Algebra 1 Unit 11 worksheet: Using the quadratic formula

Name _____ Date _____ Period _____

1. Solve with the quadratic formula. Give exact answers with radicals and fractions in simplest form. If an equation has no real solutions, say so.

(a) $x^2 + 4x - 7 = 0$

(b) $3x^2 - 7x + 2 = 0$

(c) $2y^2 + 2y - 3 = 0$

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

(e) $-x^2 + 6x - 4 = 0$

2. Put each equation in standard form, clearing any decimals or fractions, then solve it with the quadratic formula. Give exact answers in simplest form.

(a) $3x^2 = 2 - 5x$

(b) $x(2x - 3) = 4$

(c) $0.3x^2 + 0.4x - 0.2 = 0$

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

3. For each equation, name the method that reaches the solutions in the fewest steps (factoring, the square root property, completing the square or the formula) and say what in the equation tells you. Then solve it.

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

(b) $5x^2 - x - 3 = 0$

(c) $4(x + 1)^2 = 9$

(d) $x^2 - 12x + 30 = 0$

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4. Kofi solved $2x^2 - 8x - 1 = 0$ like this:

$$a = 2, \quad b = -8, \quad c = -1$$

$$x = \frac{-8 \pm \sqrt{64 + 8}}{4} = \frac{-8 \pm \sqrt{72}}{4} = \frac{-8 \pm 6\sqrt{2}}{4} = -2 \pm 6\sqrt{2}$$

(a) Kofi made two mistakes, one when he substituted into the formula and one in the last step. Name them.

(b) Solve the equation correctly. Give exact answers in simplest form.

5. Maya starts a push-up plan. On day 1 she does 4 push-ups, and on each day after that she does one more push-up than the day before. After n days her total is $\dfrac{n(n+7)}{2}$ push-ups. When the plan ends, her total was 49 push-ups. Use the quadratic formula to find how many days the plan lasted, then find how many push-ups she did on the last day.

6. A kite is made from a 90 cm wooden dowel cut into two sticks. The sticks are fastened across each other at right angles and form the kite's two diagonals, and the kite's area is half the product of the two sticks' lengths. Let x be the length of one stick, in cm.

(a) Find every value of x that gives a kite of area 950 cm^2, exactly and to two decimal places.

(b) Do both values make a real kite? Explain how the two values are related.

(c) Use $b^2 - 4ac$ to show that no cut gives a kite of area 1050 cm^2.

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