- Sort the equations based on the most efficient way to solve. Make a note as to WHY that is the method you chose. There should be at least 4 equations in each category.
- Choose 2 of the equations in each category to solve. Show all work on a separate sheet of paper.
Solutions should be written in exact, simplified form.

$7x^2 - 20x - 3 = 0$ QF $\{3, -1/7\}$	$x^2 - 6x - 11 = 0$ CS $\{3 \pm 2\sqrt{5}\}$	$x^2 - 2x - 15 = 0$ F $\{5, -3\}$	$5x^2 + 23x - 10 = 0$ QF $\{2/5, -5\}$
$x^2 + 16 = 0$ SR $\{\pm 4i\}$	$2x^2 + 4x - 70 = 0$ F $\{-7, 5\}$	$4x^2 - 12x + 9 = 0$ QF $\{3/2\}$	$2x^2 + 5x + 10 = 0$ QF $\left\{\frac{-5 \pm i\sqrt{55}}{4}\right\}$
$x^2 + 4x - 17 = 0$ CS $\{-2 \pm \sqrt{21}\}$	$2x^2 - 8x = 0$ F $\{0, 4\}$	$2x^2 - 5x + 1 = 0$ QF $\left\{\frac{5 \pm \sqrt{17}}{4}\right\}$	$x^2 + 4x + 17 = 0$ CS $\{-2 \pm i\sqrt{13}\}$
$-\frac{1}{2}(x-3)^2 - 5 = 8$ SR $\{3 \pm i\sqrt{26}\}$	$x^2 - 9x - 36 = 0$ QF $\{12, -3\}$	$3x^2 + 9x = 0$ F $\{0, -9\}$	$x^2 + 9x + 10 = 0$ QF $\left\{\frac{-9 \pm \sqrt{41}}{2}\right\}$
$x^2 - 100 = 0$ Factor SR $\{\pm 10\}$	$3x^2 - 7x + 5 = 0$ QF $\left\{\frac{7 \pm i\sqrt{11}}{6}\right\}$	$x^2 - 8 = 0$ SR $\{\pm 2\sqrt{2}\}$	$x^2 + 10x - 2 = 0$ CS $\{-5 \pm 3\sqrt{3}\}$

① $7x^2-20x-3=0$

$x=\frac{20\pm\sqrt{(-20)^2-4(7)(-3)}}{2(7)}=\frac{20\pm\sqrt{484}}{14}=\frac{20\pm22}{14}=\{3,-1/7\}$

② $x^2+16=0$
$x^2=-16$
$\sqrt{x^2}=\sqrt{-16}$
$x=\pm4i$

③ $x^2+4x-17=0$
$x^2+4x+4-17-4=0$
$(x+2)^2-21=0$
$(x+2)^2=21$
$\sqrt{(x+2)^2}=\sqrt{21}$
$x+2=\pm\sqrt{21}$
$x=-2\pm\sqrt{21}$

④ $-1/2(x-3)^2-5=8$
$-1/2(x-3)^2=13$
$(x-3)^2=-26$
$\sqrt{(x-3)^2}=\sqrt{-26}$
$x-3=\pm i\sqrt{26}$
$x=3\pm i\sqrt{26}$

⑤ $\sqrt{x^2}=\sqrt{100}$
$x=\pm10$

⑥ $x^2-6x-11=0$
$x^2-6x+9-11-9=0$
$(x-3)^2-20=0$
$(x-3)^2=20$
$\sqrt{(x-3)^2}=\sqrt{20}$
$x-3=\pm2\sqrt{5}$
$x=3\pm2\sqrt{5}$

⑦ $2x^2+4x-70=0$
$2(x^2+2x-35)=0$
$2(x+7)(x-5)=0$
$x+7=0 \quad x-5=0$
$x=-7 \quad x=5$

⑧ $2x^2-8x=0$
$2x(x-4)=0$
$2x=0 \quad x-4=0$
$x=0 \quad x=4$

⑨ $x^2-9x-36=0$

$x=\frac{9\pm\sqrt{(-9)^2-4(1)(-36)}}{2(1)}=\frac{9\pm\sqrt{225}}{2}$

$=\frac{9\pm15}{2}=\frac{9+15}{2}$ or $\frac{9-15}{2}$

$\downarrow \quad \downarrow$

$12 \quad -3$

(10) $3x^2 - 7x + 5 = 0$

$$x = \frac{7 \pm \sqrt{(-7)^2 - 4(3)(5)}}{2(3)} = \frac{7 \pm \sqrt{-11}}{6} = \frac{7 \pm i\sqrt{11}}{6}$$

(11) $x^2 - 2x - 15 = 0$

$x^2 - 2x + 1 - 15 - 1 = 0$

$(x-1)^2 - 16 = 0$

$(x-1)^2 = 16$

$\sqrt{(x-1)^2} = \sqrt{16}$

$x - 1 = \pm 4$

$x = 1 \pm 4$

OR

$(x+3)(x-5) = 0$

$x + 3 = 0 \quad x - 5 = 0$

$x = -3 \quad x = 5$

(12) $4x^2 - 12x + 9 = 0$

$$x = \frac{12 \pm \sqrt{(-12)^2 - 4(4)(9)}}{2(4)} = \frac{12 \pm \sqrt{0}}{8} = \frac{12 \pm 0}{8} = 12/8 = 3/2$$

(13) $2x^2 - 5x + 1 = 0$

$$x = \frac{5 \pm \sqrt{(-5)^2 - 4(2)(1)}}{2(2)} = \frac{5 \pm \sqrt{17}}{4}$$

(14) $3x^2 + 9x = 0$

$3x(x+9) = 0$

$3x = 0 \quad x + 9 = 0$

$x = 0 \quad x = -9$

(15) $x^2 - 8 = 0$

$x^2 = 8$

$\sqrt{x^2} = \sqrt{8}$

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

(16) $5x^2+23x-10=0$

$$x=\frac{-23\pm\sqrt{(23)^2-4(5)(-10)}}{2(5)}=\frac{-23\pm\sqrt{729}}{10}=\frac{-23\pm27}{10}$$

$$\frac{-23+27}{10}=\frac{4}{10}=\frac{2}{5} \qquad \frac{-23-27}{10}=\frac{-50}{10}=-5$$

(17) $2x^2+5x+10=0$

$$x=\frac{-5\pm\sqrt{(5)^2-4(2)(10)}}{2(2)}=\frac{-5\pm\sqrt{-55}}{4}=\frac{-5\pm i\sqrt{55}}{4}$$

(18) $x^2+4x+4+17-4=0$

$(x+2)^2+13=0$

$(x+2)^2=-13$

$\sqrt{(x+2)^2}=\sqrt{-13}$

$x+2=\pm i\sqrt{13}$

$x=-2\pm i\sqrt{13}$

(19) $x^2+9x+10=0$

$$x=\frac{-9\pm\sqrt{(9)^2-4(1)(10)}}{2(1)}=\frac{-9\pm\sqrt{41}}{2}$$

(20) $x^2+10x-2=0$

$x^2+10x+25-2-25=0$

$(x+5)^2-27=0$

$(x+5)^2=27$

$\sqrt{(x+5)^2}=\sqrt{27}$

$x+5=\pm3\sqrt{3}$

$x=-5\pm3\sqrt{3}$

Write the quadratic equation given the solution(s) and a point on the parabola.

21. $\{-2, \frac{3}{4}\}$ and passes through $(1, -6)$

$X = -2$ $\quad X = 3/4$

$X + 2 = 0$ $\quad 4X = 3$

$4X - 3 = 0$

$y = a(X+2)(4X-3)$

$-6 = a(1+2)(4\cdot 1-3)$

$-6 = a(3)(1)$

$-6 = 3a$

$a = -2$

$\therefore y = -2(X+2)(4X-3)$

22. $\{0, 5\}$ and passes through $(1,4)$

$X = 0$ $\quad X = 5$

$X - 5 = 0$

$y = a(x)(X-5)$

$4 = a(1)(1-5)$

$4 = a(1)(-4)$

$4 = -4a$

$a = -1$

$\therefore y = -1(X)(X-5)$

23. $x = 2$ and passes through $(-2, 40)$

$X = 2$ $\quad X = 2$

$X - 2 = 0$ $\quad X - 2 = 0$

$y = a(X-2)(X-2)$

$40 = a(-2-2)(-2-2)$

$40 = a(-4)(-4)$

$40 = 16a$

$a = 2.5$

$\therefore y = 2.5(X-2)^2$

24.

x	$f(x)$
-8	0
2	-180
8	0

$y = a(X+8)(X-8)$

$-180 = a(2+8)(2-8)$

$-180 = a(10)(-6)$

$-180 = -60a$

$a = 30$

$\therefore y = 30(X+8)(X-8)$

Use the discriminant to determine the number and nature/type of solutions.

25. $-2x^2 + 4x + 8 = 10$

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

$b^2 - 4ac = (4)^2 - 4(-2)(-2) = 0$

*since $b^2 - 4ac = 0$ there is 1 Real solution.

26. $3x^2 + 10x = -3$

$3x^2 + 10x + 3 = 0$

$b^2 - 4ac = (10)^2 - 4(3)(3) = 64$

*since $b^2 - 4ac = 64$ there are 2 Real Rational Solutions.

27. $7x^2 + x + 3 = 0$

$b^2 - 4ac = (1)^2 - 4(7)(3) = -83$

*since $b^2 - 4ac = -83$ there will be 2 imaginary solutions.

28. $10x^2 - 2x - 7 = -3$

$10x^2 - 2x - 4 = 0$

$b^2 - 4ac = (-2)^2 - 4(10)(-4) = 164$

*since $b^2 - 4ac = 164$ there will be 2 Real irrational Solutions.