Algebra 9.1-9.4 Quadratic Quiz Review

Quiz Topics:

- Find the vertex of a quadratic (identity it as a maximum or minimum)
- Know how all the parts of a quadratic equation affect how the parabola is graphed
- Identifying how many solutions a quadratic equation has
- Solve a quadratic by:
  - Graphing with at least 3 ordered pairs (where 1 ordered pair is the vertex) and identifying the line of symmetry
  - Square Roots
  - Factoring
- Quadratic Word Problems

Quiz Review: Complete #1-26 all from Textbk pg. 575 & then the below word problems.

1. Model each problem with a quadratic equation. Then solve, if necessary, round to the nearest tenth. Use the pi symbol to calculate your answer.

   a. Find the side length of a square with an area of 196 ft^2.

   b. Find the radius of a circle with an area of 100 in^2.

2. The square tarp you are raking leaves onto has an area of 150 ft^2. What is the side length of the tarp? Round your answer to the nearest tenth of a foot if necessary.

3. There is enough mulch to spread over a flower bed with an area of 85 m^2. What is the radius of the largest circular bed that can be covered by the mulch? Round your answer to the nearest tenth of a meter if necessary.

4. The volume of a sandbox shaped like a rectangular prism is 48 ft^3. The height of the sandbox is 2 feet. The width is w feet and the length is $w + 2$ feet. Find the length and width.

5. Stacey is cutting carpet for a rectangular room. The area of the room is 324 ft^2.The length of the room is 3 feet longer than twice the width. What should the dimensions of the carpet be?

6. A baseball player hit a ball with an upward velocity of 46 ft/s. Its height h in feet after t seconds is given by the function $h = -16t^2 + 46t + 6$. What is the maximum height the ball reaches? How long will it take the baseball to reach the maximum height? Round to the nearest tenth.

7. A golf ball is chipped into the air from a small hill with an upward velocity of 50 ft/s. Its height h in feet after t seconds is given by the function $h = -16t^2 + 50t + 10$. What is the maximum height the ball reaches? How long will it take the ball to reach the maximum height?

Quiz Review

pg. 575 (1) $y = 0.5x^2$, $y = -x^2$, $y = 2x^2$

(2) $f(x) = \frac{2}{3}x^2$, $f(x) = 3x^2$, $f(x) = 4x^2$

(3) $f(x) = 0.2x^2$, $f(x) = 0.3x^2$, $f(x) = 0.6x^2$

(4) $y = -0.25x^2$, $y = x^2$, $y = -2x^2$

(5) $y = \frac{1}{2}x^2$

x	y
2	2
0	0
-2	2

(*) no "bx"; line of symmetry is $x = 0$

(*) "c" is the y-intercept, which is at zero, (0,0)

(*) "a" $= \frac{1}{2}$, making the parabola wider than $y = x^2$

(6) $y = -2x^2 - 1$

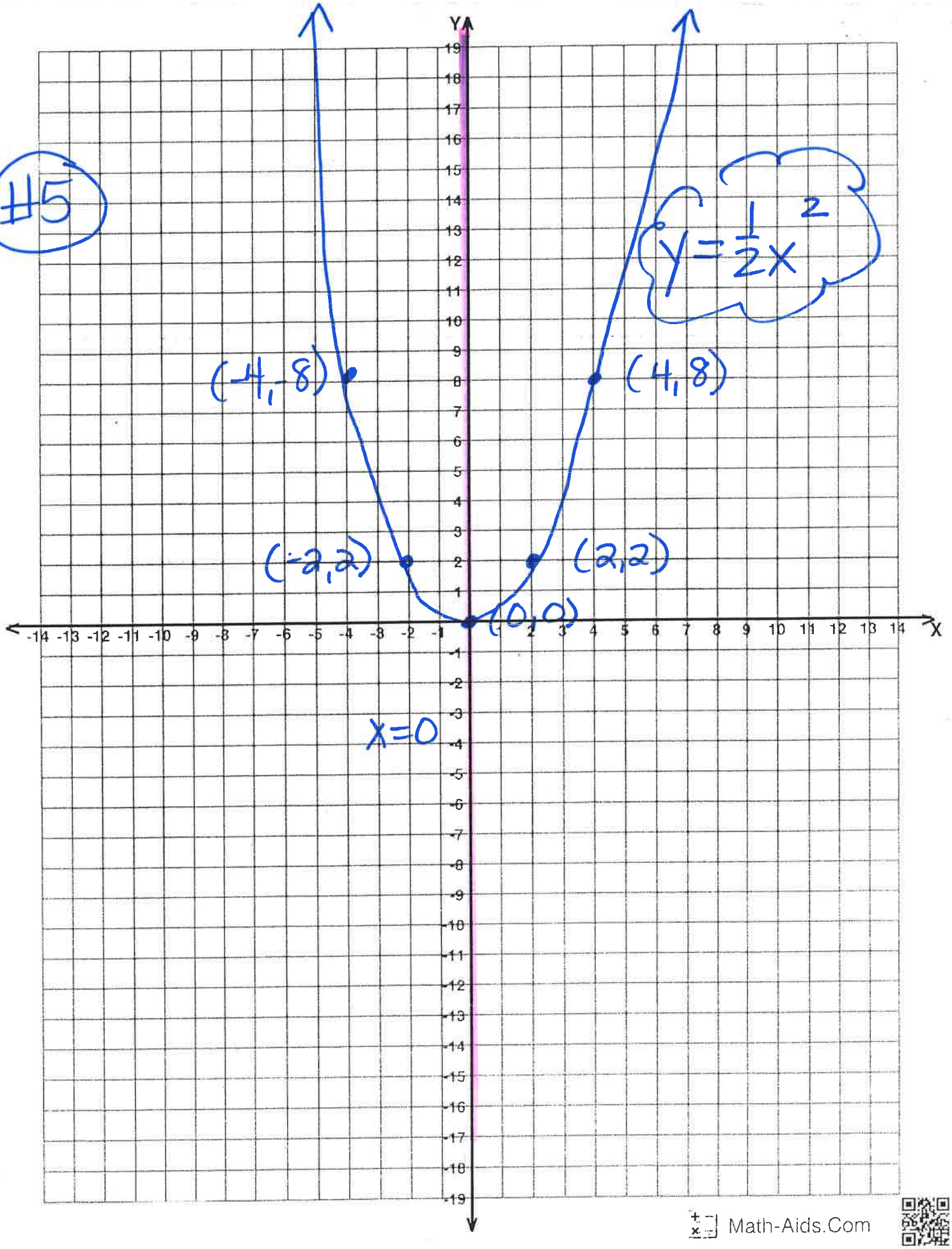
x	y
1	-3
0	-1
-1	-3

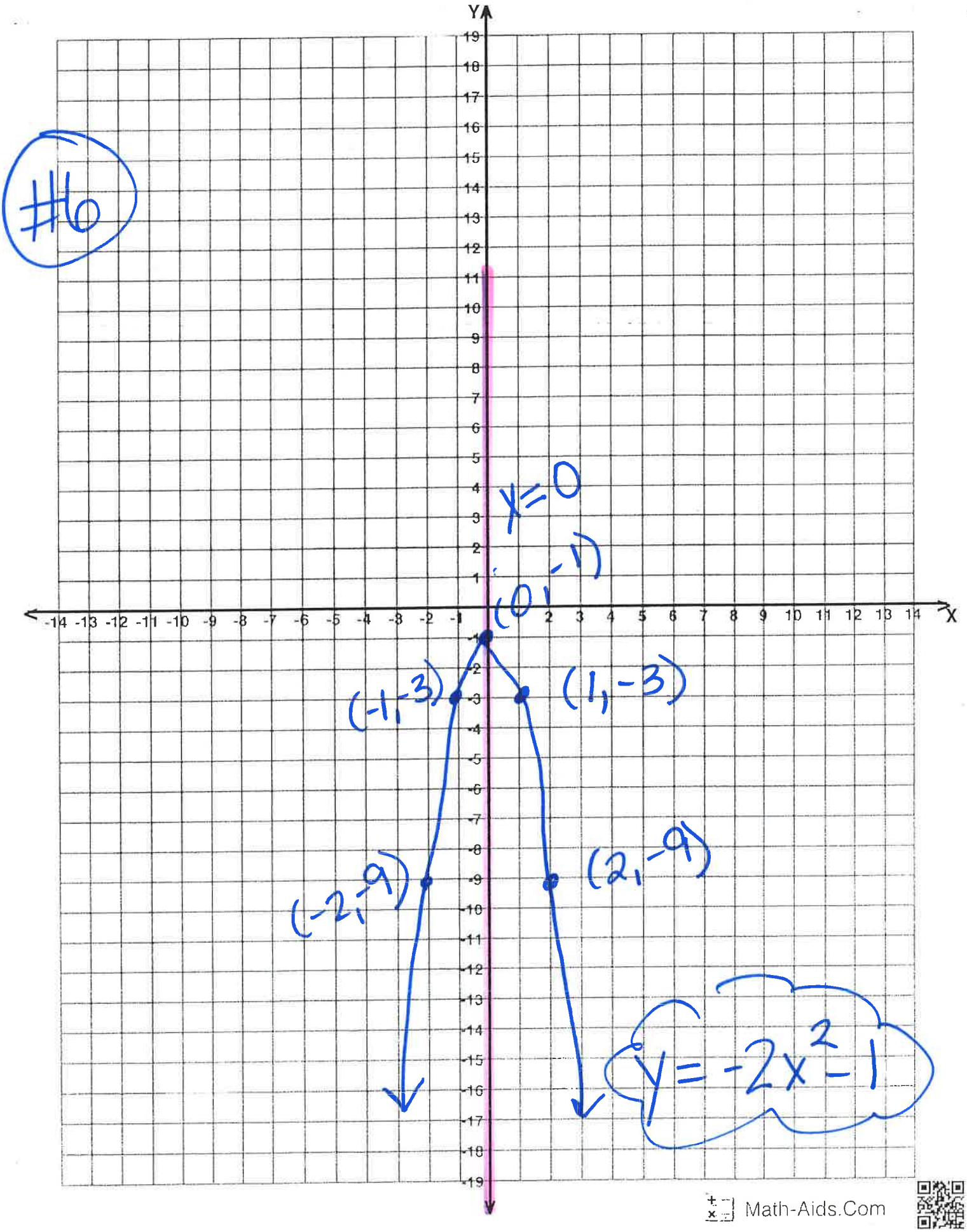
(*) no "bx"; line of symmetry is $x = 0$

(*) "c" is the y-intercept, which is at 1, (0,-1)

(*) "a" $= -2$, making the parabola facing downward and very narrow

#5





(7) $y = 3x^2 - 6x$

x	y
-1	9
0	0
1	-3
2	0

(*) line of symmetry is NOT the y-axis since there is a "bx"

(*) "c" is the y-intercept, which is at zero, (0,0)

(*) "a" = 3, making the parabola very narrow

(*) line of symmetry: $x = 1$

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

(*) vertex: (1, -3)

$y = 3x^2 - 6x$

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

$y = 3(1) - 6$

$y = 3 - 6$

$y = -3$

8) $y = x^2 + 2x + 4$

x	y
-2	4
-1	3
0	4

(*) line of symmetry: $x = -1$

$x = \frac{-b}{2a}$, $x = \frac{-(2)}{2(1)} = \frac{-2}{2} = -1$

(*) vertex: (-1, 3)

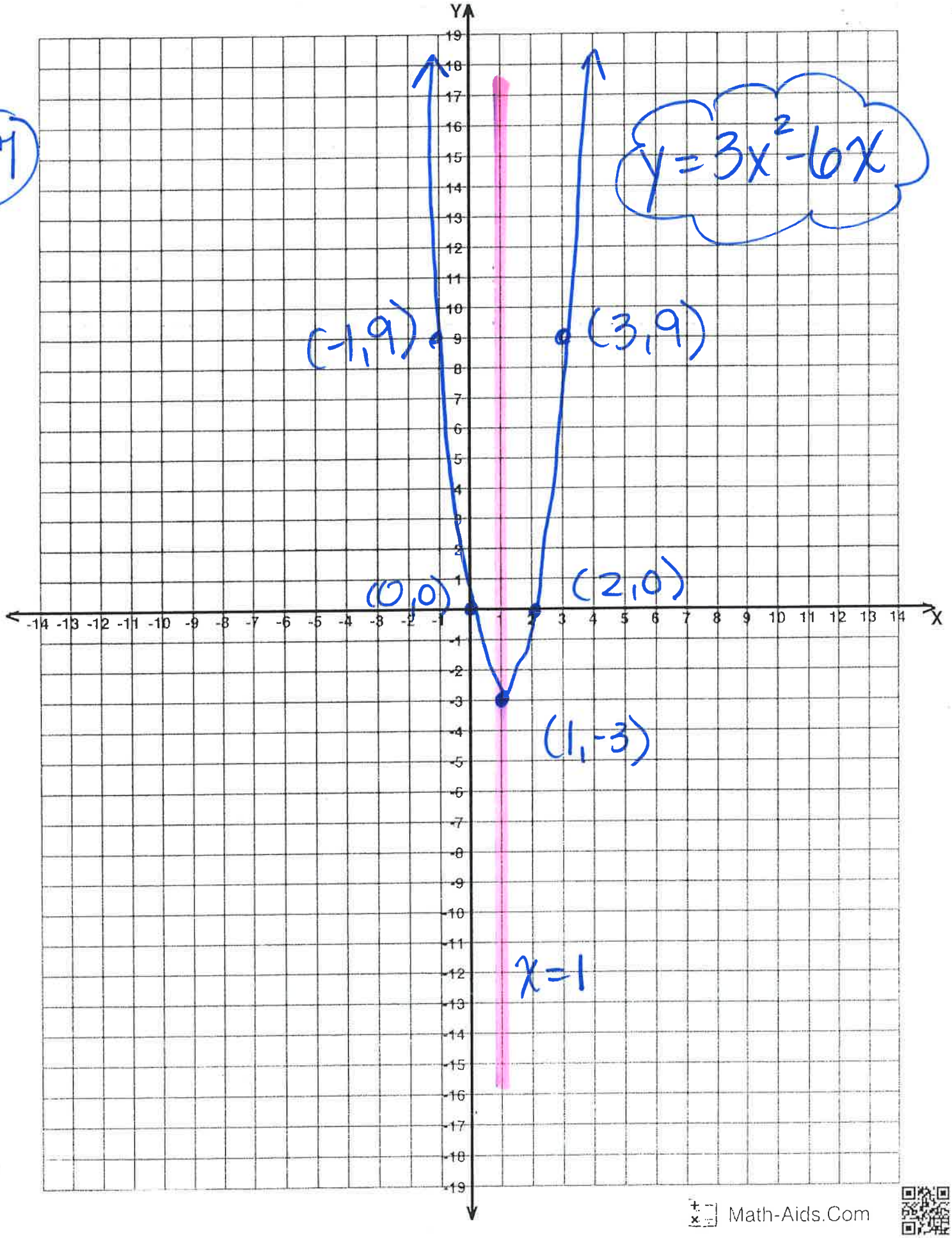
$y = (-1)^2 + 2(-1) + 4$

$y = 1 + -2 + 4$

$y = 3$

(*) y-intercept: (0, 4)

#4



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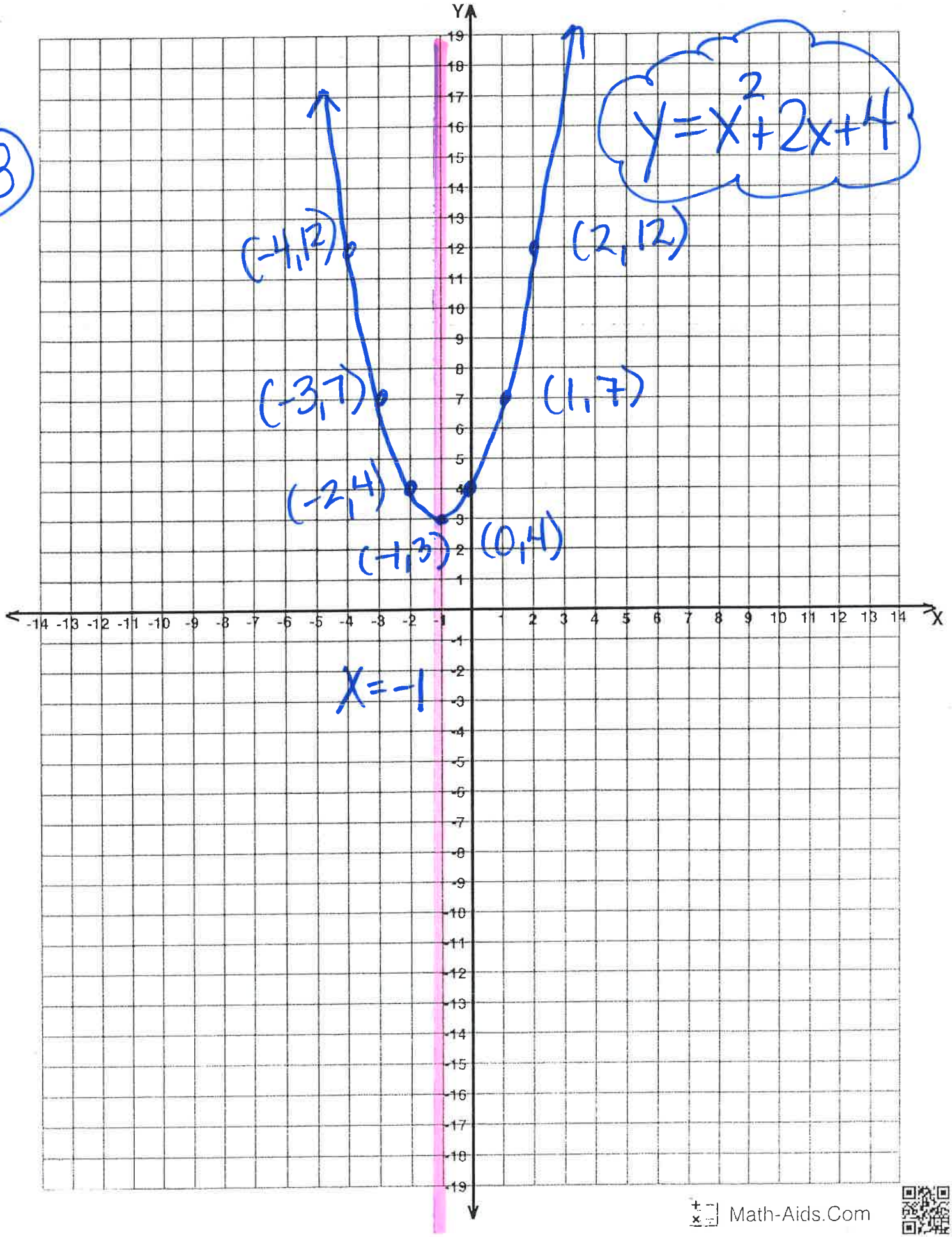


(9) $y = -0.5x^2 + 2x + 1$

(*) line of symmetry: $x = 2$

$x = \frac{-b}{2a}$, $x = \frac{-(2)}{2(-\frac{1}{2})} = \frac{-2}{-1} = 2$

x	y
2	3
0	1
-2	-5

(*) vertex: (2, 3)

$y = -0.5x^2 + 2x + 1$

$y = -0.5(2)^2 + 2(2) + 1$

$y = -\frac{1}{2}(4) + 4 + 1$

$y = -2 + 4 + 1$

$y = 3$

(*) y-intercept: (0, 1)

10) $x^2 - 16 = 0$

$+16 \quad +16$

$x^2 = 16$

$\sqrt{x^2} = \sqrt{16}$

$x = \pm 4$

Two solutions

(*) "a" & "c" are opposite signs; 2 solutions

11) $x^2 + 9 = 0$

$-9 \quad -9$

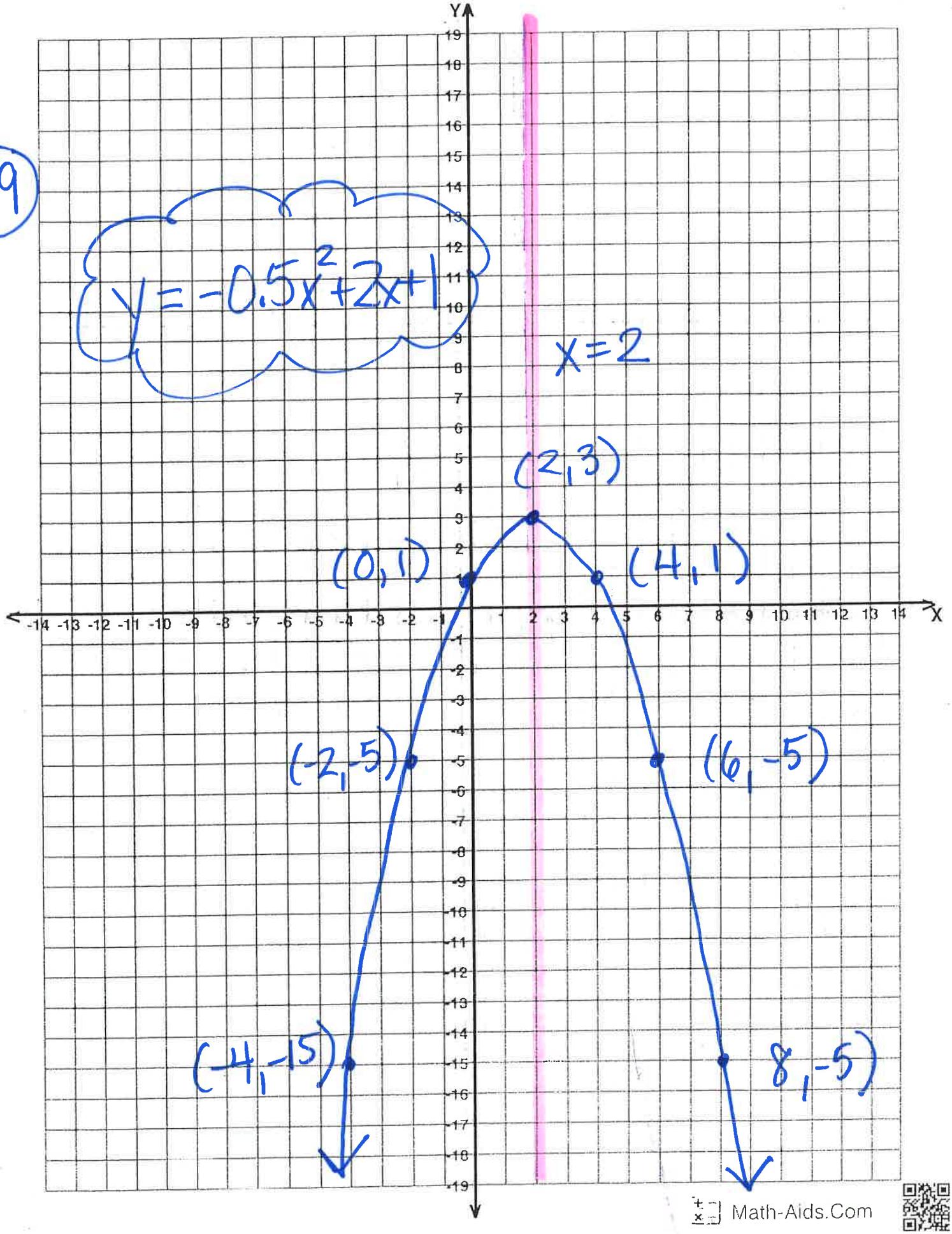
$x^2 = -9$

No solution

* "a" & "c" are the same signs; no solution

#9

$y = -0.5x^2 + 2x + 1$



(12) $\frac{0.25x^2 = 0}{0.25}$

$x^2 = 0$

$\sqrt{x^2} = \sqrt{0}$

$x = 0$

One Solution

(*) "c" = 0, only one Solution

(13) $m^2 = 81$

$m = \pm 9$

(14) $t^2 - 7 = -18$

$+7 \quad +7$

$t^2 = -11$

no solution

(15) $5r^2 - 180 = 0$

$+180 \quad +180$

$\frac{5r^2}{5} = \frac{180}{5}$

$r^2 = 36$

$r = \pm 6$

(16) $\frac{36n^2 = 9}{36 \quad 36}$

$n^2 = \frac{9}{36}$

$\sqrt{n^2} = \sqrt{\frac{9}{36}}$

$n = \frac{\pm 3}{6} = \frac{\pm 1}{2}$

(17) $A = \pi r^2$

$\frac{324}{\pi} = \frac{\pi r^2}{\pi}$

$103.1 = r^2$

$\pm 10.2 = r$

10.2 ft

(18) $b^2+3b-4=0$

$(b+4)(b-1)=0$

$\{-4,1\}$

(19) $n^2+n-12=0$

$(n+4)(n-3)=0$

$\{-4,3\}$

(20) $2x^2-5x-3=0$

$2x^2-6x+1x-3=0$

$(2x^2-6x)+(x-3)=0$

$2x(x-3)+1(x-3)=0$

$(2x+1)(x-3)=0$

$\{-\frac{1}{2},3\}$

(21) $t^2-3t=28$

$-28\ \ -28$

$t^2-3t-28=0$

$(t+4)(t-7)=0$

$\{-4,7\}$

(22) $3n^2=6n$

$-6n\ \ -6n$

$3n^2-6n=0$

$3n(n-2)=0$

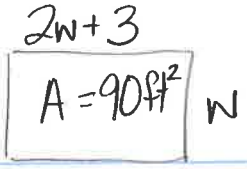
$\{0,2\}$

$\frac{3n=0}{3}$ $\quad n=0$

$n-2=0$

$+2\ +2$

$n=2$

23) 

$l \cdot w = A$

$(2w+3)(w) = 90$

$2w^2+3w = 90$

$-90 \quad -90$

$2w^2+3w-90=0$

$2w^2-12w+15w-90=0$

$(2w^2-12w)+(15w-90)=0$

$2w(w-6)+15(w-6)=0$

$(2w+15)(w-6)=0$

$2w+15=0$ | $w-6=0$

$-15 \quad -15$ | $+6 \quad +6$

$\frac{2w=-15}{2}$ | $w=6$

$w=-7\frac{1}{2}$ | 6 ft.

* Does not make Sense

* Substitute back in to the original problem

$(2w+3)$ | w

$2(6)+3$ | (6)

$12+3$

15 ft. by 6 ft

24) Answers vary

25) No, the values of "a" & "b" affect the x-coordinate of the vertex.

Word Problems

1a) $A = s^2$

$196 = s^2$

$\pm 14 = s$

14 ft

1b) $A = \pi r^2$

$\frac{100}{\pi} = \frac{\pi r^2}{\pi}$

$31.8 = r^2$

$\pm 5.6 = r$

5.6 ft

2) $A = s^2$

$150 = s^2$

$\pm 12.2 = s$

12.2 ft

3) $A = \pi r^2$

$\frac{85}{\pi} = \frac{\pi r^2}{\pi}$

$27 = r^2$

5.2 m

4) $V = lwh$

$48 = (w+2)(w)(2)$

$48 = (w^2+2w)2$

$48 = 2w^2+4w$

$-48 \qquad -48$

$0 = 2w^2+4w-48$

$0 = 2(w^2+2w-24)$

$0 = 2(w+6)(w-4)$

$w-4=0$

$+4 \quad +4$

$w = 4$

$l = (w+2)$

$= 4+2$

$l = 6$ ft.

$w = 4$ ft.

5) $A = lw$

$324 = (3+2w)w$

$324 = 3w + 2w^2$

$-324 \quad -324$

$0 = 2w^2 + 3w - 324$

$0 = 2w^2 + 27w - 24w - 324$

$0 = (2w^2 + 27w) - 1(24w + 324)$

$0 = w(2w+27) - 12(2w+27)$

$0 = (w-12)(2w+27)$

$0 = w - 12$

$+12 \quad +12$

$12 = \text{width}$

length $= 3 + 2w$

$= 3 + 2(12)$

$= 27$ ft

width $= 12$ ft

6) $h = -16t^2 + 46t + 6$

$x = \frac{-b}{2a}, \quad x = \frac{-46}{2(-16)}, \quad x = \frac{46}{-32} = 1.4375$

1.4 seconds

$h = -16t^2 + 46t + 6$

$h = -16(1.4)^2 + 46(1.4) + 6$

$h = -31.36 + 64.4 + 6$

$h = 39$ ft

7) $h = -16t^2 + 50t + 10$

$x = \frac{-b}{2a}$, $x = \frac{-(50)}{2(-16)}$, $\frac{-56}{-32} = 1.5625$

$\approx$ 1.6 seconds

$h = -16t^2 + 50t + 10$

$h = -16(1.6)^2 + 50(1.6) + 10$

$h = -40.96 + 80 + 10$

$h \approx 49$ ft