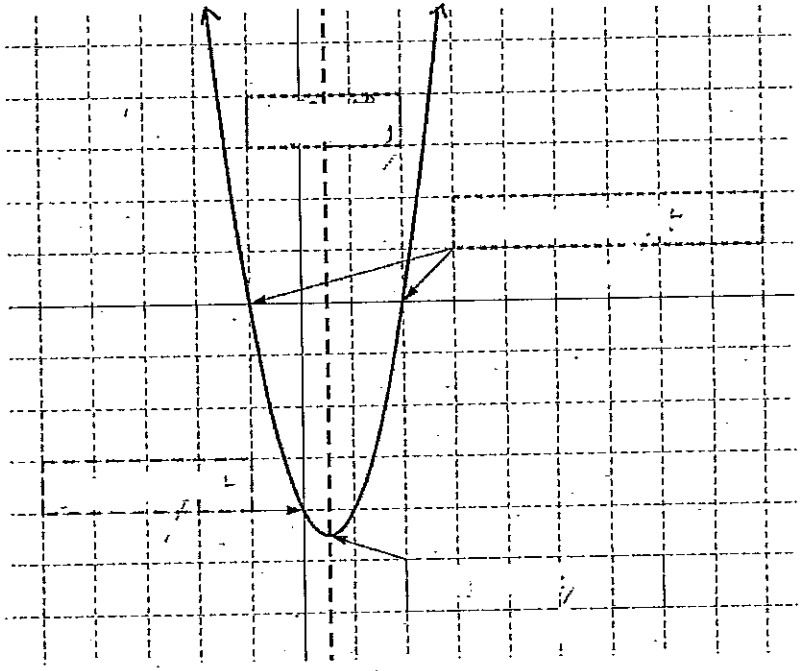
STUDENT NAME _____

SYDNEY GIRLS H.S - YR10

THE PARABOLA AND OTHER NUMBER PLANE GRAPHS TOPIC TEST

1. Complete the feature of the given graph .

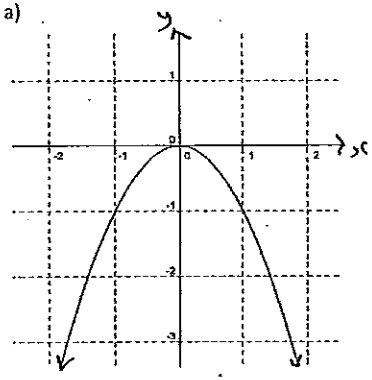


2. Match each equation with its sketch (please write the equation under its sketch)

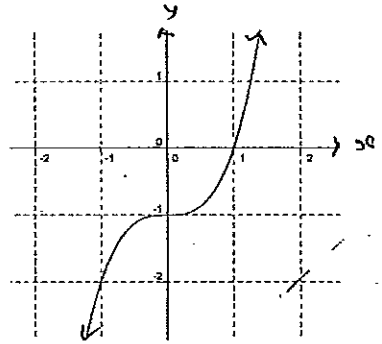
$$y = -x^2, \quad y = x^2 - 1, \quad y = -x^2 + 1, \quad y = x^3 - 1$$

$$y = \frac{-1}{x}, \quad (x-2)^2 + (y+2)^2 = 4, \quad y = \sqrt{25 - x^2}, \quad y = -x^3$$

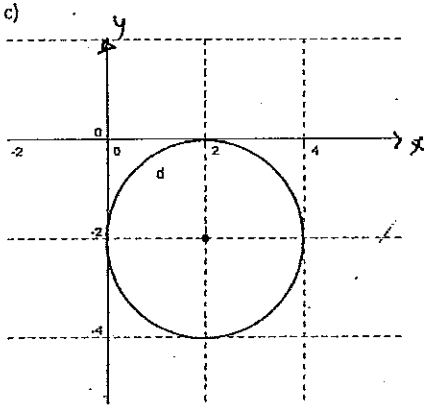
a)



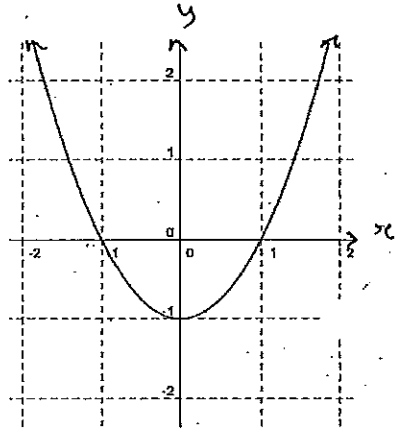
b)



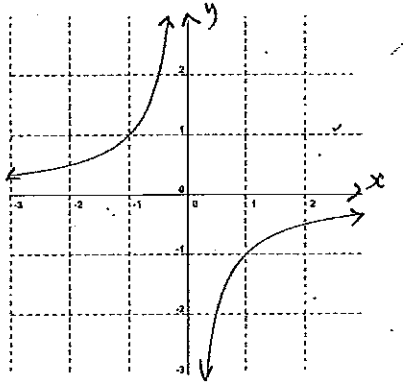
c)



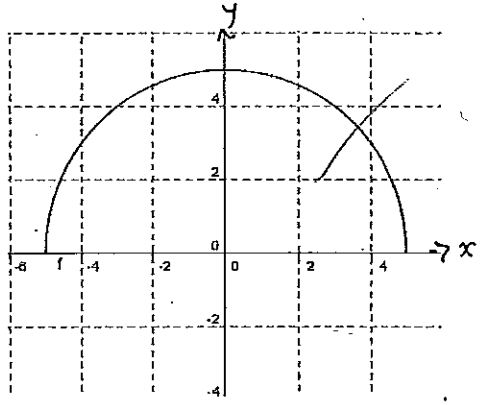
d)



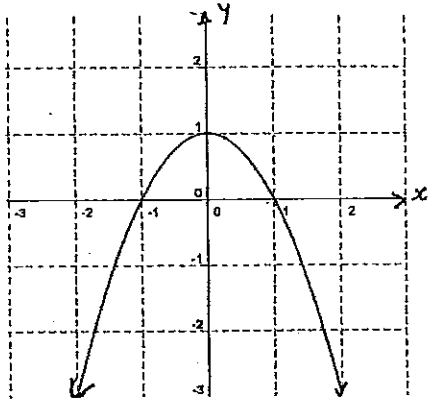
e)



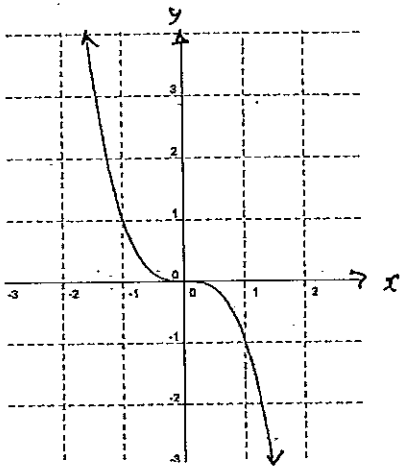
f)



g)



h)



3.

For the parabola $y = x^2 - 4x - 12$

Find

i) the y-intercept

ii) the x-intercept

iii) the axis of symmetry

iv) the vertex .

v) Sketch the parabola, indicating all the features above

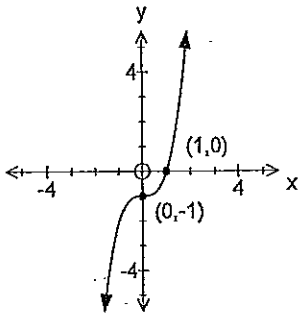
4. Find the length of thw radius in each circle . Answer in simlest surd form where appropriate .

a) $x^2 + y^2 = 49$

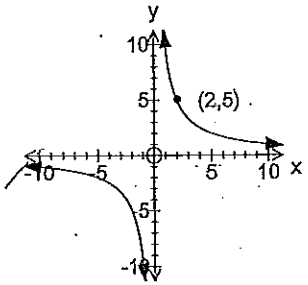
b) $x^2 + y^2 = 23$

c) $x^2 + y^2 = 12.25$

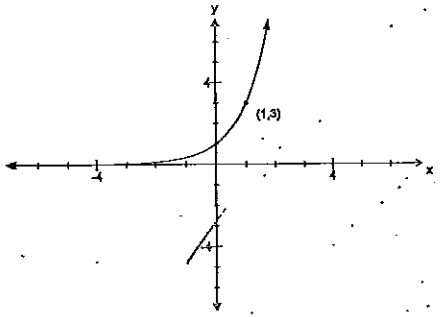
5. Find the equation of given curve (use $= ax^3 + d$)



6. Find the equation of hyperbola ($y = \frac{k}{x}$)



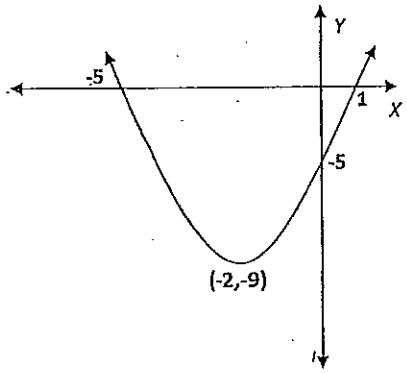
7. Determine the equation of the given graph



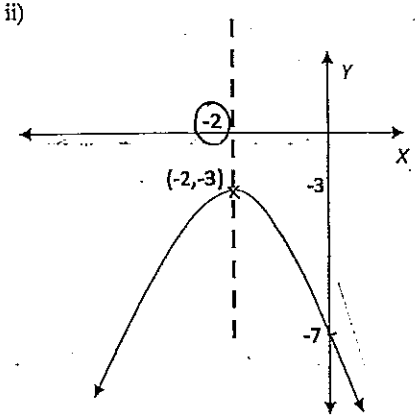
8. Determine the equations of the parabolas below

Leave your answer in the form $y = ax^2 + bx + c$

i)



ii)



STUDENT NAME _____

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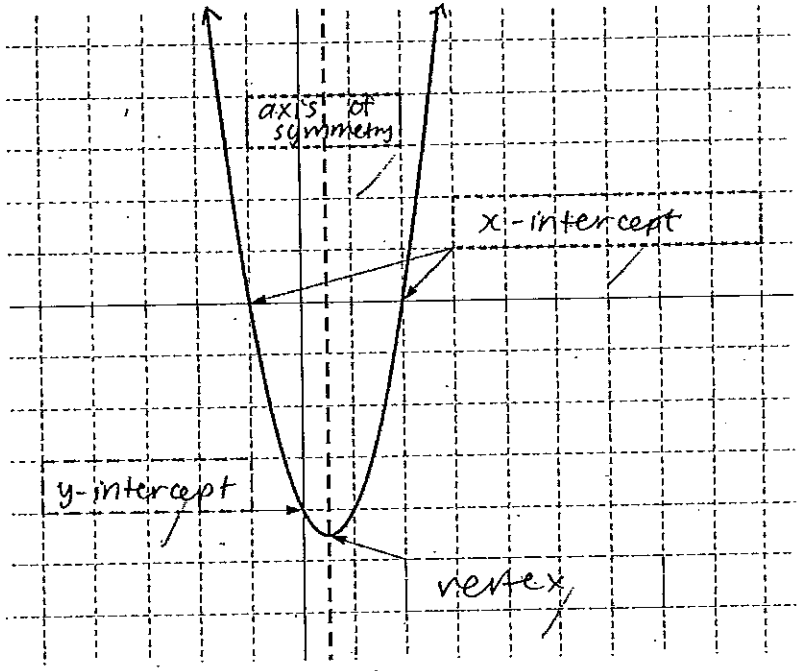
THE PARABOLA AND OTHER NUMBER PLANE GRAPHS TOPIC TEST

1. Complete the feature of the given graph .



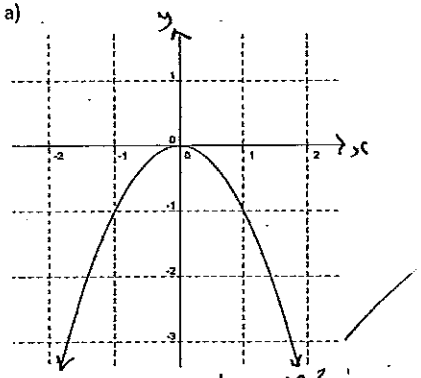
4

2. Match each equation with its sketch (please write the equation under its sketch)

$y = -x^2$, ✓ $y = x^2 - 1$, ✓ $y = -x^2 + 1$, ✓ $y = x^3 - 1$ ✓

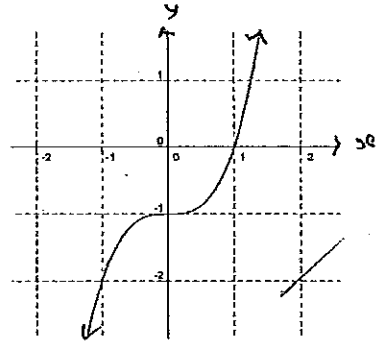
$y = \frac{-1}{x}$, ✓ $(x-2)^2 + (y+2)^2 = 4$, ✓ $y = \sqrt{25 - x^2}$, ✓ $y = -x^3$ ✓

a)



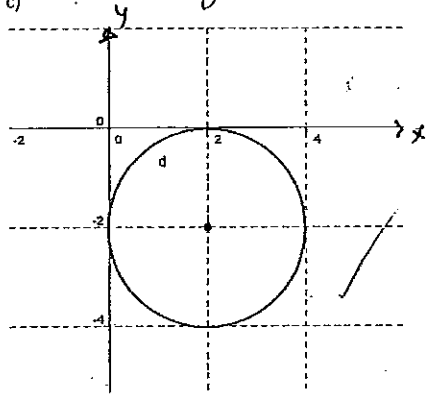
$y = -x^2$

b)



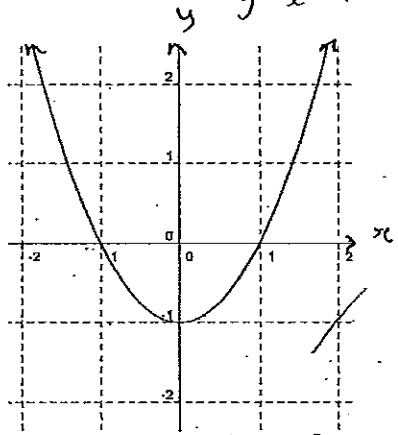
$y = x^3 - 1$

c)



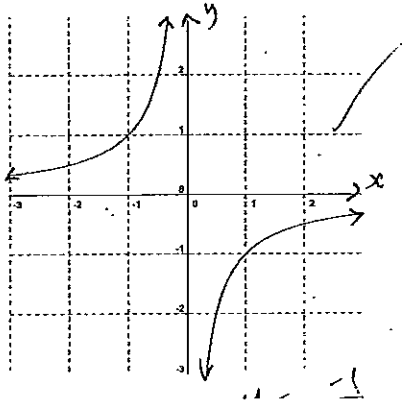
$(x-2)^2 + (y+2)^2 = 4$

d)

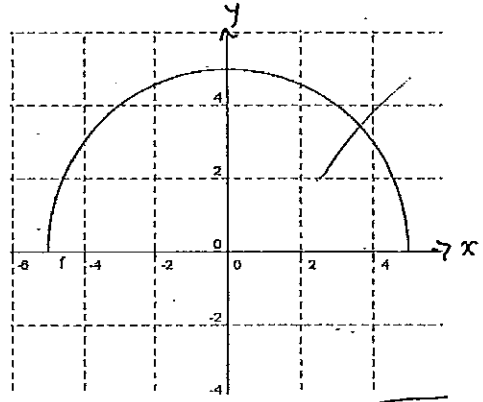


$y = x^2 - 1$

e)



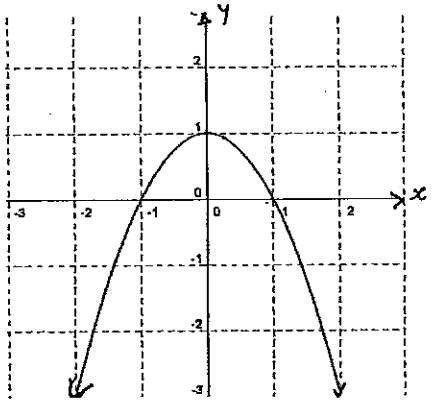
f)



$11 = \sqrt{25 - x^2}$

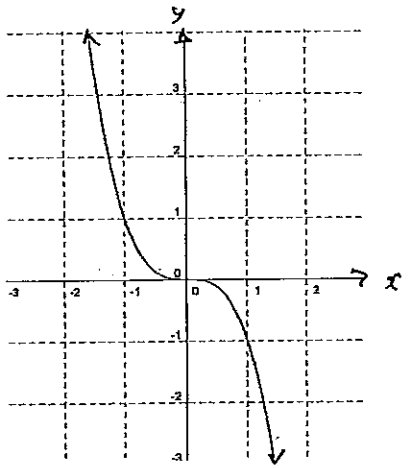
6

g)



$y = -x^2 + 1$

h)



$y = -x^3$

3. For the parabola $y = x^2 - 4x - 12$

Find

i) the y-intercept

let $x = 0$

$y = (0)^2 - 4(0) - 12$

$\therefore y\text{-int} = -12$

ii) the x-intercept

$p = -12$, $s = -4$, $r = -6, 2$

$y = x^2 - 4x - 12$

$y = x^2 + 2x - 6x - 12$

$y = x(x+2) - 6(x+2)$

$y = (x-6)(x+2)$

let $y = 0$

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

$x - 6 = 0$ or $x + 2 = 0$

$x = 6$ or $x = -2$

$\therefore$ x-intercepts are -2 &

iii) the axis of symmetry

$x = \frac{-b}{2a}$

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

$x = \frac{4}{2}$

$x = 2$

$\therefore$ axis of symmetry $= 2$

iv) the vertex

Sub $x = 2$ into the eq : $y = x^2 - 4x - 12$

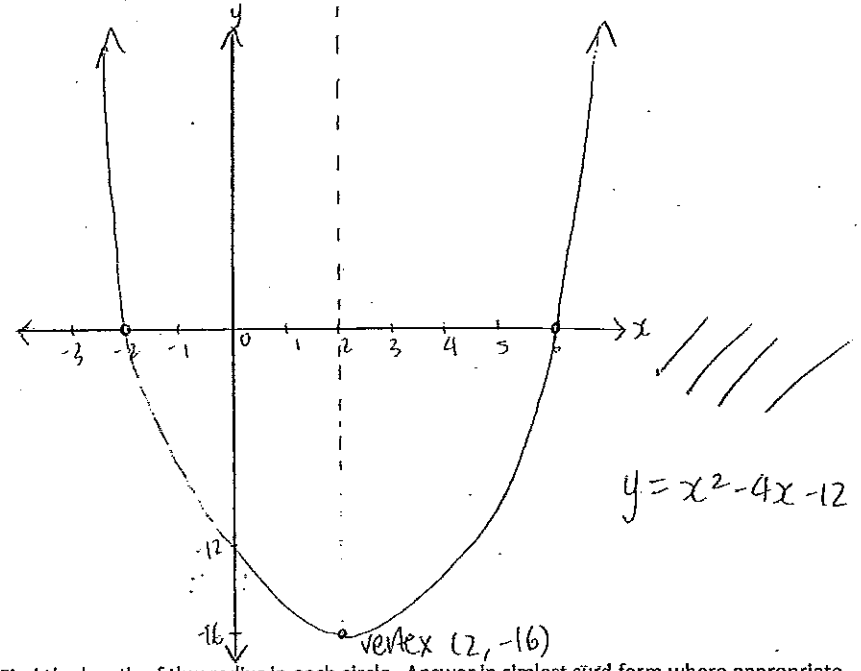
$y = (2)^2 - 4(2) - 12$

$y = 4 - 8 - 12$

$y = -4 - 12$

$y = -16$

v) Sketch the parabola, indicating all the features above



$y = x^2 - 4x - 12$

4. Find the length of thw radius in each circle . Answer in simlest surd form where appropriate .

a) $x^2 + y^2 = 49$

$x^2 + y^2 = r^2$

$r^2 = 49$

$r = \sqrt{49}$

$\therefore$ radius $= 7$ units

b) $x^2 + y^2 = 23$

$x^2 + y^2 = r^2$

$r^2 = 23$

$\therefore$ radius $= \sqrt{23}$ units

c) $x^2 + y^2 = 12.25$

$x^2 + y^2 = r^2$

$r^2 = 12.25$

$r = \sqrt{12.25}$

$\therefore$ radius $= 3.5$ units

5. Find the equation of given curve (use $= ax^3 + d$)

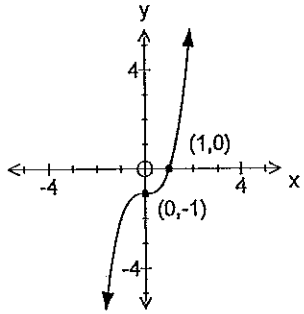
$y = ax^3 + d$

sub in point $\overset{x}{(1}, \overset{y}{0)}$

$0 = a(1)^3 - 1$

$1 = a$

$\therefore$ equation is : $y = x^3 - 1$



6. Find the equation of hyperbola ($y = \frac{k}{x}$)

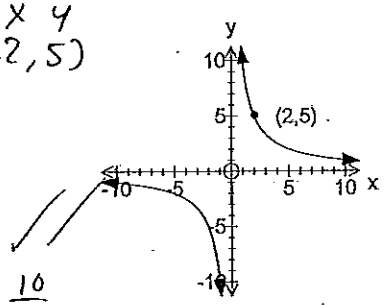
$y = \frac{k}{x}$, sub in point $\overset{x}{(2}, \overset{y}{5)}$

$5 = \frac{k}{2}$ ×2

$k = 5 \times 2$

$k = 10$

$\therefore$ equation is : $y = \frac{10}{x}$



7. Determine the equation of the given graph

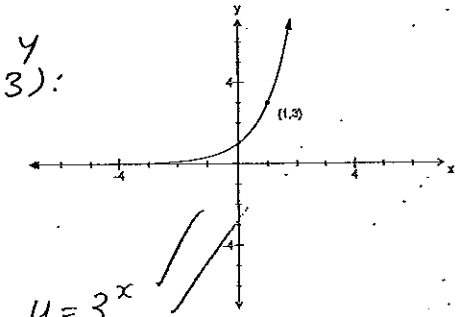
$y = a^x$

sub in point $\overset{x}{(1}, \overset{y}{3)}$:

$3 = a^1$

$a = 3$

$\therefore$ equation is : $y = 3^x$

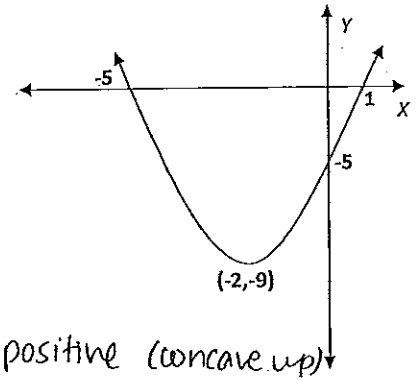


7

8. Determine the equations of the parabolas below

Leave your answer in the form $y = ax^2 + bx + c$

i)



* positive (concave up)

$y = a(x - \alpha)(x - \beta)$

$y = a(x - -5)(x - 1)$

$y = a(x + 5)(x - 1)$

sub in point $\overset{x}{(-2}, \overset{y}{-9)}$:

$-9 = a(-2+5)(-2-1)$

$-9 = a(3)(-3)$

$\frac{-9}{-9} = \frac{-9a}{-9}$

$\therefore a = 1$

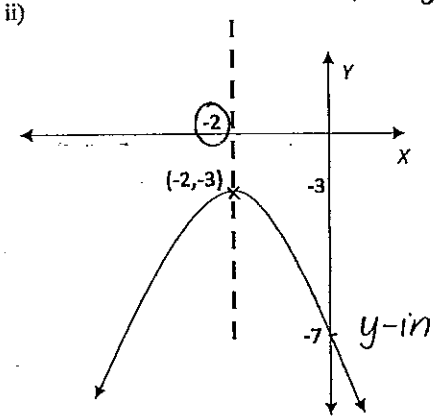
$y = (x + 5)(x - 1)$

$y = x(x - 1) + 5(x - 1)$

$y = x^2 - x + 5x - 5$

$\therefore y = x^2 + 4x - 5$ is the equation

ii)



* concave down

$x = \frac{-b}{2a}$

$x = \frac{-(-4)}{2(-1)} \rightarrow x = \frac{4}{-2}$

$x = -2$

y-int $= -7$, vertex $= (-2, -3)$, axis of symmetry $= -2$

$y = ax^2 + bx + c$

sub in point $\overset{x}{(-2}, \overset{y}{-3)}$:

$x = \frac{-b}{2a}$

$-2 = \frac{-b}{2a}$

$-2 \times 2a = -b$

$-4a = -b$

$\therefore b = 4a$

sub in point $\overset{x}{(-2}, \overset{y}{-3)}$

$y = ax^2 + bx - 7$

$-3 = a(-2)^2 + (4a \times -2) - 7$

$-3 + 7 = 4a - 8a$

$\frac{4}{-4} = \frac{-4a}{-4}$

$\therefore a = -1$

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

$\therefore y = -x^2 - 4x - 7$ is the equation

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