Name: Key Class Period: _____

Math 2: Unit 2 Review Sheet

Complete the number system chart for each number.

Number	Real	Imaginary	Natural	Whole	Integer	Rational	Irrational
1. 0	✓			✓	✓	✓	
2. $\sqrt{-3}$		✓					
3. $\sqrt{5}$	✓						✓
4. $\frac{2}{3}$	✓					✓	
5. 29	✓		✓	✓	✓	✓	
6. π	✓						✓
7. -5	✓				✓	✓	
8. $\sqrt{36} = 6$	✓		✓	✓	✓	✓	

Simplify the following radicals:

9. $\sqrt{72} = 2 \cdot 3\sqrt{2} = 6\sqrt{2}$

$72 = 8 \cdot 9$; $8 = 4 \cdot 2$; $4 = 2 \cdot 2$; $9 = 3 \cdot 3$

$2 \cdot 2 \cdot 2 \cdot 3 \cdot 3$

10. $\sqrt{-44} = 2i\sqrt{11}$

$-44 = -1 \cdot 44$; $44 = 4 \cdot 11$; $4 = 2 \cdot 2$

$-1 \; i \; 2 \cdot 2 \; 11$

11. $\sqrt{900x^3y} = 2 \cdot 3 \cdot 5x\sqrt{xy} = 30x\sqrt{xy}$

$900 = 9 \cdot 100$; $9 = 3 \cdot 3$; $100 = 10 \cdot 10$; $10 = 5 \cdot 2$

$2 \cdot 2 \cdot 3 \cdot 3 \cdot 5 \cdot 5 \cdot x \cdot x \cdot x \cdot y$

What is the quadratic formula? $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Solve the following quadratic equations by factoring, the quadratic formula, or completing the square. *Work on attached sheet for #12-15

12. $2x^2 + 8x + 3 = 0$

$$\frac{-4 \pm \sqrt{10}}{2}$$

13. $2x^2 + 12x + 3 = 0$

$$\frac{-6 \pm \sqrt{30}}{2}$$

#12 $2x^2+8x+3=0$

Factoring:

gcf: 1

6 · +8

Does not factor!

cannot do this method!

Quadratic Formula:

$$x=\frac{-8\pm\sqrt{(8)^2-4(2)(3)}}{2(2)}$$

$$x=\frac{-8\pm\sqrt{40}}{4} \quad \frac{8}{5}<\frac{4}{2}<\frac{2}{2}$$

$2\cdot2\cdot2\cdot5$

$$x=\frac{-8\pm2\sqrt{10}}{4}$$

$$x=\boxed{\frac{-4\pm\sqrt{10}}{2}}$$

Probably easiest method here!

Completing the Square:

$2x^2+8x+3=0$

$2x^2+8x=-3$

$x^2+4x=-\frac{3}{2}$

$x^2+4x+\boxed{4}=-\frac{3}{2}+\boxed{4}$

$\left(\frac{4}{2}\right)^2=(2)^2=4$

$(x+2)^2=\frac{5}{2}$

$x+2=\pm\sqrt{\frac{5}{2}}$

$x=-2\pm\sqrt{\frac{5}{2}}$

↓

same as $\frac{-4\pm\sqrt{10}}{2}$ ☺

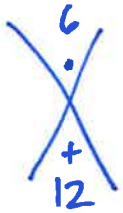
(uses something called rationalizing

Not required right now

I do not suggest this method for #12

#13 $2x^2+12x+3=0$

Factoring: gcf: 1



does not factor!

Cannot use this method here!

Quadratic Formula:

$$x=\frac{-12\pm\sqrt{(12)^2-4(2)(3)}}{2(2)}$$

$$x=\frac{-12\pm\sqrt{120}}{4}$$

$120 = 12 \cdot 10$, $12 = 4 \cdot 3$, $4 = 2 \cdot 2$, $10 = 2 \cdot 5$

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

$$x=\frac{-12\pm 2\sqrt{30}}{4}$$

$$x=\boxed{\frac{-6\pm\sqrt{30}}{2}}$$

Probably easiest method for this one!

Completing the Square:

$2x^2+12x+3=0$

$2x^2+12x=-3$

$x^2+6x=-\frac{3}{2}$

$x^2+6x+\boxed{9}=-\frac{3}{2}+\boxed{9}$

$\left(\frac{6}{2}\right)^2=(3)^2=9$

$(x+3)^2=\frac{15}{2}$

$x+3=\pm\sqrt{\frac{15}{2}}$

$x=-3\pm\sqrt{\frac{15}{2}}$

↓

same as $\frac{-6\pm\sqrt{30}}{2}$

(uses rationalizing again

↓

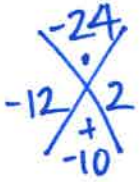
Not required right now

I do not suggest this method for #13.

#14 $x^2-10x-24=0$

Factoring:

gcf: 1



$x^2-12x+2x-24=0$

$x(x-12)+2(x-12)=0$

$(x+2)(x-12)=0$

$x+2=0$ $\quad x-12=0$

$\boxed{x=-2}$ $\quad \boxed{x=12}$

Quadratic Formula:

$$x=\frac{10\pm\sqrt{(-10)^2-4(1)(-24)}}{2(1)}$$

$$x=\frac{10\pm\sqrt{196}}{2}$$ ← perfect square ☺

$$x=\frac{10\pm14}{2}$$

$\frac{10+14}{2}=\frac{24}{2}=\boxed{12}$

$\frac{10-14}{2}=-\frac{4}{2}=\boxed{-2}$

Completing the Square:

$x^2-10x-24=0$

$x^2-10x=24$

$x^2-10x+\boxed{25}=24+\boxed{25}$

$\left(\frac{-10}{2}\right)^2=(-5)^2=25$

$(x-5)^2=49$

$x-5=\pm\sqrt{49}$

$x-5=\pm7$

$x=5\pm7$

$5+7=\boxed{12}$

$5-7=\boxed{-2}$

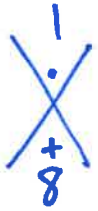
CHOOSE ANY OF THESE METHODS! ☺

(#13) $5x^2+40x+5=0$

Factoring:

gcf: 5

$5(x^2+8x+1)=0$



does not factor!

Quadratic Formula:

$$x=\frac{-40\pm\sqrt{(40)^2-4(5)(5)}}{2(5)}$$

$$x=\frac{-40\pm\sqrt{1500}}{10}$$

$1500 < 100 < 10^2$, $10 < 2\cdot 5$

$15 < 3\cdot 5$

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

$$x=\frac{-40\pm 10\sqrt{15}}{10}$$

$$x=\boxed{-4\pm\sqrt{15}}$$

Completing the Square:

$5x^2+40x+5=0$

$5x^2+40x=-5$

$x^2+8x=-1$

$x^2+8x+\boxed{16}=-1+\boxed{16}$

$\left(\frac{8}{2}\right)^2=(4)^2=16$

$(x+4)^2=15$

$x+4=\pm\sqrt{15}$

$x=\boxed{-4\pm\sqrt{15}}$

CHOOSE ONE OF THESE TWO METHODS!

14. $x^2 - 10x - 24 = 0$

-2 and 12

15. $5x^2 + 40x + 5 = 0$

$-4 \pm \sqrt{15}$

Find the discriminant for each quadratic equation and classify the roots.

16. $y = 3x^2 + 2x + 3$

$(2)^2 - 4(3)(3)$

Discriminant: -32

Solutions: 2 imaginary solutions

17. $y = 4x^2 + 4x + 1$

$(4)^2 - 4(4)(1)$

Discriminant: 0

Solutions: 2 real rational roots (happen twice with same answer!)

18. $y = 2x^2 + 5x - 1$

$(5)^2 - 4(2)(-1)$

Discriminant: 33

Solutions: 2 real, irrational zeros

Complete the perfect square trinomial.

19. $x^2 - 6x +$ 9

$\left(\frac{-6}{2}\right)^2 = (-3)^2 = 9$

20. $x^2 + 9x +$ $\frac{81}{4}$

$\left(\frac{9}{2}\right)^2 = \frac{81}{4}$

21. $x^2 - 2x +$ 1

$\left(\frac{-2}{2}\right)^2 = (-1)^2 = 1$

Solve the following:

22. $3(x-2)^2 = 12$

$\frac{3}{3} \quad \frac{12}{3}$

$(x-2)^2 = 4$

$x - 2 = \pm\sqrt{4}$

$x - 2 = \pm 2$

$x = 2 \pm 2$ → $2+2 = 4$; → $2-2 = 0$

23. $4(x+1)^2 = 20$

$\frac{4}{4} \quad \frac{20}{4}$

$(x+1)^2 = 5$

$x + 1 = \pm\sqrt{5}$

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

25. $10(x+5)^2 = 160$

$\frac{10}{10} \quad \frac{160}{10}$

$(x+5)^2 = 16$

$x + 5 = \pm\sqrt{16}$

$x + 5 = \pm 4$

$x = -5 \pm 4$ → $-5+4 = -1$; → $-5-4 = -9$