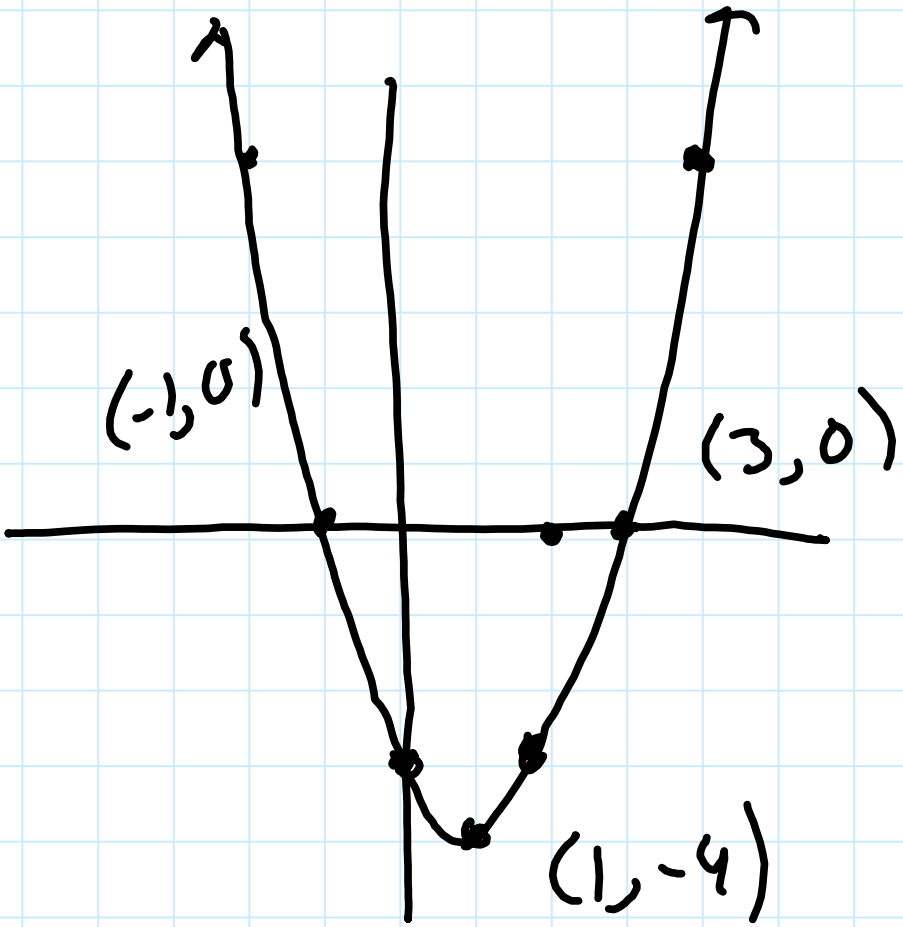
1) $y = x^2 - 2x - 3$

x	y
-2	5
-1	0
0	-3
1	-4
2	-3
3	0

$y = (-2)^2 - 2(-2) - 3$

$y = 5$



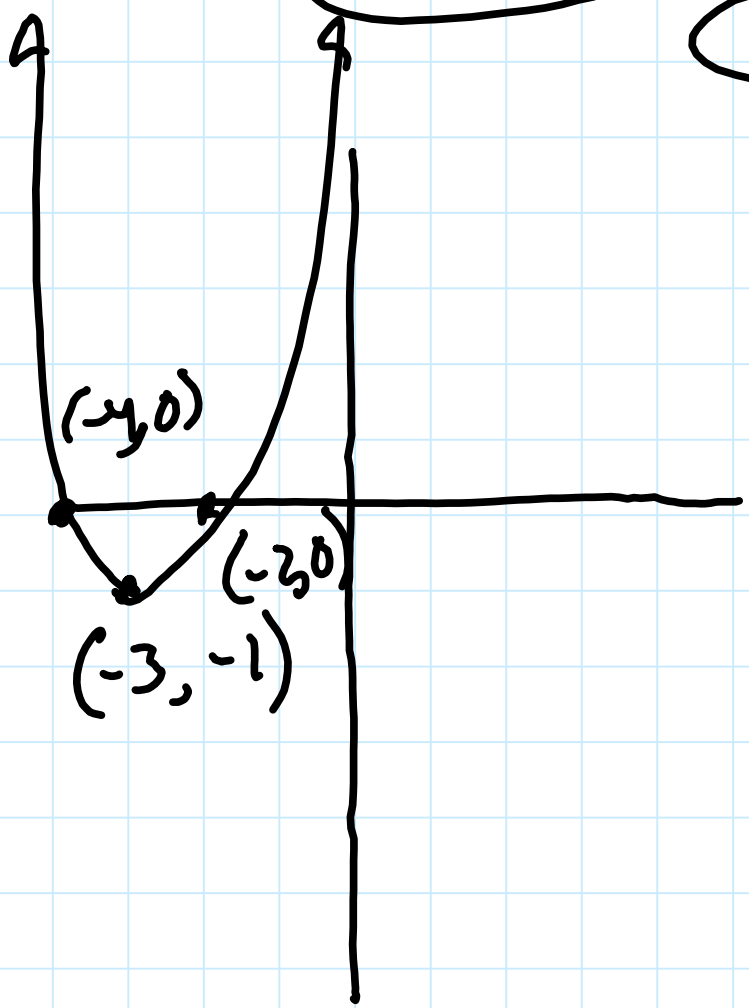
2a) $y = 1x^2 + 6x + 8$

$0 = (x+4)(x+2)$

$x+4=0$ $\quad$ $x+2=0$

$x = -4$ $\quad$ $-2 \quad -2$

$x = -2$



2b) $y = -x^2 - 5x$

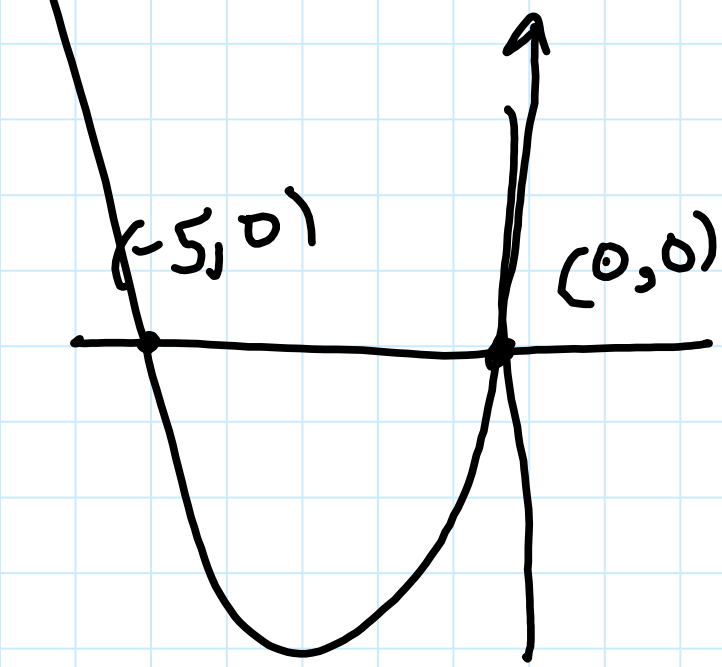
$0 = -x(x+5)$

$\frac{-x}{-1} = \frac{0}{-1}$ $\quad x+5=0$

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

$\quad -5 \quad -5$

$\quad x = -5$



2a) $y = 2x^2 - 3x - 2$

$\frac{1}{} \times \frac{-4}{} = -4$ ✓

$\frac{1}{} + \frac{-4}{} = -3$

$0 = (2x^2 - 4x)(+1x - 2)$

$2x(x-2)+1(x-2)$

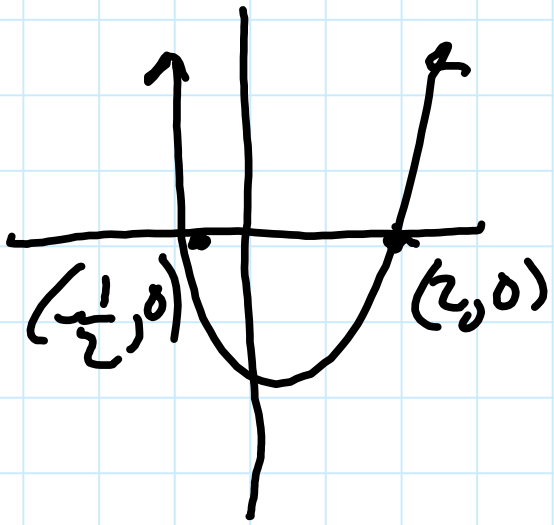
$(x-2)(2x+1) = 0$

$x - 2 = 0$ $\quad$ $2x + 1 = 0$

$+2 \quad +2$ $\quad$ $-1 \quad -1$

$x = 2$ $\quad$ $\frac{2x}{2} = \frac{-1}{2}$

$x = -\frac{1}{2}$



2d) $y = 9x^2 - 4$

$0 = (3x+2)(3x-2)$

$3x+2=0$ $\quad -2 \quad -2$

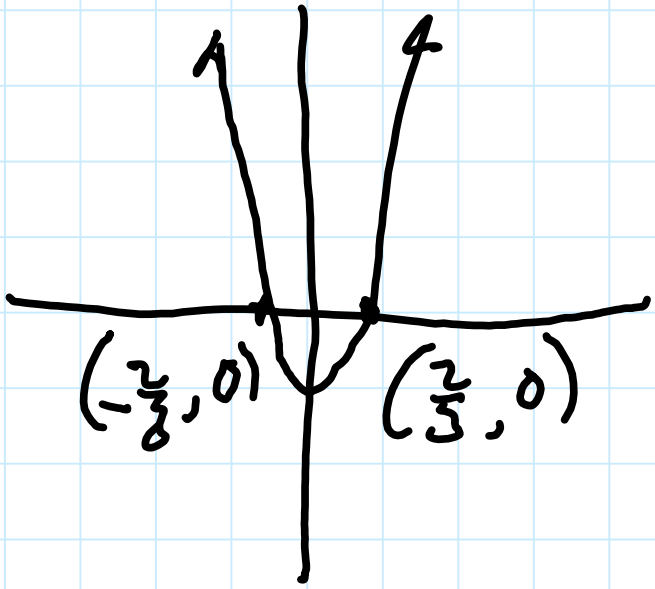
$\frac{3x}{3} = \frac{-2}{3}$

$x = -\frac{2}{3}$

$3x-2=0$ $\quad +2 \quad +2$

$\frac{3x}{3} = \frac{2}{3}$

$x = \frac{2}{3}$



2e) $x^2 = 5x - 6$

$-5x \quad -5x$

$x^2 - 5x = -6$

$+6 \quad +6$

$x^2 - 5x + 6 = 0$

$(x-2)(x-3) = 0$

$x - 2 = 0$ $\quad$ $x - 3 = 0$

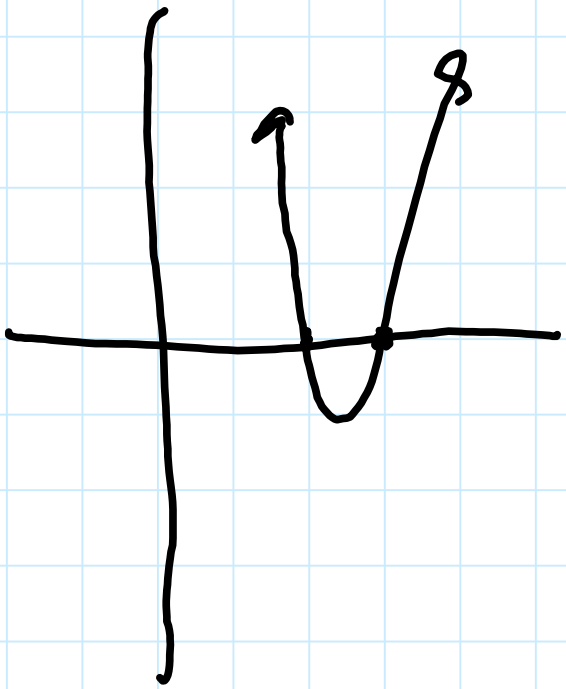
$x = 2$ $\quad$ $x = 3$

$1 \times 6 = 6$

$1 + 6 = -5$

$-2 \times -3 = 6$

$-3 + -3 = -5$

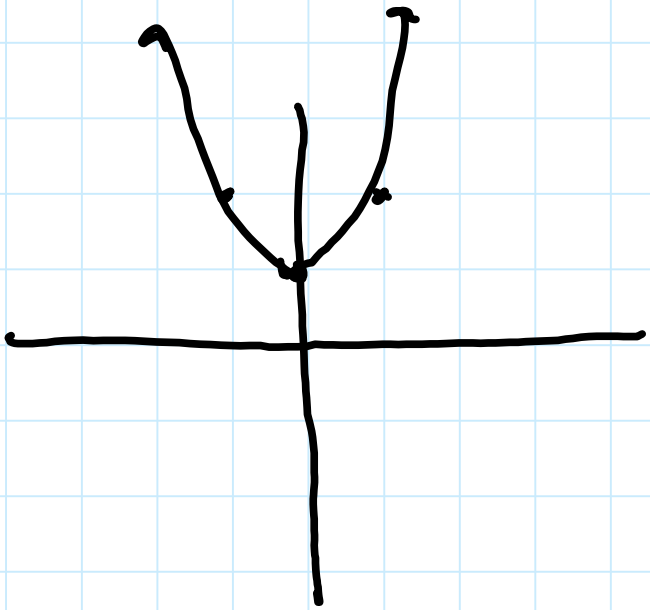


25) $x^2 + 1 = 0$

$-1 \quad -1$

$\sqrt{x^2} = \sqrt{-1}$

$x =$ No Solution



2g) $2(x-1)(x-7) = -(x-4)^2 - 6$

$2(x-1)(x-7) = -(x-4)(x-4) - 6$

$2(x^2 - 8x + 7) = -(x^2 - 8x + 16) - 6$

$2x^2 - 16x + 14 = -x^2 + 8x - 16 - 6$

$+x^2 \qquad +x^2$

$3x^2 - 16x + 14 = 8x - 22$

$-8x \qquad -8x$

$3x^2 - 24x + 14 = -22$

$+22 \qquad +22$

$\frac{3x^2}{3} - \frac{24x}{3} + \frac{36}{3} = \frac{0}{3}$

$x^2 - 8x + 12 = 0$

$(x-6)(x-2) = 0$

$x - 6 = 0$ $\qquad$ $x - 2 = 0$

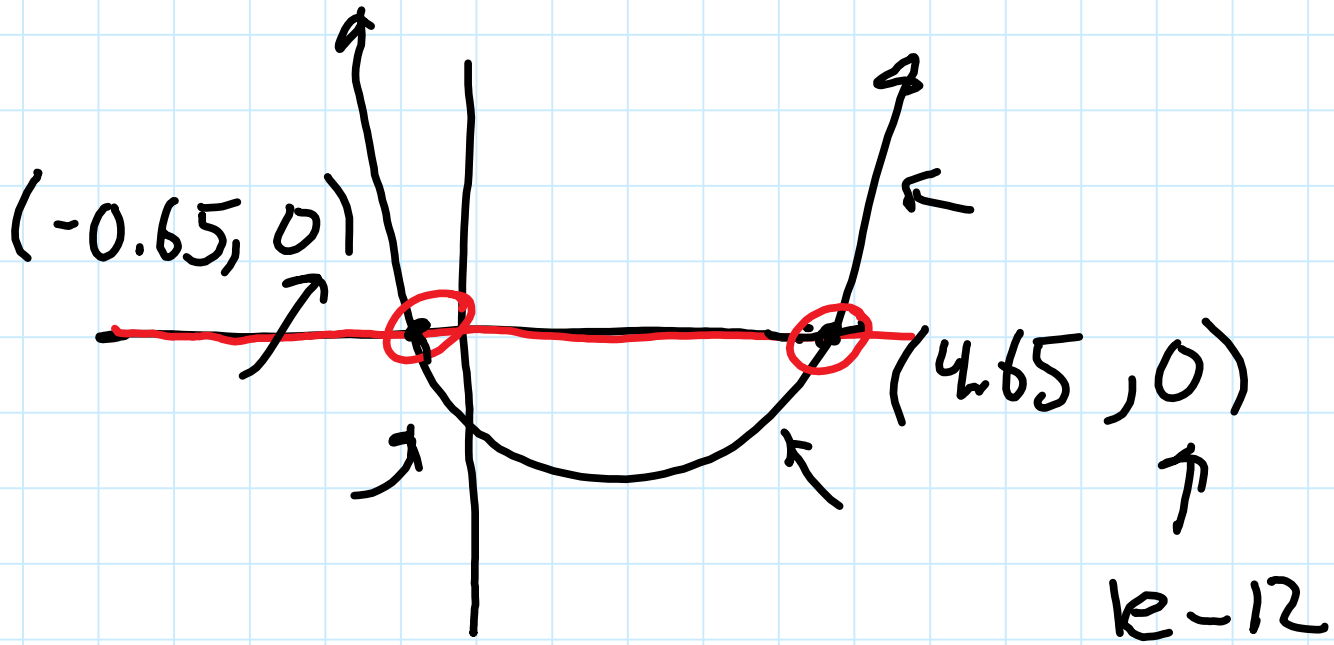
$x = 6$ $\qquad$ $x = 2$

2h) $y = x^2 - 4x - 3$

$-1 \times -3 = -3$

$-1 + -3 = -4$

[y=] [graph] [zoom] [6]



[2nd] [calc] [zero]

[y=] [▽] $y_2 = 0$

[2nd] [calc] [int] [enter]

3a) $x = 2$ $\quad$ $x = 6$

$-2 \quad -2 \quad -6 \quad -6$

$x - 2 = 0 \quad x - 6 = 0$

$(x-2)(x-6) = \not{0}\ y$

$y = x^2 - 8x + 12$

3b) $x=2$ $x=-2$ $a=2$

$y = a(x-2)(x+2)$

$y = 2(x-2)(x+2)$

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

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

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

$y = 2x^2-8$

3c) $x2x = \frac{3}{2} \times 2$ $x2x = \frac{-7}{2} \times 2$

$-3 \quad 2x = 3 - 3$ $\quad 2x = -7$

$2x - 3 = 0$ $\quad +7 \quad +7$

$2x + 7 = 0$

$y = (2x - 3)(2x + 7)$

$y = 4x^2 + 14x - 6x - 21$

$y = 4x^2 + 8x - 21$

$x = \frac{3}{2}$ $\quad x = -\frac{7}{2}$

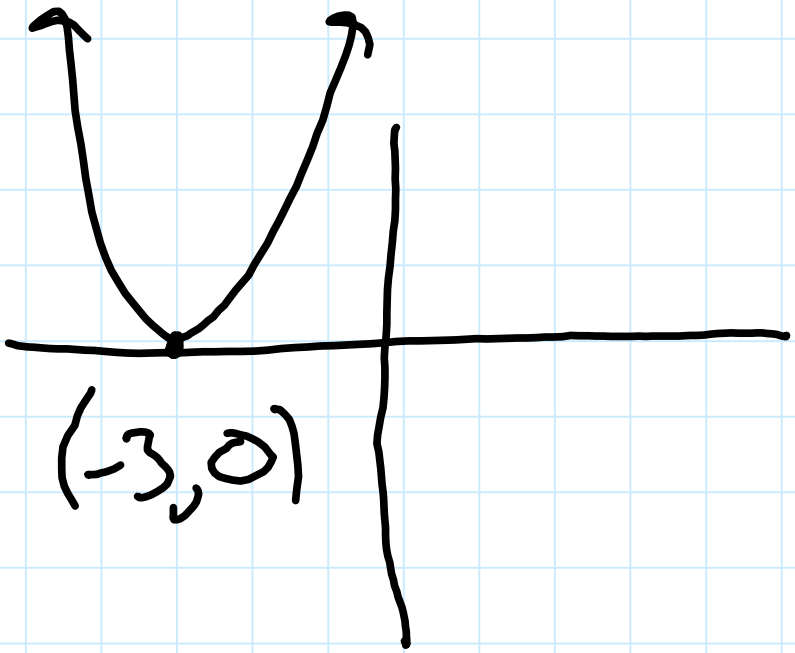
$(x - \frac{3}{2})(x + \frac{7}{2}) = 0$

3d) $x = -3$

$+3 \quad +3$

$x + 3 = 0$

$(x+3)^2 = 0$



3e) $x=-3$ $x=-1$ x, y $p:(-4,6)$

$y=a(x+3)(x+1)$

$6=a(-4+3)(-4+1)$

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

$6=a(3)$

$\frac{6}{3}=\frac{3a}{3}$

$a=2$

$y=2(x+3)(x+1)$

$y=2x^2+8x+6$

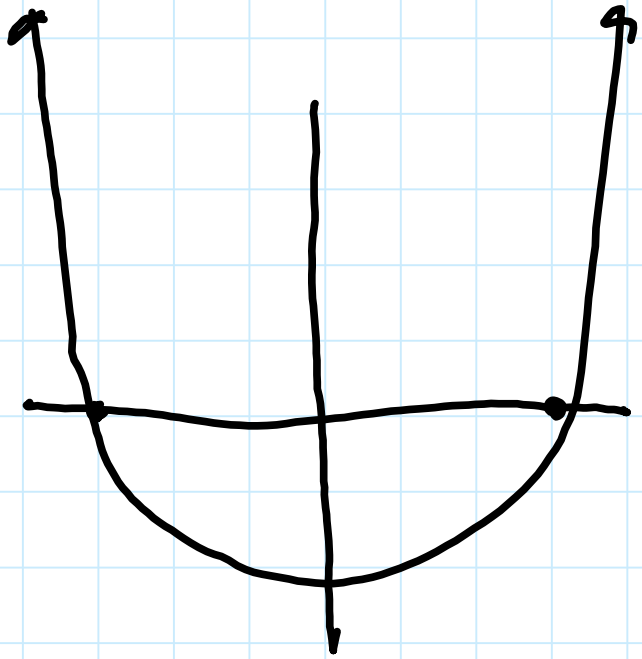
4a) $y = x^2 - 9$

$0 = x^2 - 9 = 0$

$+9 \quad +9$

$\sqrt{x^2} = \sqrt{9}$

$x = \pm 3$



4b) $(x-2)^2 - 1 = 0$

$+1 \quad +1$

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

$x - 2 = \pm 1$

$x - 2 = 1$ $\qquad$ $x - 2 = -1$

$+2 \quad +2$ $\qquad$ $+2 \quad +2$

$x = 3$ $\qquad$ $x = 1$

4d) $-x^2 = -4x + 3$

$+4x \quad +4x$

$-x^2 + 4x = 3$

$-3 \quad -3$

$\frac{-x^2 + 4x - 3}{-1} = \frac{0}{-1}$

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

$(x-3)(x-1) = 0$

$x - 3 = 0$ $\quad$ $x - 1 = 0$

$x = 3$ $\quad$ $x = 1$

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

$+x^2 \quad +x^2$

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

$49 - x^2 = -4x + 3$

$+x^2 \quad +x^2$

$0 = (x^2 - 4x) + 3$

$\left(\frac{b}{2}\right)^2$

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

$= 4$

$0 = (x^2 - 4x + 4) - 4 + 3$

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

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

$+1 \qquad +1$

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

$\pm 1 = x - 2$

$1 = x - 2 \qquad -1 = x - 2$

$+2 \quad +2$

$x = 3$

$x = 1$

4d) $x^2 + 4 = 0$

$-4 \quad -4$

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

no solution

4e) $\frac{2(x+3)^2}{2} = \frac{5}{2}$

$\sqrt{(x+3)^2} = \pm\sqrt{\frac{5}{2}}$

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

$-3 \qquad\qquad -3$

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

4-f) $3(x+1)^2 - 12 = 0$

$+12 \quad +12$

$\frac{3(x+1)^2}{3} = \frac{12}{3}$

$\sqrt{(x+1)^2} = \sqrt{4}$

$x+1 = \pm 2$

$x+1=2$ $\quad -1 \quad -1$

$x = 1$

$x+1=-2$

$x = -3$

4g) $-(x-2)^2+8=0$

$-8 \quad -8$

$\frac{-(x-2)^2}{-1}=\frac{-8}{-1}$

$\sqrt{(x-2)^2}=\sqrt{8}$

$x-2=\pm\sqrt{8}$

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

$8 = 2 \times 4$, $4 = 2 \times 2$

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

$+2 \quad +2$

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

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

$x=-2\sqrt{2}+2$

4h) $3(x+\frac{1}{2})^2 - 9 = 0$

$+9 \quad +9$

$3(x+\frac{1}{2})^2 = 9$

$\frac{3(x+\frac{1}{2})^2}{3} = \frac{9}{3}$

$\sqrt{(x+\frac{1}{2})^2} = \sqrt{3}$

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

$-\frac{1}{2}$

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

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

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

$x = 1.23$

$x = -2.23$

5a)

$$x^2 - 2x = 3$$

$$-3 \quad -3$$

$$1x^2 - 2x - 3 = 0$$

$$a = 1 \quad b = -2 \quad c = -3$$

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

$$\frac{-(-2) \pm \sqrt{(-2)^2 - 4(1)(-3)}}{2(1)}$$

$$\frac{2 \pm \sqrt{+16}}{2}$$

$$\frac{2 \pm 4}{2}$$

$$\frac{2+4}{2} = 3 \qquad \frac{2-4}{2} = -1$$

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

5b) $2x^2 = -7x + 3$

$2x^2 + 7x - 3 = 0$

$a = 2 \quad b = 7 \quad c = -3$

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

$$\frac{-(7) \pm \sqrt{7^2 - 4(2)(-3)}}{2(2)}$$

$$\frac{-7 \pm \sqrt{73}}{4} = x$$

$$x = \left(\frac{-7 + \sqrt{73}}{4}\right) \qquad x = \left(\frac{-7 - \sqrt{73}}{4}\right)$$

$x = 0.386$ $\qquad$ $x = -3.87$

5c) $1x^2 + 3x + 7 = 0$

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

$$\frac{-3 \pm \sqrt{3^2 - 4(1)(7)}}{2(1)}$$

$$\frac{-3 \pm \sqrt{-3}}{2}$$

No solution

5d) $\frac{4x^2}{2} - \frac{12x}{2} - \frac{14}{2} = \frac{0}{2}$

$2x^2 - 6x - 7 = 0$

$$\frac{-(-6) \pm \sqrt{(-6)^2 - 4(2)(-7)}}{2(2)}$$

$$\frac{+6 \pm \sqrt{92}}{4}$$

92
$4 \quad 23$
$2 \quad 2$

$$\frac{26 \pm 2\sqrt{23}}{4}$$
$\div 2$

$$\frac{3 \pm \sqrt{23}}{2}$$

$x = \frac{3+\sqrt{23}}{2}$ $\quad$ $x = \frac{3-\sqrt{23}}{2}$

$x = 3.90$ $\quad$ $x = -0.90$

6a) $(x)^2 = (\pm\sqrt{5})^2$

$x^2 = 5$

$-5 \quad -5$

$x^2 - 5 = 0$

$y = x^2 - 5$

6b) $x = 2 \pm \sqrt{3}$

$-2 \quad -2$

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

$(x-2)^2 = 3$

$-3 \quad -3$

$(x-2)^2 - 3 = 0$

$y = (x-2)^2 - 3$

6c) $x = \frac{3 \pm \sqrt{2}}{2}$ $\times 2$

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

$-3 \quad -3$

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

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

$-2 \quad -2$

$(2x-3)^2 - 2 = 0$

$y = (2x-3)^2 - 2$

7a) $y = x^2 - 4x + 3$

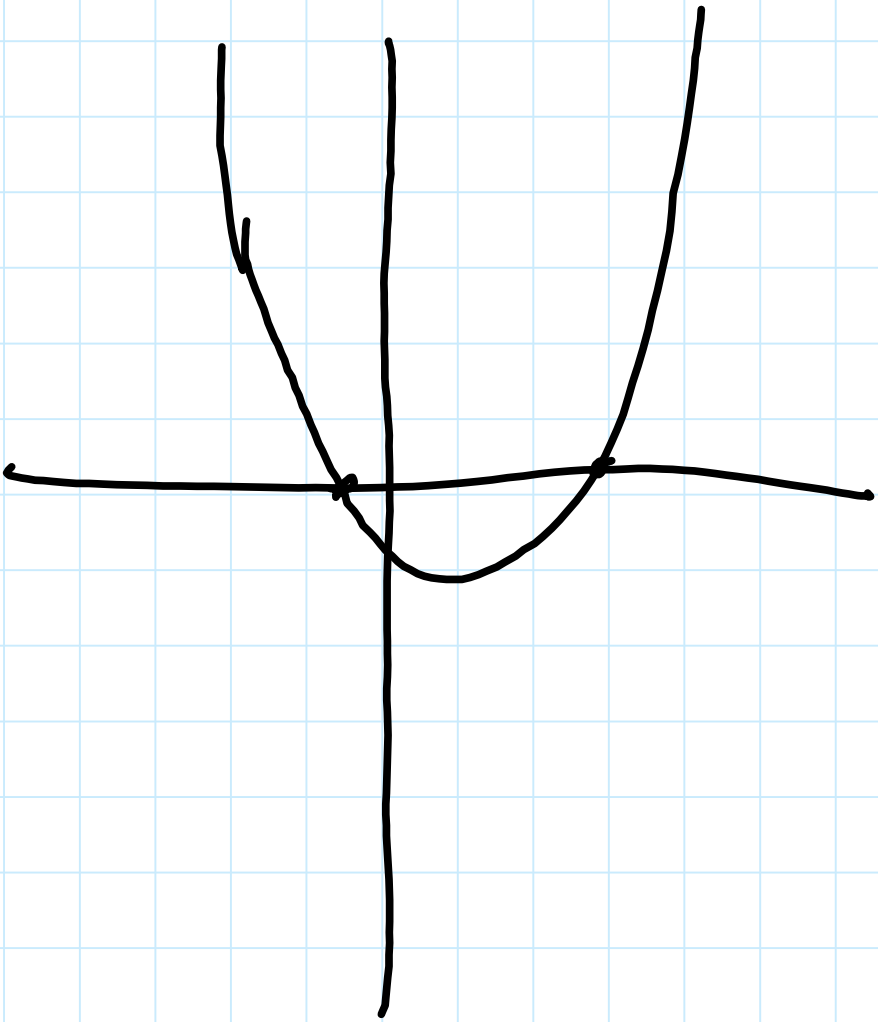
$b^2 - 4ac$ discriminant

$(-4)^2 - 4(1)(3)$

$16 - 12$

$= 4$

+ 2 solutions



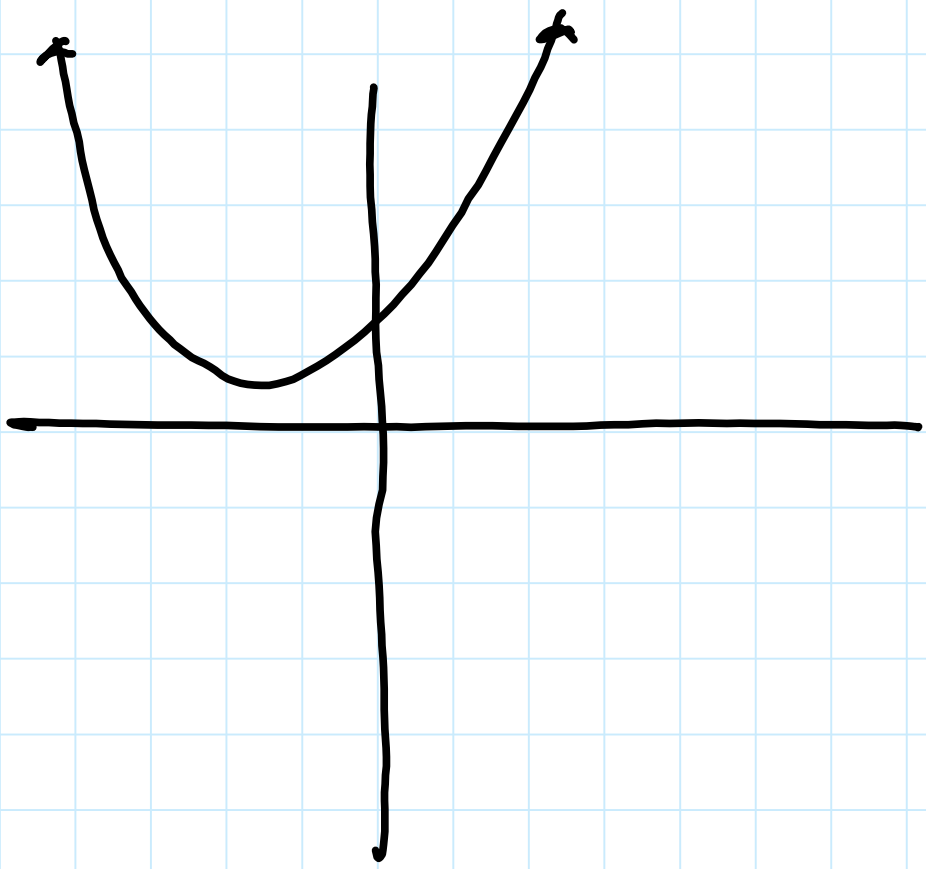
7b) $y = x^2 + 5x + 7$

$b^2 - 4ac$

$(5)^2 - 4(1)(7)$

$25 - 28$

$= -3$ | — | no solution



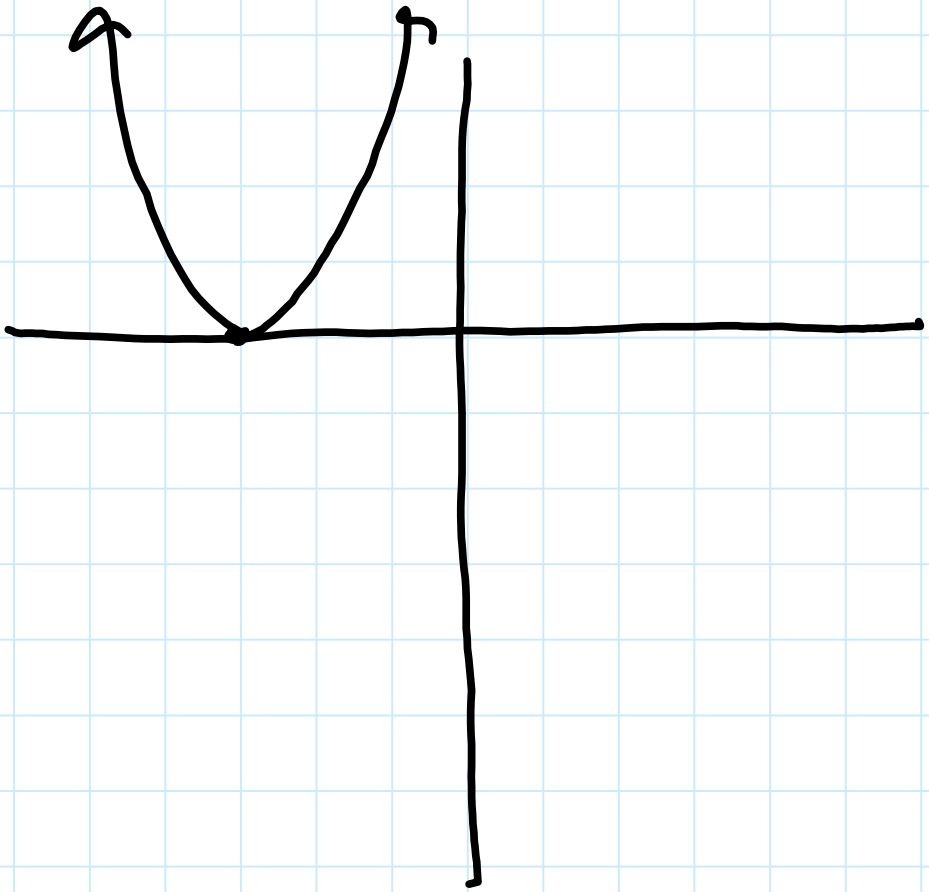
7) $y = x^2 + 6x + 9$

$b^2 - 4ac$

$(6)^2 - 4(1)(9)$

$36 - 36 = 0$ zero

one solution



8) $x^2+10x+k=0$

b^2-4ac

$(10)^2-4(1)(k)$

$100-4k$

2 sol

$100-4k>0$

$-100 \quad -100$

$\frac{-4k}{-4} > \frac{-100}{-4}$

$k<25$

1 sol

$100-4k=0$

$\frac{100}{4} = \frac{4k}{4}$

$k=25$

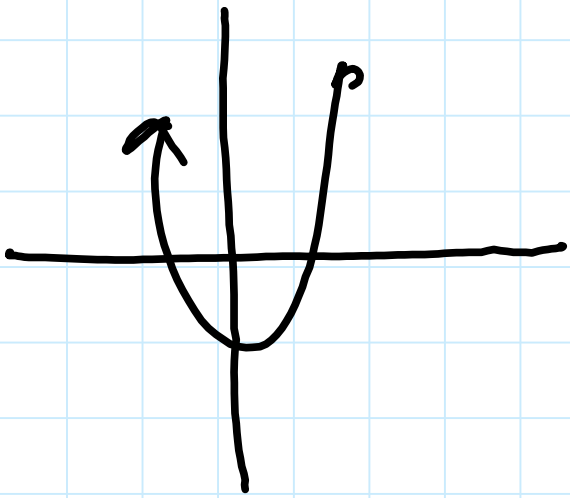
0 sol

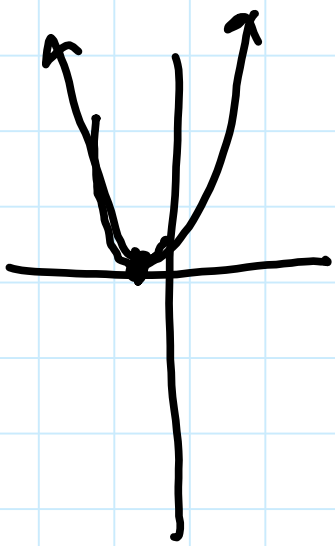
$100-4k<0$

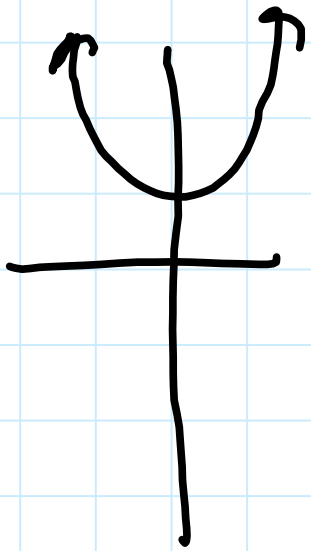
$\frac{100}{4} < \frac{4k}{4}$

$25<k$

$k>25$







9a) let $x = \#$

$$\left(\frac{1}{2}x^2 - x = 4\right)2$$

$$x^2 - 2x = 8$$

$$-8 \quad -8$$

$$x^2 - 2x - 8 = 0$$

$$(x-4)(x+2) = 0$$

$x - 4 = 0$ $\quad$ $x + 2 = 0$

$x = 4$ $\quad$ $x = -2$

$x = 4$

$\frac{16}{2} - 4 = 4$ $\quad$ $8 - 4 = 4$ ✓

$\left(\frac{1}{2}(-2)^2\right) - (-2) = 4$

$2 + 2 = 4$ ✓

9b) let x = 1st # let $x+1$ = 2nd #

$x(x+1) = 156$

$x^2 + x = 156$

$x^2 + x - 156 = 0$

$(x+13)(x-12) = 0$

$x = -13$ $x = 12$

$x = -13$

1st # = -13
2nd # = -12

$-12(-13) = 156$ ✓

$x = 12$

1st # = 12
2nd # = 13

$12(13) = 156$ ✓

9c) let x = 1st # let $x+2$ = 2nd #

$$x(x+2) = 35$$

$$x^2 + 2x = 35$$

$$x^2 + 2x - 35 = 0$$

$$(x+7)(x-5) = 0$$

$x = -7$ $x = 5$

$x = -7$ (1st # = -7, 2nd # = -5) $x = 5$ (1st # = 5, 2nd # = 7)

$-5(-7) = 35$ ✓ $5(7) = 35$ ✓

9d) let x = 1st # let $x+2$ = 2nd #

$$x^2 - (x+2)^2 = -24$$

$$x^2 - (x+2)(x+2) = -24$$

$$x^2 - x^2 - 4x - 4 = -24$$

$$-4x - 4 = -24$$

$$+4 \quad +4$$

$$-4x = -20$$

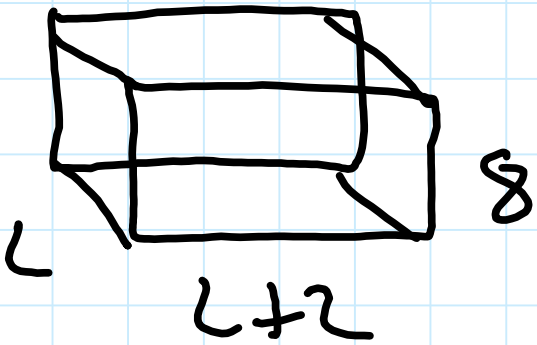
$$x = 5$$

1st # = 5
2nd # = 7

$$5^2 - 7^2 = -24$$

$$25 - 49 = -24 \checkmark$$

10a)



$V = 280 m^3$

$V = LWh$

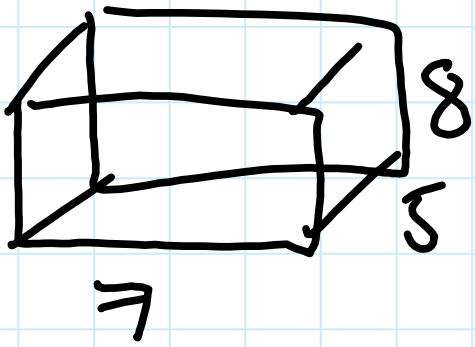
$\frac{280}{8} = \frac{L(L+2)(8)}{8}$

$35 = L^2 + 2L$

$0 = L^2 + 2L - 35$

$(L+7)(L-5)$

$L = -7$ $\quad L = 5m$



$V = 7(5)(8)$

$V = 280$ ✓

10b)

$A=56$ $P=30$

$P=2W+2L$

$\frac{30}{2}=\frac{2W}{2}+\frac{2L}{2}$

$15=W+L$

$-W \quad -W$

$15-W=L$

$L=(15-W)$

$A=LW$

$56=(L)W$

$56=(15-W)W$

$56=15W-W^2$

$+W^2 \quad +W^2$

$W^2+56=15W$

$-15W \quad -15W$

$W^2-15W+56=0$

$(W-8)(W-7)=0$

$W=8$ $W=7$

$L=15-8$

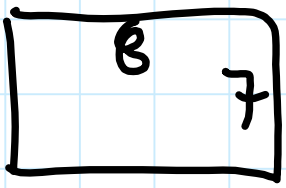
$L=7$

$L=15-7$

$L=8$

$L=7$
$W=8$

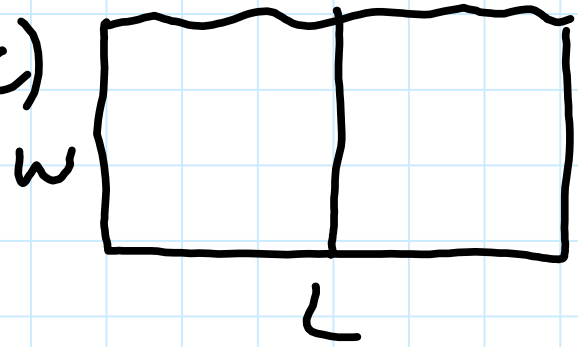
$W=7$
$L=8$



$A=LW=56$ ✓

$P=16+14=30$ ✓

10 c)



$P = 39$

$A = 66$

$P = 3w + L$

$39 = 3w + L$

$(39 - 3w) = L$

$A = (L)w$

$66 = (39 - 3w)w$

$66 = 39w - 3w^2$

$\frac{3w^2}{3} - \frac{39w}{3} + \frac{66}{3} = \frac{0}{3}$

$w^2 - 13w + 22 = 0$

$(w - 11)(w - 2) = 0$

$w = 11$ $\quad$ $w = 2$

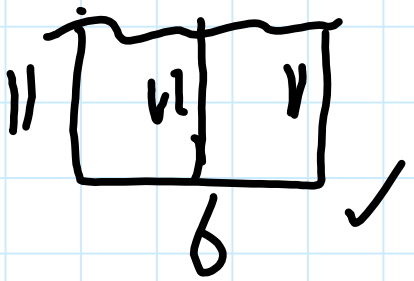
$L = 6$ $\quad$ $L = 33$

$L = 39 - 3(11)$

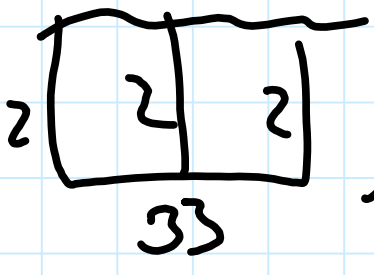
$L = 6$

$L = 39 - 3(2)$

$L = 33$

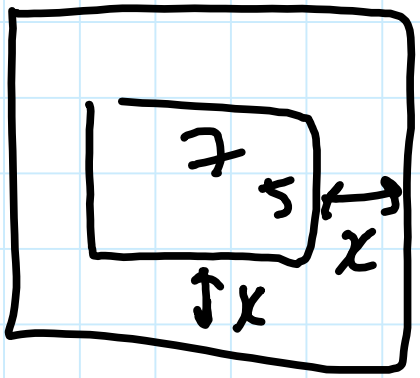


✓



✓

10d)



$A = lw$

$A = (5)7 = 35$

$35 + 28 = 63$

$A = lw$

$63 = (7+2x)(5+2x)$

$63 = 35 + 14x + 10x + 4x^2$

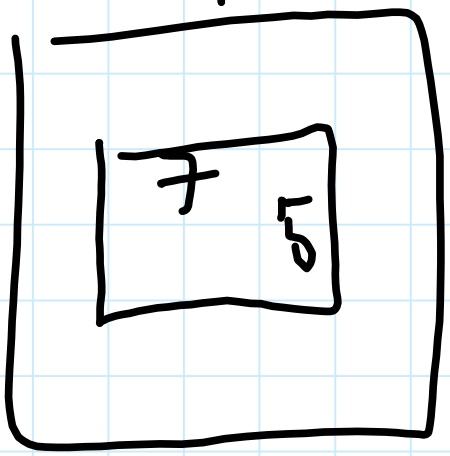
$\frac{0}{4} = \frac{4x^2 + 24x - 28}{4}$

$0 = x^2 + 6x - 7$

$(x+7)(x-1)$

$x = -7$ ~~$x = -7$~~ $x = 1$

9

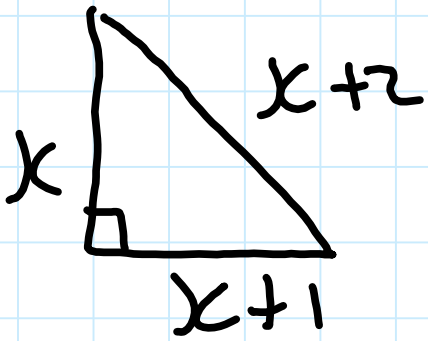


$A = lw$

$A = 7(9)$

$A = 63$

11)



$a^2 + b^2 = c^2$

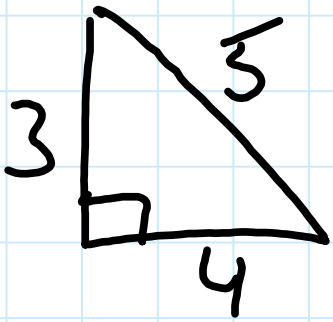
$x^2 + (x+1)^2 = (x+2)^2$

$x^2 + x^2 + 2x + 1 = x^2 + 4x + 4$

$x^2 - 2x - 3 = 0$

$(x-3)(x+1) = 0$

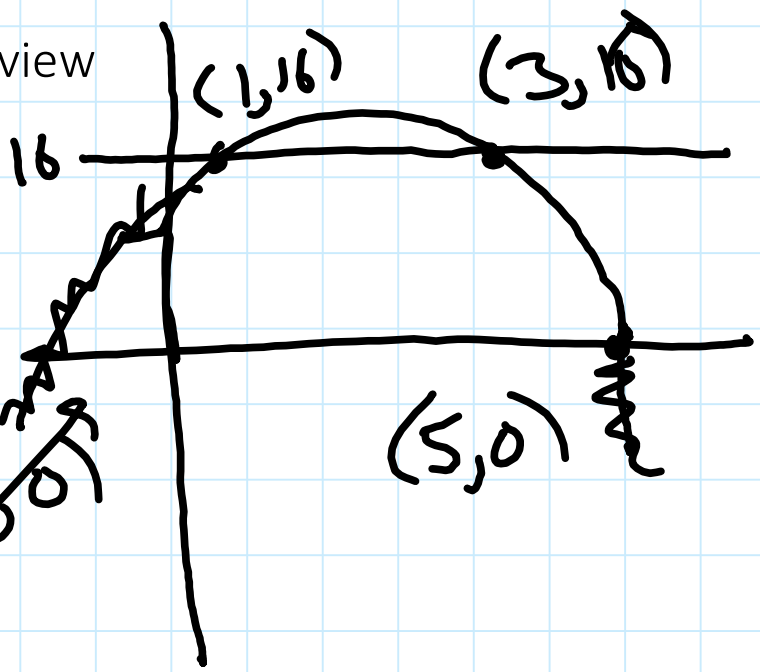
$x = 3$ $\quad x \neq -1$



$3^2 + 4^2 = 5^2$

$25 = 25$ ✓

12) $h = -2d^2 + 8d + 10$



$\frac{0}{-2} = \frac{-2d^2 + 8d + 10}{-2}$

$0 = d^2 - 4d - 5$

$(d-5)(d+1)$

$d = 5$ $d \neq -1$

five meters before hitting the ground

$16 = -2d^2 + 8d + 10$

$\frac{0}{2} = \frac{-2d^2 + 8d - 6}{-2}$

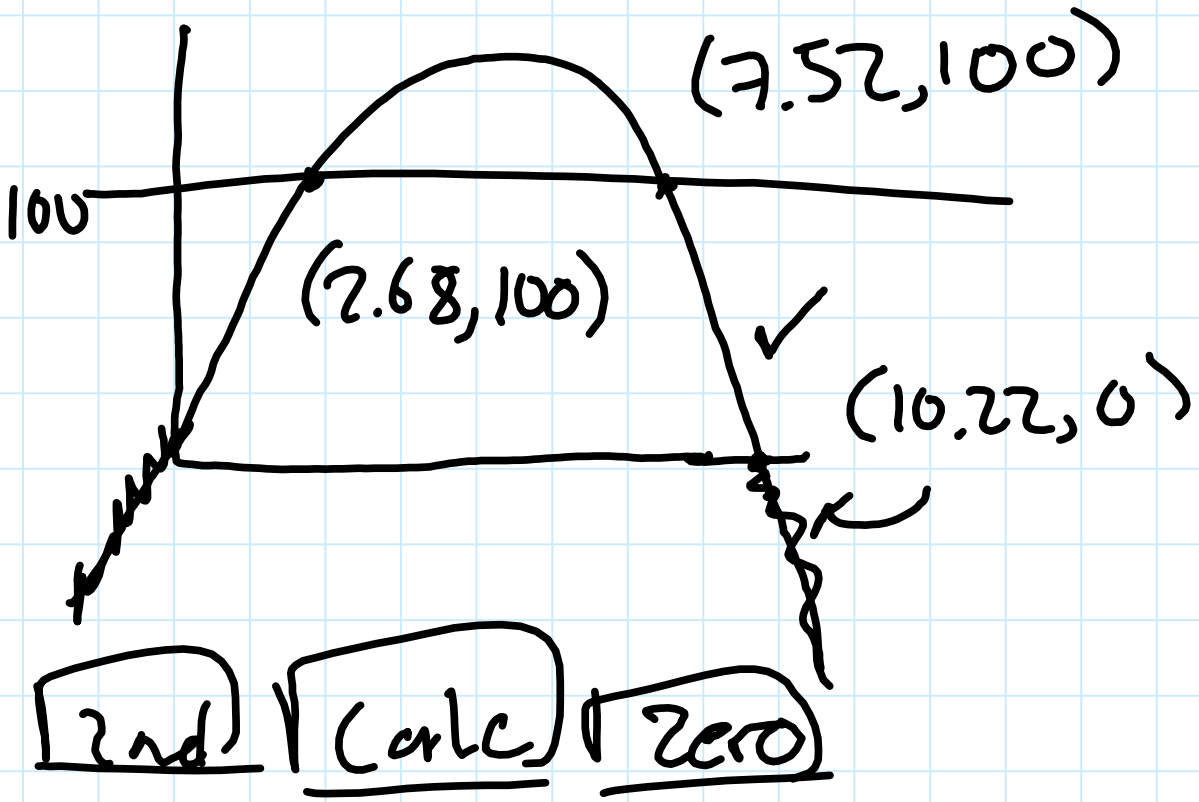
$0 = d^2 - 4d + 3$

$(d-3)(d-1) = 0$

$d = 3$ $d = 1$

at a distance of one meter & three meters the arrow has a height of sixteen meters

12b) $h = -4.9t^2 + 30t + 1$

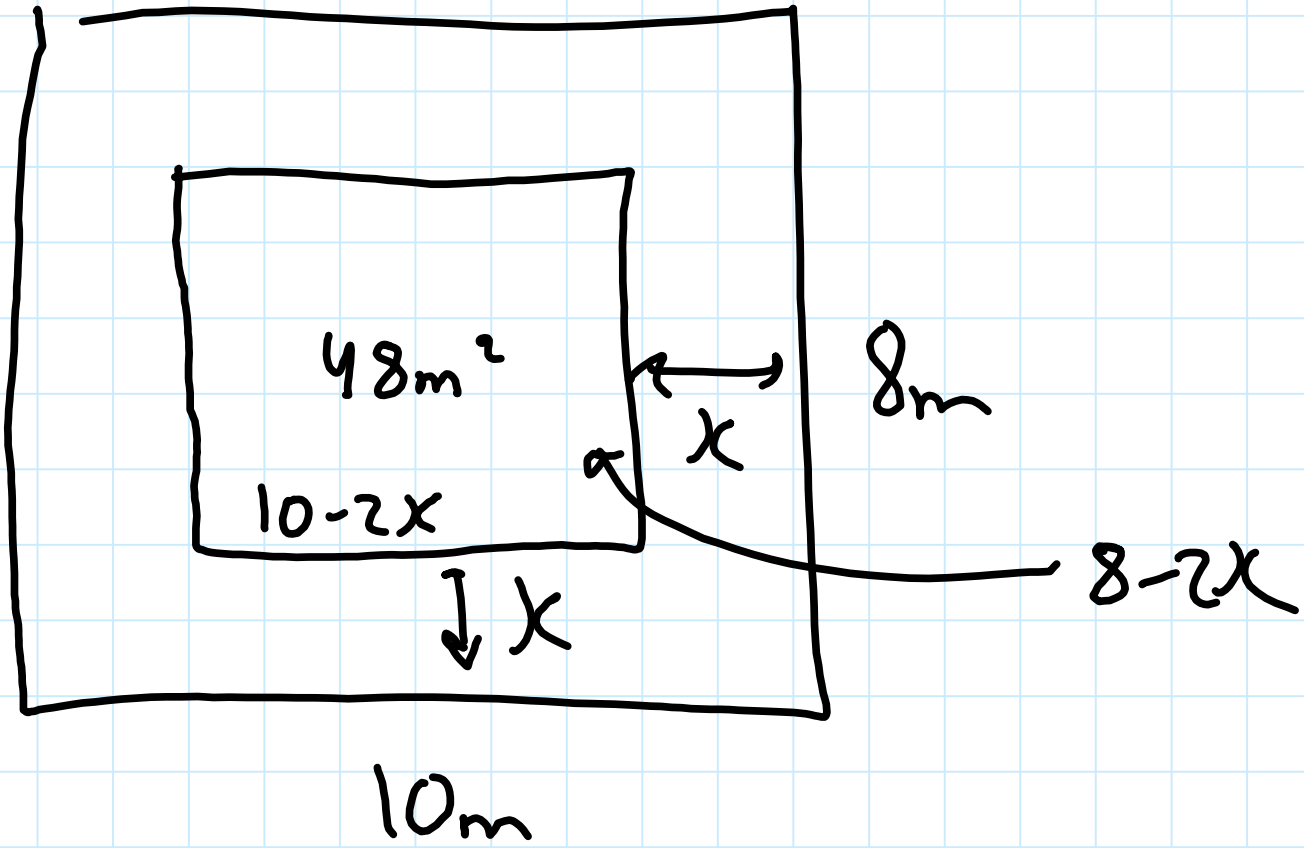


2nd | calc | zero

rocket went 10.22 seconds in the air.

2nd | calc | int

13a)



$A = LW$

$48 = (10-2x)(8-2x)$

$48 = 80 - 36x + 4x^2$

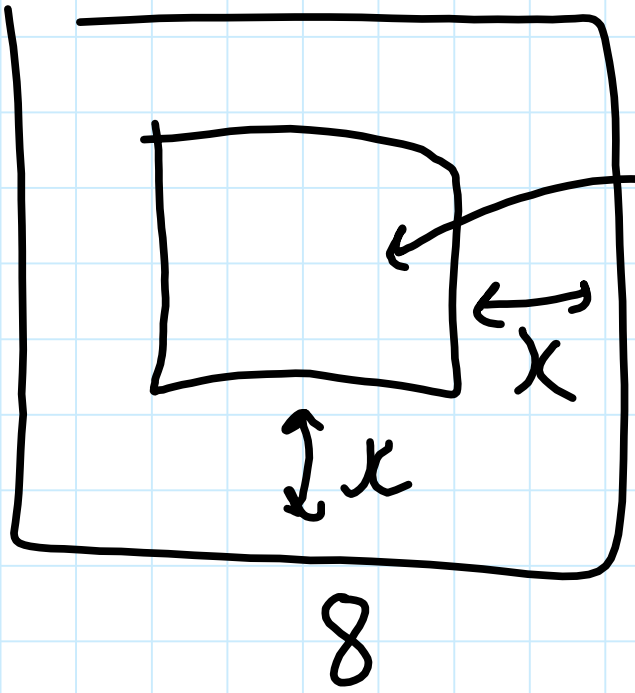
$0 = 4x^2 - 36x + 32$

$0 = x^2 - 9x + 8$

$(x-8)(x-1)$

$x = 8$ $x = 1$ ✓

13b)



$A = 6(8) = 48$

$48(0.75) = 36$

$$\frac{-(-7) \pm \sqrt{(-7)^2 - 4(1)(3)}}{2(1)}$$

$$\frac{7 \pm \sqrt{37}}{2}$$

$A = LW$

$36 = (8 - 2x)(6 - 2x)$

$36 = 48 - 16x - 12x + 4x^2$

$\frac{0}{4} = \frac{4x^2 - 28x + 12}{4}$

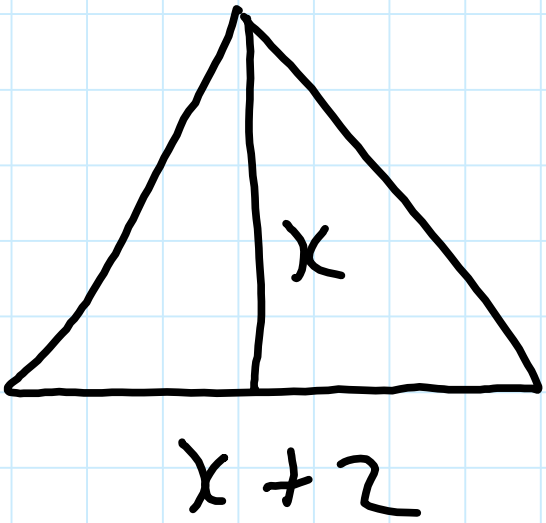
$0 = x^2 - 7x + 3$

$x = 6.54$

$x = 0.45$

$x = 0.45$m

13c)



$A = 40m^2$

$A = \frac{b(h)}{2}$

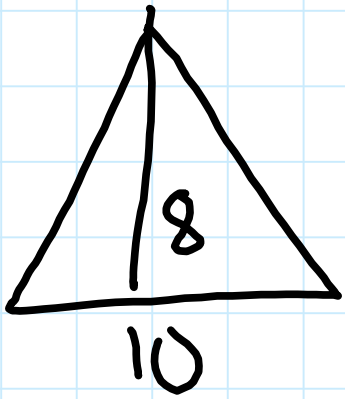
$2 \times 40 = \frac{(x+2)(x)}{2} \times 2$

$80 = x^2 + 2x$

$0 = x^2 + 2x - 80$

$(x+10)(x-8)$

$x = -10$ $x = 8$

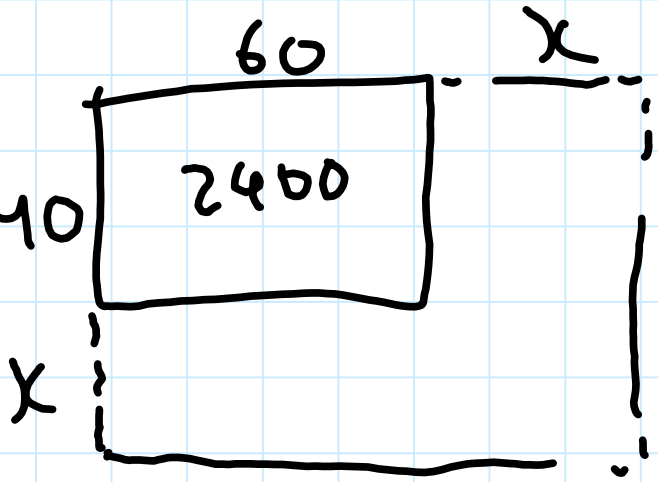


$A = \frac{bh}{2}$

$A = \frac{8(10)}{2}$

$A = 40$

14)



$2400(2)$
4800

$A = l(w)$

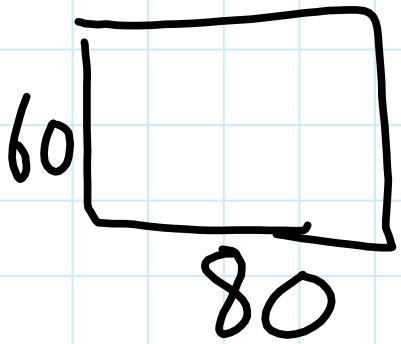
$4800 = (40+x)(60+x)$

$4800 = 2400 + 100x + x^2$

$0 = x^2 + 100x - 2400$

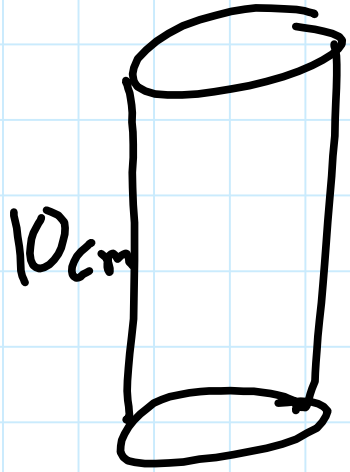
$(x-20)(x+120)$

$x = 20$ $\quad x = -120$



$60(80) = 4800$ ✓

15)



$SA = 400\pi$

$SA = 2\pi r^2 + 2\pi rh$

$400\pi = 2\pi r^2 + 2\pi r(10)$

$\frac{400\pi}{2} = \frac{2\pi r^2 + 20\pi r}{2}$

$200 = r^2 + 10r$

$0 = r^2 + 10r - 200$

$(r+20)(r-10)$

$r = -20$ $\quad r = 10$

$V = \pi r^2 h$

$V = \pi(10)^2(10)$

$V = 1000\pi\ cm^3$

$V = 3141.59\ cm^3$