Unit 2 Review Name Key

Simplify each expression. Write the solution in standard form.

(1) $(7i + 3) - (7i - 14)$

$\boxed{17}$

(2) $(-3i + 2)(2 + 3i)$

$-6i - 9i^2 + 6i + 4 = 4 + 9 = \boxed{13}$

(3) $(-2 + 5 - 8i) + (-3i - 2i)$

$3 - 8i + -5i = \boxed{3 - 13i}$

(4) $(2 + 5i)(4 - 6i)$

$8 - 12i + 20i - 30i^2 = \boxed{38 + 8i}$

(5) $\frac{5-6i}{6i}\frac{(-6i)}{(-6i)} = \frac{-30i + 36i^2}{36} = \frac{-36 - 30i}{36} = \boxed{-1 - \frac{5}{6}i}$

(6) $\frac{(7+2i}{3-4i}\frac{(3+4i)}{3+4i)} = \frac{21 + 6i + 28i + 8i^2}{25} = \boxed{\frac{13}{25} + \frac{34i}{25}}$

Answer each question.

(7) If $w = -6i^{23}$, what does w simplify to?

$-6(-i) = \boxed{6i}$

(8) Solve $3x^2 - 11x \geq -10$ and write your answer in interval notation.

$3x^2 - 11x + 10 \geq 0$

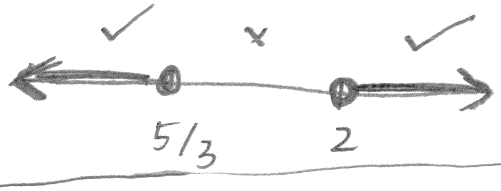
$3x^2 - 6x - 5x + 10 \geq 0$

$3x(x - 2) - 5(x - 2) \geq 0$

$(x - 2)(3x - 5) \geq 0$

$x = 2, 5/3$

*Always have a number line!



$\boxed{(-\infty, 5/3] \cup [2, \infty)}$

Unit 2 Review Name_____

Find all solutions to the equation. (Complex numbers are allowed)

(9) $\frac{x^2}{2} = 5x - 17$ $x^2 = 10x - 34$

$x^2 - 10x + 34 = 0$

$x = \frac{10 \pm \sqrt{100 - 4(34)}}{2} = \frac{10 \pm \sqrt{-36}}{2} = 5 \pm 3i$

(10) $3x^2 + 10 = 4x$

$3x^2 - 4x + 10 = 0$ $x = \frac{4 \pm \sqrt{16 - 4(3)(10)}}{6} = \frac{4 \pm \sqrt{-104}}{6} = \frac{2}{3} \pm \frac{i\sqrt{26}}{3}$

(11) $2x^2 + 12 = 0$ $x^2 + 6 = 0$

$x = \pm i\sqrt{6}$

(12) In a student's science fair project, he claims that the height h in feet above the ground of an object shot from a catapult can be modeled by $h(t) = 16t^2 - 3t + 32$, where t is the time in seconds after the object is shot. What are the zeros of this function? Explain why the values of the zeros indicate that the student's model is incorrect

$t = \frac{3 \pm \sqrt{9 - 4(16)(32)}}{32} = \frac{3 \pm \sqrt{-2039}}{32} = \frac{3}{32} \pm \frac{i\sqrt{2039}}{32}$

cannot be true since the object doesn't hit the ground!

(13) Let $\boldsymbol{k(x) = 4x^2 - 24x + 35}$.

a) Rewrite the function into vertex form.

$-35 + 36 = 4x^2 - 24x + 36$

$= 4(x^2 - 6x + 9)$

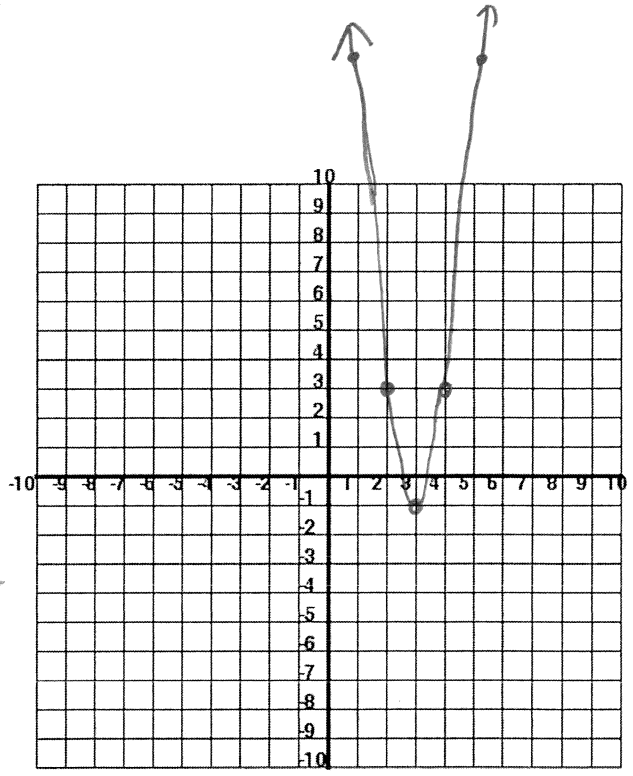
$1 = 4(x - 3)^2$

$k(x) = 4(x - 3)^2 - 1$

b) Describe the transformations from the parent function.

vertical stretch by 4

Translate Right 3 and down 1



x	y
5	15
4	3
3	-1
2	3
1	15

c) State the vertex and axis of symmetry.

$(3, -1)$ $x = 3$

d) What is the domain and the range?

D: $\mathbb{R}$ R: $y \geq -1$

(14) A) The line $y = 8x - 24$ intersects the parabola $y = 2x^2 - 12x + 26$ at exactly one point. Find the coordinates of this point algebraically.

$8x - 24 = 2x^2 - 12x + 26$

$0 = 2x^2 - 20x + 50$

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

$x = 5$

$y = 8(5) - 24 = 16$

$\boxed{(5, 16)}$

B) The line $y = 5.8x + 11$ intersects the parabola $y = 2x^2 - 12x + 26$ twice. Find the coordinates of each intersection point using the graphing calculator. Round to the nearest thousandths. WINDOW: [-5,20] by [-5,70]

(.942, 16.467) and (7.958, 57.153)

(15) You are trying to dunk a basketball. You need to jump 2.5 feet in the air in order to dunk. Suppose you jump from the ground with an initial velocity of 9ft/sec.

a) Write a function *h(t)* that models this situation.

$h(t) = -16t^2 + 9t$

b) Using the graphing calculator, what is the maximum height your feet will be above the ground? Round to the nearest thousandth. WINDOW: [-5,5] by [-5,5]

1.266 feet

c) Will you be able to dunk the ball? Justify your answer.

No, since 2.5 is higher than the maximum jump height of 1.266 ft.

(16) Richard knows that the points $(-2, -9), (-1, 0),$ *and* $(1, -12)$ lie on the same parabola. Find the equation of this quadratic function in standard form.

$-9 = 4a - 2b + c$

$0 = a - b + c$

$-12 = a + b + c$

$\boxed{y = -5x^2 - 6x - 1}$