

Name: Answer Key

Class: _____

Quadratics Day One: Solutions and Zeros

Question 1

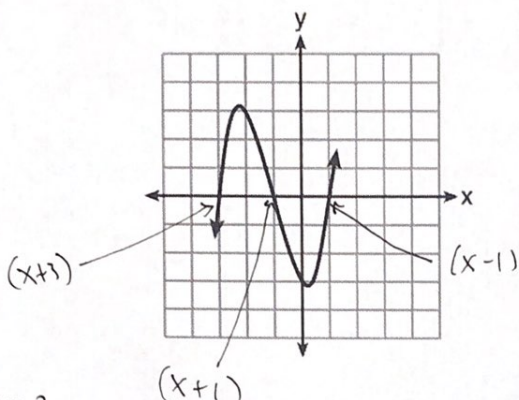
Explain how to determine the zeros of $f(x) = (x + 3)(x - 1)(x - 8)$. State the zeros of the function.

Using the zero product law to the equation $0 = (x + 3)(x - 1)(x - 8)$, set each parenthesis equal to zero and solve. You get $x = -3$, $x = 1$, and $x = 8$

Question 2

A cubic function is graphed on the set of axes below.

Which function could represent this graph?



(1) $f(x) = (x - 3)(x - 1)(x + 1)$

(2) $g(x) = (x + 3)(x + 1)(x - 1)$

(3) $h(x) = (x - 3)(x - 1)(x + 3)$

(4) $k(x) = (x + 3)(x + 1)(x - 3)$

Question 3

How many real-number solutions does $4x^2 + 2x + 5 = 0$ have?

Can't factor this!

(1) one

(2) two

(3) zero

(4) infinitely many

Quadratic Formula

$$-2 \pm \frac{\sqrt{(2)^2 - 4(4)(5)}}{2(4)}$$

negative, so no real solutions

Question 4

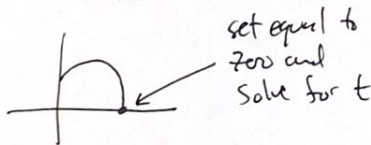
Solve for x to the nearest tenth: $x^2 + x - 5 = 0$

~~Factor~~ Can't factor!
$$\frac{-1 \pm \sqrt{1^2 - 4(1)(-5)}}{2(1)} \rightarrow 1.8$$

$$\rightarrow -2.8$$

Question 5

When an apple is dropped from a tower 256 feet high, the function $h(t) = -16t^2 + 256$ models the height of the apple, in feet, after t seconds. Determine, algebraically, the number of seconds it takes the apple to hit the ground.



$$0 = -16t^2 + 256$$

$$-256 = -16t^2$$

$$16 = t^2 \rightarrow t = 4 \text{ or } -4$$

4 seconds

Question 6

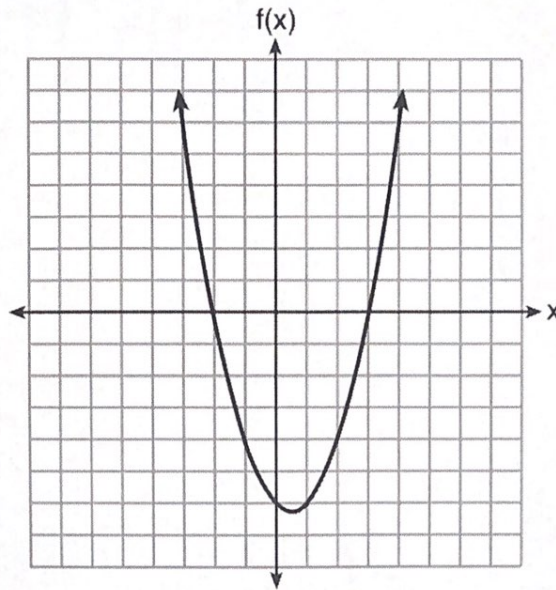
If the zeros of a quadratic function, F , are -3 and 5 , what is the equation of the axis of symmetry of F ? Justify your answer.

Axis of symmetry is between zeros: $\frac{-3 + 5}{2} = 1$

$x = 1$

Question 7

The graph of the function $f(x) = ax^2 + bx + c$ is given below.



Could the factors of $f(x)$ be $(x + 2)$ and $(x - 3)$? Based on the graph, explain why or why not.

Yes, because $f(x) = (x+2)(x-3)$ would have zeros of -2 and 3 , which is shown on the graph at $(-2, 0)$ and $(3, 0)$.

Question 8

Solve $8m^2 + 20m = 12$ for m by factoring.

$$2m^2 + 5m = 3$$

$$2m^2 + 5m - 3 = 0 \rightarrow (2m - 1)(m + 3) = 0$$

$$\begin{matrix} m = -3 \\ m = \frac{1}{2} \end{matrix}$$

Question 9

Write an equation that defines $m(x)$ as a trinomial where $m(x) = (3x - 1)(3 - x) + 4x^2 + 19$. Solve for x where $m(x) = 0$.

$$9x - 3 - 3x^2 + x + 4x^2 + 19$$

$$x^2 + 10x + 16 = 0$$

$$(x + 2)(x + 8) = 0$$

$$\begin{matrix} x = -2 \\ x = -8 \end{matrix}$$

Questions 10-11

10.

The zeros of the function $p(x) = x^2 - 2x - 24$ are

(1) -8 and 3

(2) -6 and 4

(3) -4 and 6

(4) -3 and 8

$$(x - 6)(x + 4) = 0$$

11.

What are the solutions to the equation $3(x - 4)^2 = 27$?

(1) 1 and 7

(2) -1 and -7

(3) $4 \pm \sqrt{24}$

(4) $-4 \pm \sqrt{24}$

$$(x - 4)^2 = 9$$

$$x - 4 = 3 \quad \text{OR} \quad x - 4 = -3$$

$$x = 7$$

$$x = 1$$

Question 12

Which ordered pair would *not* be a solution to $y = x^3 - x$?

(1) $(-4, -60)$

(3) $(-2, -6)$

use table in calculator

(2) $(-3, -24)$

(4) $(-1, -2)$

Question 13

Determine algebraically the zeros of $f(x) = 3x^3 + 21x^2 + 36x$.

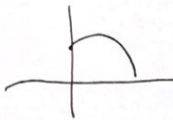
$x = 0$
 $x = -3$
 $x = -4$

$0 = 3x(x^2 + 7x + 12)$

$0 = 3x(x+3)(x+4)$

Question 14

A toy rocket is launched from the ground straight upward. The height of the rocket above the ground, in feet, is given by the equation $h(t) = -16t^2 + 64t$, where t is the time in seconds. Determine the domain for this function in the given context. Explain your reasoning.



$0 = -16t^2 + 64t$

$t = 0$

$t = 4$

$0 = -16t(t - 4)$

$0 \leq t \leq 4$

The rocket launches at 0 seconds and falls on the ground at 4 seconds

Question 15

Find three consecutive odd integers such that the product of the first and the second exceeds the third by 8.

$x, x + 2, x + 4$

USE PARENTHESES

$x(x+2) - (x+4) = 8$

$x^2 + 2x - x - 4 = 8$

$x^2 + x - 12 = 0$

$(x+4)(x-3) = 0$

$x = -4, x = 3$

$3, 5, 7$

Question 16

Three brothers have ages that are consecutive even integers. The product of the first and third boys' ages is 20 more than twice the second boy's age. Find the age of each of the three boys.

$x, x + 2, x + 4$

$x(x+4) = 2(x+2) + 20$

$x^2 + 4x = 2x + 4 + 20$

$x^2 + 2x - 24 = 0$

$(x+6)(x-4) = 0$

$x = 4$

$4, 6, 8$

Question 17-18

17.

A student is asked to solve the equation

$4(3x - 1)^2 - 17 = 83$. The student's solution to the

problem starts as $4(3x - 1)^2 = 100$

$(3x - 1)^2 = 25$

A correct next step in the solution of the problem is

1) $3x - 1 = \pm 5$

2) $3x - 1 = \pm 25$

3) $9x^2 - 1 = 25$

4) $9x^2 - 6x + 1 = 5$

18.

Solve the quadratic equation below for the exact values of x .

Get x alone

$4x^2 - 5 = 75$

$4x^2 = 80$

$x^2 = 20$

$x = \pm \sqrt{20}$