Name ______________________ Period ________

5.2M *Solving Quadratic Equations Using the Quadratic Formula to Find Real or Complex Solutions*

#1 – 3: Review: Simplify the following radicals.

1. $\sqrt{-12}$

$\sqrt{-1\cdot 4\cdot 3}$

$\boxed{2i\sqrt{3}}$

2. $\sqrt{24}$

$\sqrt{4\cdot 6}$

$\boxed{2\sqrt{6}}$

3. $\sqrt{-16}$

$\sqrt{-1\cdot 16}$

$\boxed{4i}$

#4-9: The following solutions were found using the quadratic formula but are not simplified all the way. Put the solutions in simplest form. No decimals allowed!

4. $x=\dfrac{-2\pm 4}{2}$ $\frac{2}{2}$ $\frac{-6}{2}$

$\boxed{x = 1 \text{ or } x = -3}$

5. $x=\dfrac{-6\pm\sqrt{0}}{4}$

$\boxed{x = -\frac{3}{2}}$

6. $x=\dfrac{3\pm\sqrt{-4}}{2}$ $2i$

$\boxed{x = \frac{3 \pm 2i}{2}}$

7. $x=\dfrac{-6\pm\sqrt{-11}}{2(2)}$

$\boxed{x = \frac{-6 \pm i\sqrt{11}}{4}}$

8. $x=\dfrac{-2\pm\sqrt{-20}}{2(1)}$ $2i\sqrt{5}$

$\boxed{x = -1 \pm i\sqrt{5}}$

9. $x=\dfrac{-2\pm\sqrt{64}}{2(1)}$ 8 $\frac{6}{2}$ $\frac{-10}{2}$

$\boxed{x = 3 \text{ or } x = -5}$

10. Carter solved the following quadratic equation using the quadratic formula – his work is shown below. However, he did not simplify his answer correctly. Find his mistake(s) and then simplify the solution correctly.

Error Line 6

$x = \frac{-6 \pm 2i}{2} = -3 \pm i$

$\boxed{x = -3 \pm i}$

c	Line 1	$x^2+6x+10=0$
c	Line 2	$a=1,\ b=6,\ c=10$
c	Line 3	$x=\dfrac{-6\pm\sqrt{(6)^2-4(1)(10)}}{2(1)}$
c	Line 4	$x=\dfrac{-6\pm\sqrt{-4}}{2}$
c	Line 5	$x=\dfrac{-6\pm 2i}{2}$
X	Line 6	$x=-3\pm 2i$

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5.2M Solving Quadratic Equations Using the Quadratic Formula to Find Real or Complex Solutions

#11 – 13: Solve using the quadratic formula. Be sure to simplify your answer, keeping your answers <u>exact</u> (no decimals approximations). Remember to show ALL work.

11. $x^2+6x=-2$

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

$a=1 \quad b=6 \quad c=2$

$x=\dfrac{-6\pm\sqrt{(6)^2-4(1)(2)}}{2(1)}$

$x=\dfrac{-6\pm\sqrt{28}}{2}=\dfrac{-6\pm2\sqrt{7}}{2}$

$\boxed{x=-3\pm\sqrt{7}}$

12. $2x^2-8x=-8$

$2x^2-8x+8=0$

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

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

$a=1 \quad b=-4 \quad c=4$

$x=\dfrac{4\pm\sqrt{(-4)^2-4(1)(4)}}{2(1)}$

$x=\dfrac{4\pm\sqrt{0}}{2}$

$\boxed{x=2}$

13. $5x^2-13x+9=0$

$a=5 \quad b=-13 \quad c=9$

$x=\dfrac{13\pm\sqrt{(-13)^2-4(5)(9)}}{2(5)}$

$x=\dfrac{13\pm\sqrt{-11}}{2(5)}$

$\boxed{x=\dfrac{13\pm i\sqrt{11}}{10}}$

14. The path of an object thrown straight up in the air with an initial velocity of 40 feet per second and from an initial height of 4 feet can be modeled by the equation $h(t)=-16t^2+40t+4$, where h is the height of the object at time t.

a) How long does the object remain in the air before landing (height = 0)? Put your answer in decimal form, rounded to the nearest tenth of a second.

$a=-16 \quad b=40 \quad c=4$

$x=\dfrac{-40\pm\sqrt{(40)^2-4(-16)(4)}}{2(-16)}$

$x=\dfrac{-40\pm\sqrt{1856}}{2(-16)}=\dfrac{-40\pm43.08}{-32}$ — -0.1 extraneous; 2.6 sec

b) From part **a)** of this problem, the quadratic formula gives you two answers. How did you know which answer to choose? Since $t=0$ means time when object is initially thrown, positive time means time after the throw was started. Negative time implies time before the object was thrown, which doesn't make sense here.

c) How long is the object in the air when it reaches a height of 25 feet?

$-16t^2+40t+4=25$

$-16t^2+40t-21=0$

$a=-16 \quad b=40 \quad c=-21$

$t=\dfrac{-40\pm\sqrt{(40)^2-4(-16)(-21)}}{2(-16)}$

$t=\dfrac{-40\pm\sqrt{256}}{-32}$

$t=\dfrac{-40\pm16}{-32}$ — 0.75 sec; 1.75 sec

After 0.75 secs and again at 1.75 secs

Section 5.2M

5.2 I CAN REPRESENT REAL-WORLD SITUATIONS WITH QUADRATIC EQUATIONS AND SOLVE USING APPROPRIATE METHODS. FIND REAL AND NON-REAL COMPLEX ROOTS WHEN THEY EXIST. RECOGNIZE THAT A PARTICULAR SOLUTION MAY NOT BE APPLICABLE IN THE ORIGINAL CONTEXT.