1. Solve the linear system. $\begin{cases} x - y + 2z = 11 \\ 2y + z = 5 \\ z = -3 \end{cases}$

$x - 4 - 6 = 11$
$x - 10 = 11$ $x = 21$
$2y - 3 = 5$
$2y = 8$
$y = 4$

$(21, 4, -3)$

2. Identify the solutions of $x^2 - 7x + 10 = 0$.

$(x - 5)(x - 2)$ $x = 5, 2$

3. Solve for x $-x^2 + 4 = -8$

$x^2 = 12$
$x = \pm \sqrt{12} = \pm 2\sqrt{3}$

4. Solve the equation by completing the square. $x^2 + 8x - 6 = 0$

$x^2 + 8x + \boxed{16} = 6 + \boxed{16}$
$(x + 4)^2 = 22$
$x + 4 = \pm \sqrt{22}$
$x = -4 \pm \sqrt{22}$

5. Solve the equation using the quadratic formula. $4x^2 - 6x - 3 = 0$

$\dfrac{6 \pm \sqrt{36 + 48}}{8} = \dfrac{6 \pm \sqrt{24}}{8} = \dfrac{6 \pm 2\sqrt{6}}{8} = \dfrac{3 \pm \sqrt{6}}{4}$

6. Find the discriminant of the equation and state the number of REAL solutions. $3x^2 - 7x + 2 = 0$

$49 - 4(3)(2) = 49 - 24 = 65$, 2 real sol

7. Factor the polynomial $5x^2 - 13x - 6$

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

$5x^2 - 15x | 2x - 6$
$5x(x - 3) + 2(x - 3)$

8. Factor the polynomial $9x^2 - 16$

$(3x - 4)(3x + 4)$

9. Factor the polynomial $x^2 - 9x + 20$

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

10. Solve $|3 - 5x| = 1$

$3 - 5x = 1$ $3 - 5x = -1$
$-5x = -2$ $-5x = -4$
$x = 2/5$ $x = 4/5$

11. Evaluate $f(-4)$ if $f(x) = 2x^2 - 2x - 1$.

$2(-4)^2 - 2(-4) - 1$
$2(16) + 8 - 1$
$32 + 7 = 39$

12. What is the vertex of the function: $y = 2(x + 2)^2 - 3$

$(-2, -3)$

13. What is the maximum value of the function $y = -3x^2 + 6x - 5$

$\dfrac{-6}{2(-3)} = \dfrac{-6}{-6} = 1$

$-3(1)^2 + 6(1) - 5$
$-3 + 6 - 5 = -2$

$(1, -2)$

14. Solve the inequality $2 + |x + 2| \geq 5$

$|x + 2| \geq 3$

$x + 2 \geq 3$ $x + 2 \leq -3$
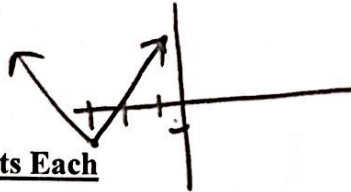$x \geq 1$ $x \leq -5$

15. Data from an experiment is shown in the table below. What is the quadratic regression for the real world data?

X	8	10	12	14	16	18
Y	52	64	72	78	81	76

16. Graph $y = |x+3| - 1$.

$$y = -0.47x^2 + 14.72x - 36.12$$

Open Ended – 10 Points Each

1. Write a system of equations for the word problem.
Ethan bought 1 pound of M&M's, 2 pounds of Swedish Fish and 1 pound of Snowcaps for $11.70. Kiersten bought 2 pounds of M&M's, 1 pound of Swedish Fish and 1 pound of Snowcaps for $12.40. Chris bought 3 pounds of M&M's, 1 pound of Swedish Fish and 2 pounds of Snowcaps for $19.10.

a.) Write a system of equations to represent the problem above.

$$x + 2y + z = 11.70$$
$$2x + y + z = 12.40$$
$$3x + y + 2z = 19.10$$

$$x = 3.2 \quad y = 2.5 \quad z = 3.5$$

b.) Solve to find the price of each item separately.

M&M's $\rightarrow$ $3.20   Snow cap $\rightarrow$ $3.50
Swedish $\rightarrow$ $2.50

c.) How much would it cost for 2 pounds of M&M's, 3 pounds of Swedish Fish and 2 pounds of snowcaps?

$$2(3.2) + 3(2.5) + 2(3.5)$$
$$6.4 + 7.5 + 7$$
$$\$20.90$$

2. Solve the quadratic equation below using 2 of the methods we studied this year.
You MUST show ALL of your work to receive credit.
$$x^2 - 14x + 48 = 0$$

1. factor

$$(x-6)(x-8) = 0$$

$$x = 6 \quad x = 8$$

2. comp sq

$$x^2 - 14x + 49 = 1$$
$$(x-7)^2 = 1$$
$$x - 7 = \pm\sqrt{1}$$
$$x - 7 = \pm 1$$
$$x = 8, 6$$

3. Q form

$$\frac{14 \pm \sqrt{196 - 4(1)(48)}}{2}$$

$$\frac{14 \pm \sqrt{196 - 192}}{2}$$

$$\frac{14 \pm \sqrt{4}}{2} = \frac{14 \pm 2}{2}$$

$$6, 8$$

1. $x - y + 2z = 11$
   $2y + z = 5$
   $z = -3$

   $\left.\right\} \longrightarrow$ $2y - 3 = 5$
   $2y = 8$
   $y = 4$

   (plug this in!)

   $x - 4 + 2(-3) = 11$

2. $x^2 - 7x + 10 = 0$
   $(x - 5)(x - 2) = 0$

   $x - 5 = 0 \qquad x - 2 = 0$
   $\boxed{x = 5} \qquad \boxed{x = 2}$

3. $-x^2 + 4 = 8$
   $-4 \quad -4$

   $-x^2 = -12$
   $x^2 = 12$
   $x = \pm\sqrt{12} \qquad \longrightarrow \sqrt{4}\sqrt{3}$
   $\boxed{x = \pm 2\sqrt{3}}$

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

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

   $x^2 + 8x + 16 = 6 + 16$
   $\sqrt{(x + 4)^2} = \sqrt{22}$
   $x + 4 = \pm\sqrt{22}$
   $\boxed{x = -4 \pm \sqrt{22}}$

5. $4x^2 - 6x - 3 = 0$ $\dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$$\dfrac{6 \pm \sqrt{(-6)^2 - 4(4)(-3)}}{2(4)} = \dfrac{6 \pm \sqrt{36 + 48}}{8}$$

$$\dfrac{6 \pm \sqrt{84}}{8} = \dfrac{6 \pm \sqrt{4}\sqrt{21}}{8}$$

$$\dfrac{6 \pm 2\sqrt{21}}{8} = \boxed{\dfrac{3 \pm \sqrt{21}}{4}}$$

6. $3x^2 - 7x + 2$ $b^2 - 4ac$

$(-7)^2 - 4(3)(2)$

$49 - 24$

25 — 2 real solutions

7. $5x^2 - 13x - 6$

slide & divide   or   grouping $a \cdot c = -30$

$x^2 - 13x - 30$ $\overset{\wedge}{}$
                                                                         $-15 \quad 2$

$\dfrac{(x - 15)}{5}\dfrac{(x + 2)}{5}$ $5x^2 - 15x + 2x - 6$

$\boxed{(x - 3)(5x + 2)}$ $5x(x - 3) + 2(x - 3)$

$\boxed{(x - 3)(5x + 2)}$

8. $9x^2 = 16$

difference of squares!

$\boxed{(3x + 4)(3x - 4)}$

9. $x^2-9x+20$
    $\boxed{(x-4)(x-5)}$

10. $|3-5x| = 1$

    $3-5x=1 \qquad 3-5x=-1$

    $-5x=-2 \qquad -5x=-4$

    $\boxed{x=\frac{2}{5} \qquad x=\frac{4}{5}}$

11. $2(4)^2-2(4)-1$

    $2(16)+8 \;\; -1$

    $32+8 \;\; -1$

    $40-1$

    $\boxed{39}$

12. $a(x-h)^2+k$

    $2(x+2)^2-3$

    $\boxed{(-2,-3)}$

13. $y=-3x^2+6x-5$

    $-b/2a = \frac{-6}{2(-3)} = 1$

    $\boxed{(1,-2)}$

    $y=-3(1)^2+6(1)-5$

    $-3+6 \;\; -5$

    $3-5=-2$

14. $\dfrac{-2}{-2} + |x+2| \geq \dfrac{5}{-2}$

$$|x+2| \geq 3$$

$x+2 \geq 3$ $x+2 \leq -3$
$-2 \quad -2$ $-2 \quad -2$

$\boxed{x \geq 1}$ $\boxed{x \leq -5}$

15. Stat → edit   put data in L_1, L_2
     Stat → calc → Quad Reg

$$y = -0.47x^2 + 14.72x - 36.12$$

16. $y = |x+3| - 1$
     vertex : $(-3, -1)$
     opens up
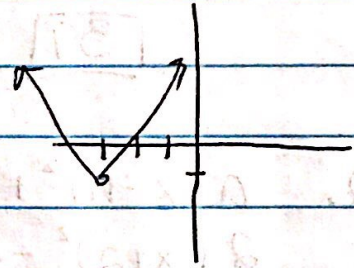
OE. 1 $x + 2y + z = 11.7$

elim z   2 $2x + y + z = 12.4$

    3    $3x + y + 2z = 19.1$

$$\begin{bmatrix} 1 & 2 & 1 & | & 11.7 \\ 2 & 1 & 1 & | & 12.4 \\ 3 & 1 & 2 & | & 19.1 \end{bmatrix}$$

↓ rref

$$\begin{bmatrix} 1 & 0 & 0 & 3.2 \\ 0 & 1 & 0 & 2.5 \\ 0 & 0 & 1 & 3.5 \end{bmatrix}$$

×−1   1 $-x - 2y - z = -11.7$

    2    $2x + y + z = 12.4$

   ④ $x - y = .7$

×−2   1 $-2x - 4y - 2z = -23.4$

    3    $3x + y + 2z = 19.1$

   ⑤ $x - 3y = -4.3$

④ $x - 2.5 = .7$

    $x = 3.2$

×−1   4 $-x + y = -.7$

    5    $x - 3y = -4.3$

        $-2y = -5$

        $y = 5/2 = 2.5$

① $3.2 + 2(2.5) + z = 11.7$

    $3.2 + 5 + z = 11.7$

    $8.2 + z = 11.7$

    $z = 3.5$

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2.   **factor** | **complete sq** | **quad form**

factor	complete sq	quad form
$x^2 - 14x + 48 = 0$	$x^2 - 14x = -48 \quad b = 14$	
$(x-6)(x-8) = 0$	$x^2 - 14x + 49 = -48 + 49 \quad \frac{b}{2} = -7$	$\dfrac{14 \pm \sqrt{14^2 - 4(1)(48)}}{2(1)}$
$x - 6 = 0 \quad x - 8 = 0$	$(x-7)^2 = \sqrt{1}$ $\left(\frac{b}{2}\right)^2 = 49$	
$x = 6 \quad x = 8$	$x - 7 = \pm 1$	$\dfrac{14 \pm \sqrt{4}}{2}$
	$x = 7 \pm 1$	
	$x = 6 \quad x = 8$	$\dfrac{14 \pm 2}{2} \nearrow \frac{16}{2} = 8$
		$\searrow \frac{12}{2} = 6$