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Algebra 2H: Quadratic Equations

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21. There are total of 22 questions in this test.
22. Each of the first 20 worth 2 points:
 - a. The first 16 relate directly to the present chapter.
 - b. The last 4 questions relate mostly to other subjects we covered this year.
23. Extra-credit: There are TWO extra-credit question, worth 1pt each.
24. You have 50 minutes (one Block) to complete the test (more if you have accommodations).

You are allowed to use a calculator.

==> You have to SHOW YOUR WORK for full credit. Either on the space given here, or on extra paper.

Results WITHOUT showing your work might not get full credit.

Therefore, writing on the white-board might be redundant, as you will have to copy something back to paper.

Good luck!!

-Zachi

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Helper section

The general form of equation for vertical motion is:

$$h(t) = -16t^2 + v_0t + h_0$$

where:

$h(t)$ - Height at time t , in units of feet

v_0 - Starting (initial) vertical velocity, in units of feet-per-second

h_0 - Starting (initial) height, in units of feet

t - Time, in units of second

The time to reach maximum height is

$$t_{maxHeight} = \frac{v_0}{32}$$

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=== Start of test

1) Solve by factoring (MATH method, box, or similar)

$$3x^2 - 11x + 6 = 0$$

2) Solve by factoring (MATH method, box, or similar)

$$x^2 - 5x = -4$$

3) Solve by completing the square.

$$y^2 - 6y + 4 = 0$$

4) Solve by completing the square.

$$x^2 + 4x + 7 = 0$$

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5) Solve using the quadratic equation formula.

$$2u = u^2 - 3$$

6) Solve using the quadratic equation formula.

$$2x^2 + 6x + 5 = 0$$

7) Solve in whichever method you choose (and SHOW your work)

$$a^2 + a \cdot \sqrt{8} - 2 = 0$$

8) Solve in whichever method you choose (and SHOW your work).

$$4y^2 - 2 = 2y^2 + 16$$

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9) Solve.

$$z^{\frac{1}{3}} + 3z^{\frac{1}{6}} - 10 = 0$$

10) For each of the below, determine if the equation has one or two solutions, and whether these are real or complex. You do not need to solve the equations.

(a) $x^2 + 2 = 2x\sqrt{2}$

(b) $2x^2 + 7x - 15 = 0$

(c) $4x^2 + 2x + 3 = 0$

11) Write a quadratic equation for which the solutions satisfy the below:

(a) Sum of solution is -3 , and product is $\frac{1}{4}$.

(b) There is only one solution, equal to -2π .

(c) Two complex solutions, one of which is $i\sqrt{3}$.

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12) The hypotenuse of a right triangle is 15km long. The length of one leg is $\frac{4}{3}$ times the other. Find the lengths of the legs.

13) Hikers A and B leave the same city at the same time, headed east and north respectively. Hiker A is walking at a pace of 4 miles-per-hour.

Hiker B travels X miles/hour slower than Hiker A. After 2 hours they are 10 miles apart. Find the speed of each hiker. (SHOW your work)

14) Solve for the indicated letter:

(a) $5 = \frac{a}{K-t^2}$; t

(b) $a - 2 = r(r + 2\pi)$; r

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15) An object is launched directly upward at 48 feet per second (ft/s) from a platform 80 feet high above the ground.

(a) What will be the object's maximum height?

(b) When will the object hit the ground?

16) A rocket was launched upward from ground level. It reached its maximum height after 5 seconds. When did it reach a height of 32ft above ground?

=== Review questions ===

17) Solve:

$$\left. \begin{array}{l} 2x = y - 5 \\ 8 = 4y - 2x \end{array} \right\}$$

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18) Write the equation of the line with slope $m = -2$ that goes through the point $(x, y) = (3, 5)$

19) Solve:

$$\frac{2}{x-1} + \frac{8}{x^2-1} = \frac{8}{x+1}$$

20) (a) Simplify (SHOW your work) $(\sqrt{20} - \sqrt{5})^2$

(b) Simplify (SHOW your work) $(\sqrt{-9} + \sqrt{-4})^2$

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Extra-credit

21. (Credit for the idea for this question goes to Gilly Weiss and Chloe Jedwood).

Given the two function $f(x)$ and $g(x)$ as below, where C is (an unknown) real number:

$$f(x) = 2x + C \quad \text{and} \quad g(x) = 3x + 4$$

Find the value of C if it is given that

$$f(g(x)) = g(f(x))$$

22. Find all the values of x for which

$$(x - 3)^{(3x^2 - 12x + 9)} = 1$$

=== End of test