Algebra 2
Unit 2 Review

Name: Answer KEY
Date: ______ **Pd:** ______

Factor the following COMPLETELY

1. x^2-81 **DOS**

$(x+9)(x-9)$

2. $x^2-11+18$ **a=1**

18; −9, −2; −11

$-9\cdot-2=18$
$-9+-2=-11$

$(x-9)(x-2)$

3. $2x^2-7x-4$ **a>1**

−8; −8, 1; −7

$-8\cdot1=-8$
$-8+1=-7$

$2x^2+1x-8x-4$
$x(2x+1)-4(2x+1)$
$(2x+1)(x-4)$

4. $8x^2+24$ **GCF**

$8(x^2+3)$

5. $4x^2-49$ **DOS**

$(2x+7)(2x-7)$

6. x^2-x-20 **a=1**

−20; −5, 4; −1

$-5\cdot4=-20$
$-5+4=-1$

$(x-5)(x+4)$

7. $5x^2+25x+30$

$5(x^2+5x+6)$ **GCF, a=1**

6; 3, 2; 5

$3\cdot2=6$
$3+2=5$

$5(x+3)(x+2)$

8. $-3x^2+9$ **GCF**

$-3(x^2-3)$

9. $4x^2-x-5$ **a>1**

−20; 4, −5; −1

$4\cdot-5=-20$
$4+-5=-1$

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

10. $3x^2-9x-30$

$3(x^2-3x-10)$ **GCF**

−10; −5, 2; −3

$-5\cdot2=-10$
$-5+2=-3$

$3(x-5)(x+2)$ **a=1**

11. $x^2+8xy+12y^2$

12; 6, 2; 8

$6\cdot2=12$
$6+2=8$

$(x+6y)(x+2y)$ **a=1**

12. $12x^2-15x$

$3x(4x-5)$ **GCF**

Plot all the points from your table that fit on the graph and sketch your parabola:

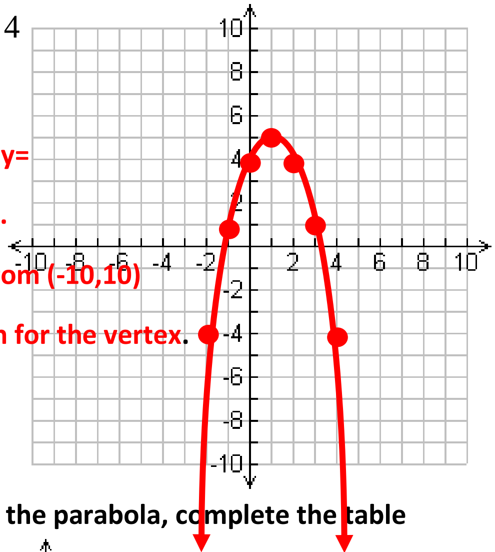
13. $y = -x^2 + 2x + 4$

Put the equation in y=

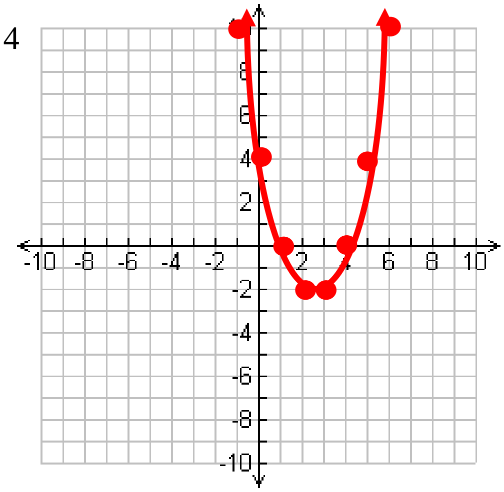
Then go to 2nd table.

Plot all the points from (-10,10)

use the trace button for the vertex.

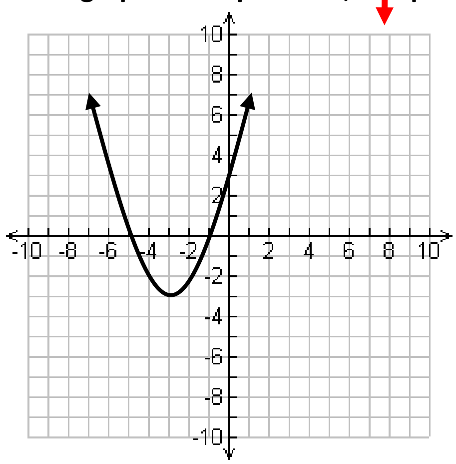


14. $y = x^2 - 5x + 4$



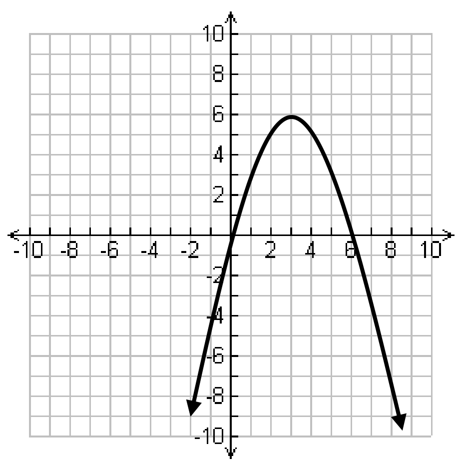
Given the graph of the parabola, complete the table

15.



x-intercepts:	(-5,0)(-1,0)	*y*-intercept:	(0,3)
Domain:	R	Range:	[-3,∞)
Increasing:	(-3,∞)	Decreasing:	(-∞,-3)
As $x \to \infty$, $f(x) \to$	∞	As $x \to -\infty$, $f(x) \to$	∞

16.



x-intercepts:	(0,0)(6,0)	*y*-intercept:	(0,0)
Domain:	R	Range:	(-∞,6)
Increasing:	(-∞,3)	Decreasing:	(3,∞)
As $x \to \infty$, $f(x) \to$	-∞	As $x \to -\infty$, $f(x) \to$	-∞

Solve each equation algebraically: factoring or quadratic formula

17. $2x^2 + 14x = 0$

$2x(x+7) = 0$ factor GCF

$2x = 0, x + 7 = 0$ set =0

$x = 0, x = -7$

18. $3x^2 - 8 = -2x$

$3x^2 + 2x - 8 = 0$ standard form

-24, 6, -4, 2

$6 \cdot -4 = -24$

$6 + -4 = 2$

$3x^2 + 6x - 4x - 8 = 0$

$(3x-4)(x+2) = 0$ factor a>1

$3x - 4 = 0, x + 2 = 0$ set =0

$x = 4/3, x = -2$

19. $x^2 - 11x + 18 = 0$

18, -2, -9, -11

$-2 \cdot -9 = 18$

$-2 + -9 = -11$

$(x-2)(x-9) = 0$ factor a=1

$x - 2 = 0, x - 9 = 0$ set =0

$x = 2, x = 9$

20. $3x + 4 = -x^2$

$x^2 + 3x + 4 = 0$ standard form

$$x = \frac{-3 \pm \sqrt{3^2 - 4 \cdot 1 \cdot 4}}{2 \cdot 1}$$ Q. Formula

$$x = \frac{-3 \pm \sqrt{9 - 16}}{2}$$

$$x = \frac{-3 \pm \sqrt{-7}}{2}$$

$$x = \frac{-3 \pm \sqrt{7}i}{2}$$ $\sqrt{-1} = i$

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

$x^2 + 6x + 11 = 0$ standard form

$$x = \frac{-6 \pm \sqrt{6^2 - 4 \cdot 1 \cdot 11}}{2 \cdot 1}$$

$$x = \frac{-6 \pm \sqrt{36 - 44}}{2}$$

$$x = \frac{-6 \pm \sqrt{-8}}{2} = \frac{-6 \pm \sqrt{8}i}{2}$$

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

22. $x^2 - 3x = 9$

$x^2 - 3x - 9 = 0$ standard form

$$x = \frac{-(-3) \pm \sqrt{(-3)^2 - 4 \cdot 1 \cdot (-9)}}{2 \cdot 1}$$

$$x = \frac{3 \pm \sqrt{9 + 36}}{2}$$

$$x = \frac{3 \pm \sqrt{45}}{2}$$

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

Answer Explanations

Below are some QR codes that link to tutorial videos that you can reference to help you complete these problems.

Question #1,#5
factoring Difference of squares

#2, #6, #11
trinomial a=1

#3,#9
Trinomial a>1

#4,#8, #12
GCF

#7,#10
GCF, Trinomial a=1

#13,14

1. Put the equation in y=
2. Click on 2nd table.
3. Plot all the points from (-10,10)
4. use the trace button for the vertex

#15,16

x-intercepts are the two points touching the x-axis. They should have 0 for the y-value. (,0), (,0)
y-intercept is the point touching the y-axis. It should have 0 for the x-value. (0,)
domain is all real numbers R
Range is the y-values from bottom to up
Increasing,decreasing are the x-values from left to right.
As $x \to \infty$ means the graph goes to the right side, then $f(x) \to$ put $-\infty$ for DOWN / ∞ for UP
As $x \to -\infty$ means the graph goes to the left side, then $f(x) \to$ put $-\infty$ for DOWN / ∞ for UP

#17-19

Solving quadratic equations by factoring

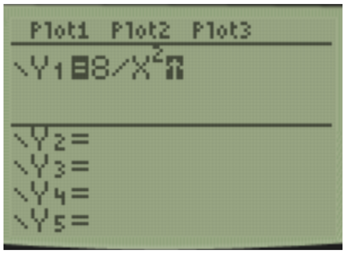
#20-23
When the quadratic function is not factorable, solve it using the quadratic equation. Remember, you need to put the equation in the standard form first.

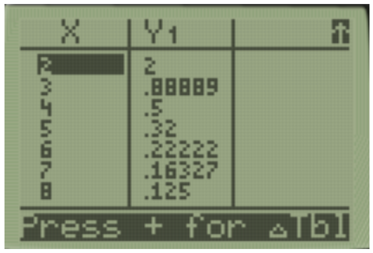
$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$
when $ax^2+bx+c=0$

#21.

- how to simplify the radical $\sqrt{8} = 2\sqrt{2}$?

Option 1. Use a calculator. Put y=8/x^2. Then go to the table and y value of 1. Then go up in the table and find the values that make both X and Y1 integers(without decimals). If you see 2and 2 then it's $2\sqrt{2}$.





Option 2. Use the factor tree 8=2x2x2. There's a pair of 2 that can come out of the radical as a 2. The other 2 stays inside the radical. $\sqrt{8} = \sqrt{2 \cdot 2 \cdot 2} = 2\sqrt{2}$

Or $\sqrt{8} = \sqrt{4 \cdot 2} = \sqrt{4}\sqrt{2} = 2\sqrt{2}$

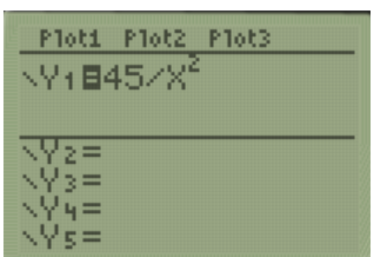
- How to simplify $\frac{-6 \pm 2\sqrt{2}i}{2} = -3 \pm \sqrt{2}i$?

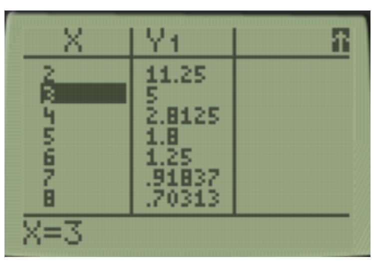
$$\frac{-6 \pm 2\sqrt{2}i}{2} = \frac{-6}{2} \pm \frac{2\sqrt{2}i}{2} = -3 \pm \sqrt{2}i$$

#22.

- how to simplify the radical $\frac{3 \pm \sqrt{45}}{2} = \frac{3 \pm 3\sqrt{5}}{2}$?

Option 1. Use a calculator. Put y=45/x^2. Then go to the table and y value of 1. Then go up in the table and find the values that make both X and Y1 integers(without decimals). If you see 3 and 5 then it's $3\sqrt{5}$.





Option 2. Use the factor tree 45=5x3x3. There's a pair of 3 that can come out of the radical as a 3. 5 stays inside the radical. $\sqrt{45} = \sqrt{5 \cdot 3 \cdot 3} = 3\sqrt{5}$

Or $\sqrt{45} = \sqrt{9 \cdot 5} = \sqrt{9}\sqrt{5} = 3\sqrt{5}$