Sect 7.2 Solving Quadratic Equations by Factoring

Review factoring Math 1201

a) $b^2 + 8b + 7$

b) $n^2 - 11n + 10$

c) $m^2 + m - 90$

d) $-k^2 + 13k - 40$

e) $12x^2 - 9x$

f) $2n^2 + 6n - 108$

g) $5n^2 - 30n + 40$

h) $x^2 - 49$

i) $100 - b^2$

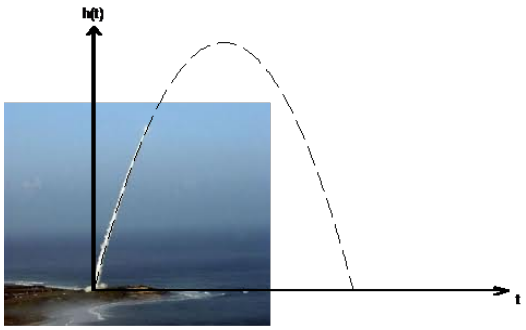
j) $50 - 2x^2$

k) $6x^2 - x - 2$

l) $6x^2 - 11x - 10$

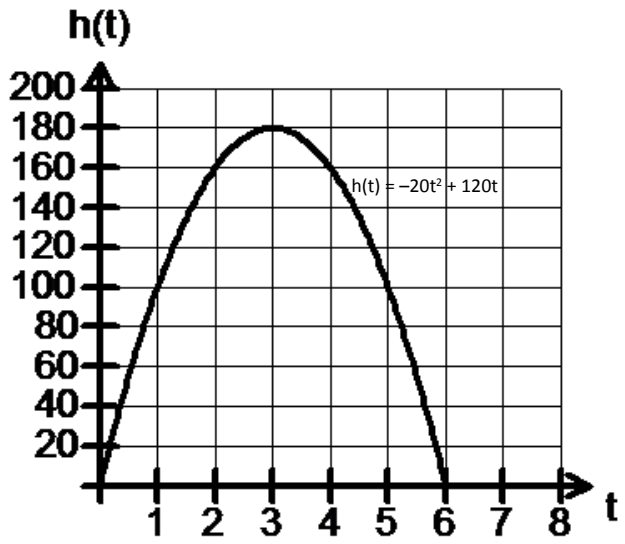
Example 1:

A missile fired from ground level is modeled by the quadratic function $h(t) = -20t^2 + 120t$, where $h(t)$ represents height in meters and t is the time in seconds.



a) Use the graph below to determine the times where the rocket attained a height of 160 m.

t_1 = _____ t_2 = _____



b) Use the quadratic function $h(t) = -20t^2 + 120t$ to write the quadratic equation that represents the height at 160 m.

We can determine the two times where the missile attains a height of 160 m by **FACTORING** this quadratic equation and using the zero product property to isolate and solve for t.

$$160 = -20t^2 + 120t$$

Express in the form $ax^2 + bx + c = 0$

Remove the **common factor**.

Factor the remaining trinomial.

To isolate t, apply the **Zero Product Property**

Remember : If the product of two real numbers is zero (a • b = 0)

then one or both must be zero.

These are the same solutions we saw from the graph!!

Example 2:
Solve each quadratic equation by factoring:
HINT: (Use the **zero** product property!)

a) $x^2 + 7x + 12 = 0$

b) $x^2 - x = 72$

c) $5x^2 + 14x - 3 = 0$

d) $x^2 = 5x$

e) $x^2 - 4 = 0$

f) $x^2 - 8 = 0$

g) $m(m+1) - 80 = 10$

h) $2x^2 + 2x - 12 = 3(x-2)$

Example 3:
Use www.desmos.com to find the x-intercepts of each graph.

		x - intercepts	
1.	$y = x^2 + x - 2$	_____	
2.	$y = (x+2)(x-1)$	_____	
3.	$y = 2x^2 + 2x - 4$	_____	multiply a,b,c by 2
4.	$y = 2(x+2)(x-1)$	_____	
5.	$y = -x^2 - x + 2$	_____	multiply a,b,c by -1
6.	$y = -(x+2)(x-1)$	_____	

What do you notice?

Example 4:
Write 2 different quadratic equations,in standard form, having roots -2 and 2.

Example 5:

Write a quadratic equation,in standard form, having roots 3 and -2.5.

Example 6:
Solve and verify your solution:

$$75x^2 - 192 = 0$$

Example 7:
Solve:

a) $-3.2x^2 + 6.4x = -25.6$

b) $-\frac{1}{2}x^2 = 2x - 6$

Example 8:
What are the zeros of the function:

$$f(x) = 4x^2 + 28x + 49$$

Example 9:

Marty solved a quadratic equation as shown. Identify and correct the error in Marty's solution.

$$4x^2 = 9x$$
$$\frac{4x^2}{x} = \frac{9x}{x}$$
$$4x = 9$$
$$x = 2.25$$

Think about:

What number will ALWAYS be a root of an equation that can be written in standard form as $ax^2 + bx = 0$?

In Summary

Key Idea

- Some quadratic equations can be solved by factoring.

Need to Know

- To factor an equation, start by writing the equation in standard form.
- You can set each factor equal to zero and solve the resulting linear equations. Each solution is a solution to the original equation.
- If the two roots of a quadratic equation are equal, then the quadratic equation is said to have one solution.

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1ab, 2 bdef, 4ad, 5, 6bd,7, 9, 11, 12a, 13, 14

Attachments

PM11-7s1.gsp

pm7s1-p8.tns

7s1e1 finalt.mp4

7s1e2 finalt.mp4

7s1e3 finalt.mp4

pm7s1-p1.tns

pm7s1-p2.tns

PM11-7s1-2.gsp