Algebra 2
3.1-3.2 Test Review

Name: KEY

Period: ______

3.1 – I can solve quadratic functions by graphing.

Step 1: Determine the x-coordinate of the vertex by using the formula $x = \dfrac{-b}{2a}$

Step 2: Find the y-coordinate of the vertex by plugging in the x-value from step 1 into the function.

Step 3: Identify the coefficient on the x^2 term and decide whether the parabola opens up or down.

Step 4: Sketch a parabola that fits the information from steps 1-3 and estimate where the graph crosses the x-axis.

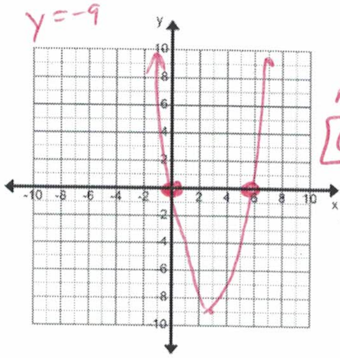
For #1-3, solve by graphing. *Estimate* the locations of the solutions.

1.) Solve $x^2 - 6x = 0$ by graphing.

$x = \frac{6}{2}$ OPENS UP

$x = 3$ $a = 1$

$y = -9$



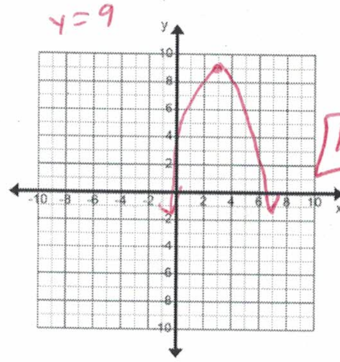
ABOUT $\boxed{0 \text{ AND } 6}$

2.) Solve $-2x^2 + 12x - 9 = 0$ by graphing.

$x = \frac{-12}{-4}$ OPENS DOWN

$x = 3$ $a = -2$

$y = 9$



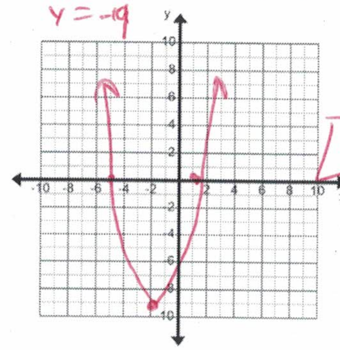
ABOUT $\boxed{1 \text{ AND } 5}$

3.) Solve $x^2 + 4x - \cancel{7}\,5 = 0$ by graphing.

$x = \frac{-4}{2}$ OPENS UP

$x = -2$ $a = 1$

$y = -9$



ABOUT $\boxed{-5 \text{ AND } 1}$

3.1 – I can solve quadratic equations by factoring using the AC method and the Zero Product Property.

Step 1: Move any terms so that the equation is set equal to zero, making sure the x^2 term is always positive.

Step 2: Using the AC method, factor the polynomial

Step 3: Using the Zero Product Property, set each of the parentheses equal to zero and solve.

Step 4: If necessary, write the solutions from step 3 as ordered pairs *(x,0)* representing the x-intercepts.

For #4-6, factor and solve the quadratic equations.

4.) $y^2 - 7 = 6y$

$ac = -7$

$1 \cdot -7$

$y^2 - 6y - 7 = 0$

$y^2 + 1y - 7y - 7 = 0$

$y(y+1) - 7(y+1) = 0$

$(y+1)(y-7) = 0$ FACTOR

$y+1 = 0$ $y-7 = 0$

$\boxed{y = -1 \quad y = 7}$ SOLVE

5.) $-6x + 56 = 2x^2$

$ac = 112$

$-8 \cdot 14$

$2x^2 + 6x - 56 = 0$

$2x^2 - 8x + 14x - 56 = 0$

$2x(x-4) + 14(x-4) = 0$

$(x-4)(2x+14) = 0$ FACTOR

$x-4 = 0$ $2x+14 = 0$

$\boxed{x = 4 \quad x = -7}$ SOLVE

6.) $4y^2 - 12y = 17y - 30$

$ac = 120$

$-5 \cdot -24$

$4y^2 - 29y + 30 = 0$

$4y^2 - 5y - 24y + 30 = 0$

$y(4y-5) - 6(4y-5) = 0$

$(4y-5)(y-6) = 0$ FACTOR

$4y-5 = 0$ $y-6 = 0$

$\boxed{y = \frac{5}{4} \quad y = 6}$ SOLVE

3.1 and 3.2 – I can simplify radical expressions using "Radical Prison" with both real and imaginary numbers.

For #7-10, simplify the radical expressions.

7.) $\sqrt{225}$

25 9

$\sqrt{5}\cdot\cancel{\sqrt{5}}\cdot\sqrt{3}\cdot\cancel{3}$

$\boxed{15}$

8.) $\sqrt{-440}$

$\sqrt{-1}$ $\sqrt{440}$

i

$20 \cdot 22$

$5 \cdot 4 \cdot 2 \cdot 11$

$i\sqrt{5}\,2\cdot\cancel{2}\cdot 2\;11$

$\boxed{2i\sqrt{110}}$

9.) $-2\sqrt{72}$

9 8

3 3 4 2

$-2\sqrt{3\cdot\cancel{3}\cdot 2\cdot\cancel{2}\cdot 2}$

$-2\cdot 3\cdot 2\sqrt{2}$

$\boxed{-12\sqrt{2}}$

10.) $8\sqrt{-120}$

$\sqrt{-1}$ $\sqrt{120}$

i

12 10

$4\cdot 3\cdot 5\cdot 2$

$8i\sqrt{2\cdot\cancel{2}\cdot 3\cdot 5\cdot 2}$

$\boxed{16i\sqrt{30}}$

3.1 and 3.2 – I can solve quadratic equations using Greatest Common Factors (GCF) and square roots.

For #11-13, solve the equations.

11.) $-2x^2 - 10 = 30$

$+10 \quad +10$

$\frac{-2x^2}{-2} = \frac{40}{-2}$

$x^2 = -20$

$x = \pm\sqrt{-20}$

$\sqrt{-1}$ $\sqrt{20}$

i 4 5

$\sqrt{2\cdot\cancel{2}\cdot 5}$

$\boxed{x = \pm 2i\sqrt{5}}$

12.) $4(w+1)^2 - 12 = 20$

$+12 \quad +12$

$\frac{4(w+1)^2}{4} = \frac{32}{4}$

$(w+1)^2 = 8$

$w+1 = \pm\sqrt{8}$

$4\cdot 2$

$\sqrt{2\cdot 2}\;2$

$\boxed{w = \pm 2\sqrt{2} - 1}$

13.) $2p^2 - 14p = 0$

$2p(p-7) = 0$

$2p = 0 \quad p - 7 = 0$

$\boxed{p = 0 \quad p = 7}$

For #14, find the zeros of the function.

14.) $f(x) = \frac{1}{2}x^2 - 60$

$\frac{1}{2}x^2 - 60 = 0$

$+60 \quad +60$

$(\frac{1}{2}x^2 = 60)\cdot 2$

$x^2 = 120$

$x = \pm\sqrt{120}$ SEE #10

$x = \pm\sqrt{2\cdot 2\cdot 3\cdot 5\cdot 2}$

$\boxed{x = \pm 2\sqrt{30}}$

$(2\sqrt{30}, 0)$

$(-2\sqrt{30}, 0)$

X-INTERCEPTS

3.2 – I can simplify imaginary numbers involving higher powers of *i*.

For #15-17, rewrite each expression in reduced powers of *i* (I won, I won!).

15.) $i^{34} = i^2 = \boxed{-1}$

$\frac{34}{4} = 8\,r\,2$

16.) $i^3 \cdot i^9 = -i \cdot i = -i^2 = -(-1) = \boxed{1}$

or

$i^{12} = i^0 = 1$

$\frac{12}{4} = 3\,r\,0$

17.) $(i^5)^2 = i^5 \cdot i^5 = i^{10} = i^2 = \boxed{-1}$

$\frac{10}{4} = 2\,r\,2$

3.2 – I can perform operations on complex number including addition, subtraction, and multiplication.

For #18-23, simplify the complex expressions by performing the required operations.

18.) $5i(6-3i)$

$30i - 15i^2$ $\quad i^2 = -1$

$30i + 15$

$\boxed{15 + 30i}$

19.) $(6-7i)-(4+2i)$

$6 - 7i - 4 - 2i$

$\boxed{2 - 9i}$

20.) $(8-i)(3+10i)$ $\quad i^2 = -1$

$24 + 80i - 3i - 10i^2$

$24 + 80i - 3i + 10$

$\boxed{34 + 77i}$

21.) $(10+2i)+(16-3i)$

$10 + 2i + 16 - 3i$

$\boxed{26 - i}$

22.) $(4-4i)(1-11i)$ $\quad i^2 = -1$

$4 - 44i - 4i + 44i^2$

$4 - 44i - 4i - 44$

$\boxed{-40 - 48i}$

23.) $2(9-i)-3(4+i)$

$18 - 2i - 12 - 3i$

$\boxed{6 - 5i}$