Geometry CC
Module 15-16 Test Review

Name: KEY
Date: _____ Period: ___

Quadratic Formula:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

1. Factor $x^2 + 12x + 35$.

add mult.

$(x+7)(x+5)$

2. Factor $2x^2 + 23x + 11$.

add 22 mult.

$2x^2 + 22x + x + 11$ → $2x(x+11) + 1(x+11)$

$(x+11)(2x+1)$

3. Determine whether $4x^2 - 81$ is a difference of two squares. If so, factor.

yes; $(2x+9)(2x-9)$

4. Find the minimum or maximum of $g(x) = -x^2 - 2x + 8$. → maximum

$x = \frac{-b}{2a} = \frac{-(-2)}{2(-1)} = -1$ → $V(-1, 9)$ maximum

↑ plug in (-1) to get y.

5. Find all zeros of the trinomial $k(x) = x^2 - 2x - 24$ by factoring.

add mult.

$0 = (x-6)(x+4)$

$x = 6 \quad x = -4$

6. Solve $81x^2 = 1$.

$\frac{81}{81} \quad \frac{1}{81}$

$x^2 = 1/81$ → $x = \pm 1/9$

7. Identify the vertex and axis of symmetry of $g(x) = (x+10)^2 + 2$.

opp keep

$V(-10, 2)$

↓

AOS: $x = -10$

8. Complete the square to write $c(x) = x^2 + 6x + 14$ in vertex form.

$c(x) - 14 + 9 = x^2 + 6x + 9$

$c(x) - 5 = (x+3)^2$

$c(x) = (x+3)^2 + 5$

9. Solve $36x^2 + 25 = 0$.

$36x^2 = -25$ → $x^2 = -25/36$ → $x = \pm \frac{5}{6}i$

10. Use the Quadratic Formula to solve $x^2 + 4x + 6 = 0$.

$a=1 \quad b=4 \quad c=6$

$$x = \frac{-4 \pm \sqrt{16 - 4(1)(6)}}{2(1)} = \frac{-4 \pm \sqrt{-8}}{2} = \frac{-4 \pm 2i\sqrt{2}}{2} = -2 \pm i\sqrt{2}$$

11. Find the discriminant for $g(x) = 5x^2 + 7x + 3$, identify the number of solutions and their type(s).

$b^2 - 4ac$

$(7)^2 - 4(5)(3) = -11$

>0, 2 Real $\quad <0$, 2 Imag.
$=0$, 1 Real

↓

2 Imaginary (complex)

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12. Solve the system by **elimination**.

$\begin{cases} y = x^2 - 1 \\ x - y = -1 \end{cases}$ → $-x^2 + 0x + y = -1$, $0x^2 + x - y = -1$

$-x^2 + x = -2$

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

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

(-1, 0) (2, 3)

plug-in (-1) plug-in (2)

13. Factor $x^2 + 10x + 21$. (add, mult.)

$(x + 7)(x + 3)$

14. Factor $7x^2 + 29x + 4$. (add, 28 mult.)

$7x^2 + 28x + x + 4$

$7x(x+4) + 1(x+4)$

$(x+4)(7x+1)$

15. Determine whether the binomial is a difference of two squares. If so, factor it. $x^2 - 100$

yes; $(x + 10)(x - 10)$

16. State whether there is a minimum or maximum of $g(x) = \frac{1}{2}x^2 - 6x - 32$ and identify it. → ∪ minimum

$x = \frac{-b}{2a} = \frac{-(-6)}{2(1/2)} = 6$ → V(6, -50) minimum

plug-in (6) to get y.

17. Find all zeros of the trinomial by factoring: $k(x) = 2x^2 - 5x - 25$. (add, -50 mult.)

$2x^2 - 10x + 5x - 25$

$2x(x-5) + 5(x-5)$

$(x-5)(2x+5)$

$x = 5 \quad x = -5/2$

18. Solve $225x^2 = 9$.

$x^2 = 9/225$

$x = \pm 1/5$

19. Identify the vertex and axis of symmetry of $g(x) = (x - 11)^2 - 4$. (opp, keep)

V(11, -4)

AOS: x = 11

20. Solve by completing the square $c(x) = x^2 - 8x + 26$

$-26 + 16 = x^2 - 8x + 16$

$-10 = (x-4)^2$ → $\pm i\sqrt{10} = x - 4$

$4 \pm i\sqrt{10} = x$

21. Solve $49x^2 + 100 = 0$.

$49x^2 = -100$

$x^2 = \frac{-100}{49}$ → $x = \pm \frac{10}{7}i$

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22. Use the Quadratic Formula to solve $x^2 + 6x + 58 = 0$.

$a=1 \quad b=6 \quad c=58$

$$x = \frac{-6 \pm \sqrt{36-4(1)(58)}}{2(1)} = \frac{-6 \pm \sqrt{-196}}{2} = \frac{-6 \pm 14i}{2} = \boxed{-3 \pm 7i}$$

23. Find the discriminant for $h(x) = 9x^2 - 30x + 26$, identify the number of solutions and their type(s). b^2-4ac

$(-30)^2 - 4(9)(26) = -36$

>0, 2 Real
$=0$, 1 Real
<0, 2 Imag.

↓

2 Imaginary

24. Solve the system by **substitution**. ***Be careful with the "-y" in the second equation!***

$$\begin{cases} y = x^2 + 2 \\ -4x - y = 10 \end{cases}$$

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

$-4x - x^2 - 2 = 10$

$-x^2 - 4x - 12 = 0$

$a=-1 \quad b=-4 \quad c=-12$

$$x = \frac{4 \pm \sqrt{16-4(-1)(-12)}}{2(-1)} = \text{domain error}$$

↓

No solution!

25. Solve the system by **graphing**.

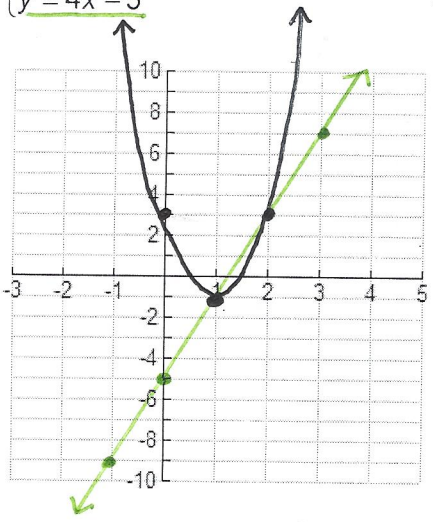
$$\begin{cases} y = 4x^2 - 8x + 3 \\ y = 4x - 5 \end{cases}$$

$y = 4x - 5$

$\frac{-b}{2a} = \frac{-(-8)}{2(4)} = 1$

↓

$V(1, -1)$



$(1, -1) + (2, 3)$