)$

Factor Perfect Squares

$a^2 + 2ab + b^2 = (a + b)^2$

Example 6: Solve a quadratic equation by using the Distributive Property	**Example 7: Solve a quadratic equation by factoring a trinomial**
Solve: $4x^2 - 12x = 0$. Check your solution. $4x^2 - 12x = 0$ $4x(x - 3) = 0$ $4x = 0$ $\quad$ $x - 3 = 0$ $\div 4 \quad \div 4$ $\quad$ $+3 \quad +3$ $x = 0$ $\quad$ $x = 3$ Check: $4(0)^2 - 12(0) = 0$ ✅ $4(3)^2 - 12(3) = 0$ ✅	Solve: $x^2 - 2x - 8 = 0$. Check your solution. $x^2 - 2x - 8 = 0$ $(x - 4)(x + 2) = 0$ $x - 4 = 0$ $\quad$ $x + 2 = 0$ $+4 \quad +4$ $\quad$ $-2 \quad -2$ $x = 4$ $\quad$ $x = -2$ Check: $(4)^2 - 2(4) - 8 = 0$ ✅ $(-2)^2 - 2(-2) - 8 = 0$ ✅
Example 8: Solve a quadratic equation by factoring a difference of squares	**Example 9: Solve a quadratic equation by factoring a perfect square trinomial**
Solve: $49 - x^2 = 0$. Check your solution. $49 - x^2 = 0$ $(7 + x)(7 - x) = 0$ $7 + x = 0$ $\quad$ $7 - x = 0$ $-7 \quad -7$ $\quad$ $+x \quad +x$	Solve: $25y^2 - 60y + 81 = 45$. Check your solution $25y^2 - 60y + 81 = 45$ $-45 \quad -45$ $25y^2 - 60y + 36 = 0$ $(5y - 6)(5y - 6) = 0$

$x = -7 \qquad 7 = x$ Check: $49 - (-7)^2 = 0$ ✅ $49 - (7)^2 = 0$ ✅	$5y - 6 = 0$ $+6 \quad +6$ $5y = 6$ $\div 5 \quad \div 5$ $y = \frac{6}{5}$ Check: $25\left(\frac{6}{5}\right)^2 - 60\left(\frac{6}{5}\right) + 81 = 45$ $25(1.44) - 60(1.2) + 81 = 45$ ✅

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Solve each equation. Check your solutions.

16.) $81 - 4b^2 = 0$
Check:

17.) $x^2 + 9x + 18 = 0$

Check:

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18.) $4x^2 + 28x + 49 = 0$

Check:

19.) $x^2 - 6x = 27$

Check:

20.) $a^2 + 11a = -18$

Check: