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VCE Mathematical Methods ½
Quadratics [1.3]
Homework

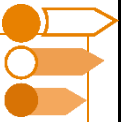
Homework Outline:

Compulsory	Pg 2 – Pg 16
Supplementary	Pg 17 – Pg 31



Section A: Compulsory

Sub-Section [1.3.1]: Rewriting quadratics in different forms



Question 1



Find the factorised forms of these quadratics.

a. $x^2 - 9$

b. $x^2 + 7x$

c. $4 - 4x^2$

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Question 2

a. Factorise $x^2 + 4x + 4$.

b. Express $x^2 + 6x + 8$ in intercept form, $(a(x - b)(x - c))$.

c. Express $x^2 + 6x + 8$ in turning point form, $(a(x - h)^2 + k)$.

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Question 3

a. Factorise: $4x^2 - 8x - 12$.

b. Express $3x^2 - 6x + 5$ in turning point form.

c. Factorise $2x^2 - 7x - 15$.

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Question 4 Tech-Active.

a. Factorise: $12x^2 + 4x - 40$.

b. Express $12x^2 - 120x + 337$ in turning point form.

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Sub-Section [1.3.2]: Find solutions and number of solutions to quadratic equations.

Question 5



Find all real solutions to the following equations:

a. $x^2 - 25 = 0$

b. $3x^2 = 6x$

c. $3x^2 - 27 = 0$

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Question 6

- a. Find all real solutions to the equation $4x^2 + 16x + 16 = 0$.

- b. How many solutions does the equation $x^2 - 4x + 7 = 0$ have?

- c. Find all real solutions to the equation $2x^2 + 2x = 24$.

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Question 7

- a. Find all real solutions to the equation $x(x - 4) = 1$.

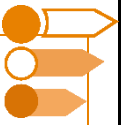
- b. For what values of c does the equation $x^2 - 2x = c$ have two real solutions?

c. Find all real solutions to the equation $9x^2 - 12x - 3 = 0$.

Question 8 Tech-Active.

Find all real solutions to the equation $2x^2 - 20x + 37 = 0$.

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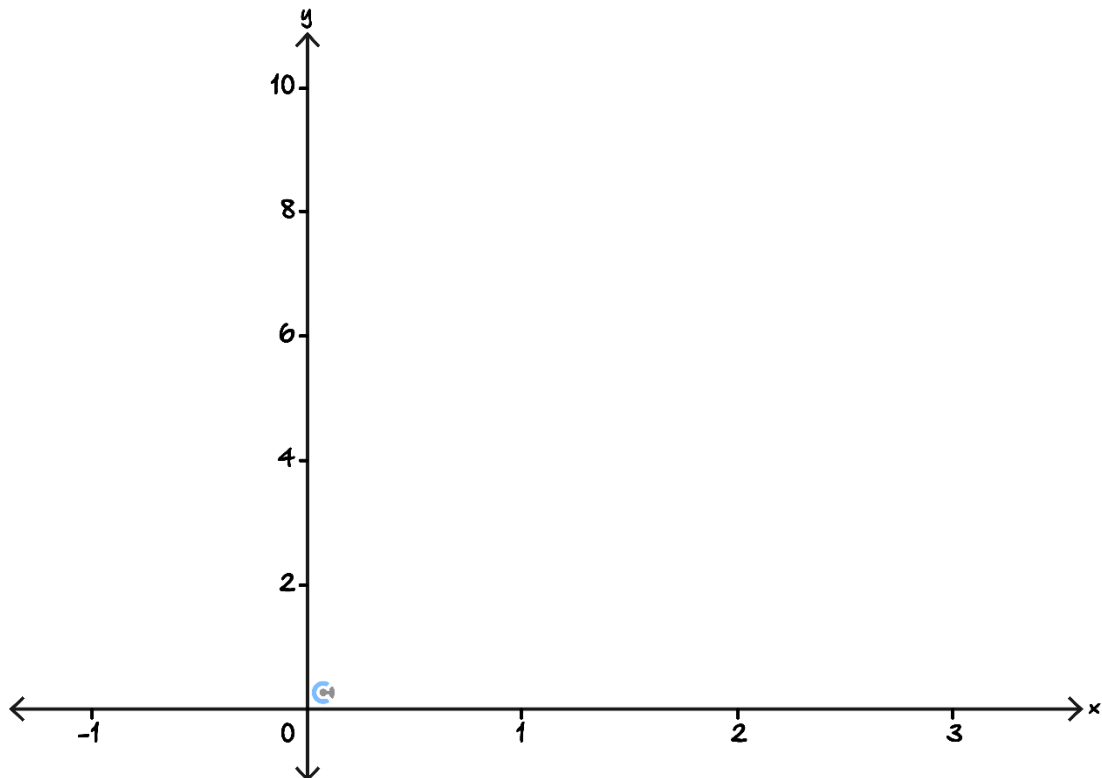


Sub-Section [1.3.3]: Graph and find rules from the graph of quadratic equations.

Question 9



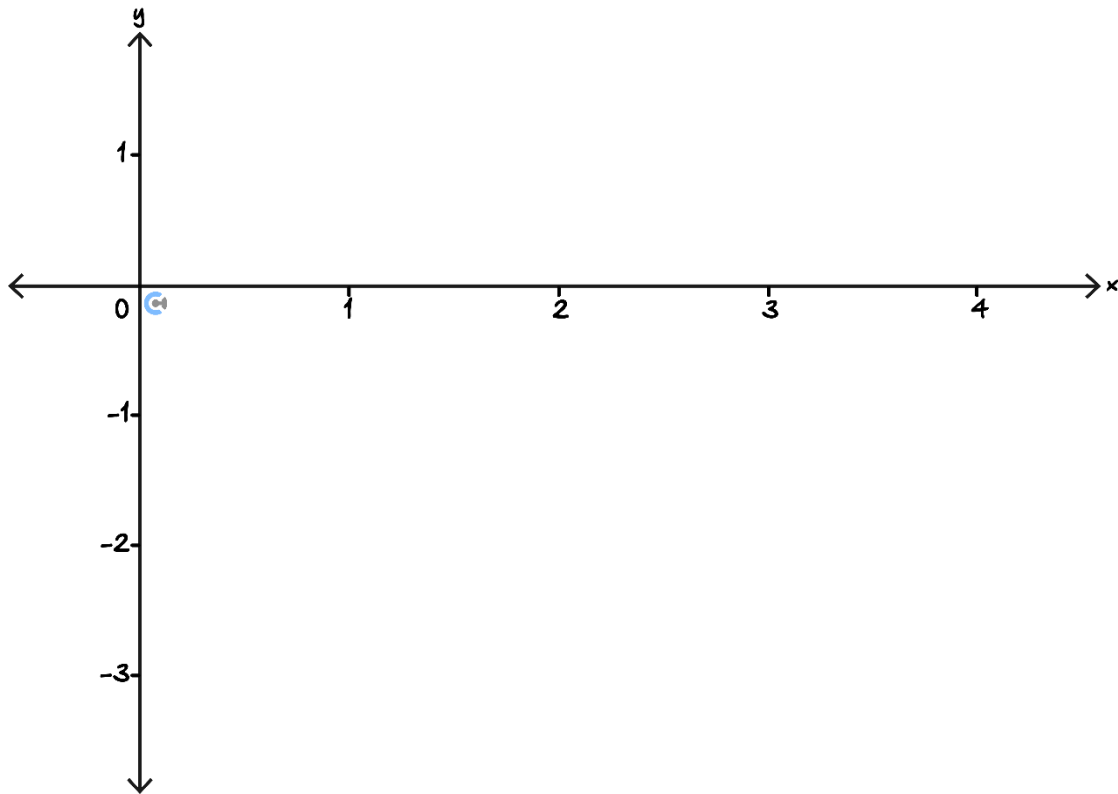
Sketch the graph of $y = (x - 1)^2 + 2$ on the axis below.



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Question 10

Sketch the graph of $y = -\frac{1}{3}(x - 1)(x - 3)$ on the axis below, labelling axis intercepts and turning points with their coordinates.

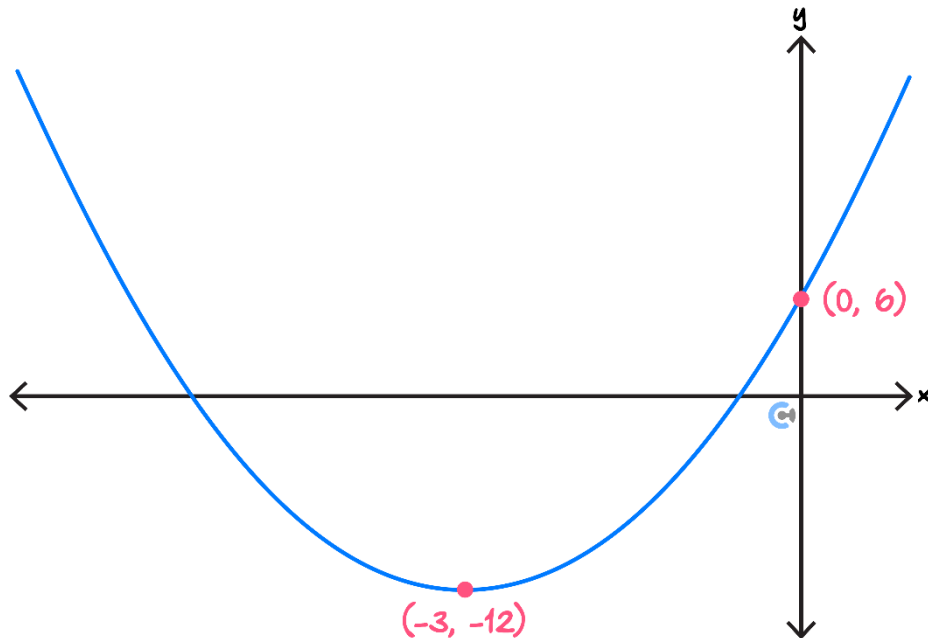


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Question 11

The graph of a parabola is shown below.

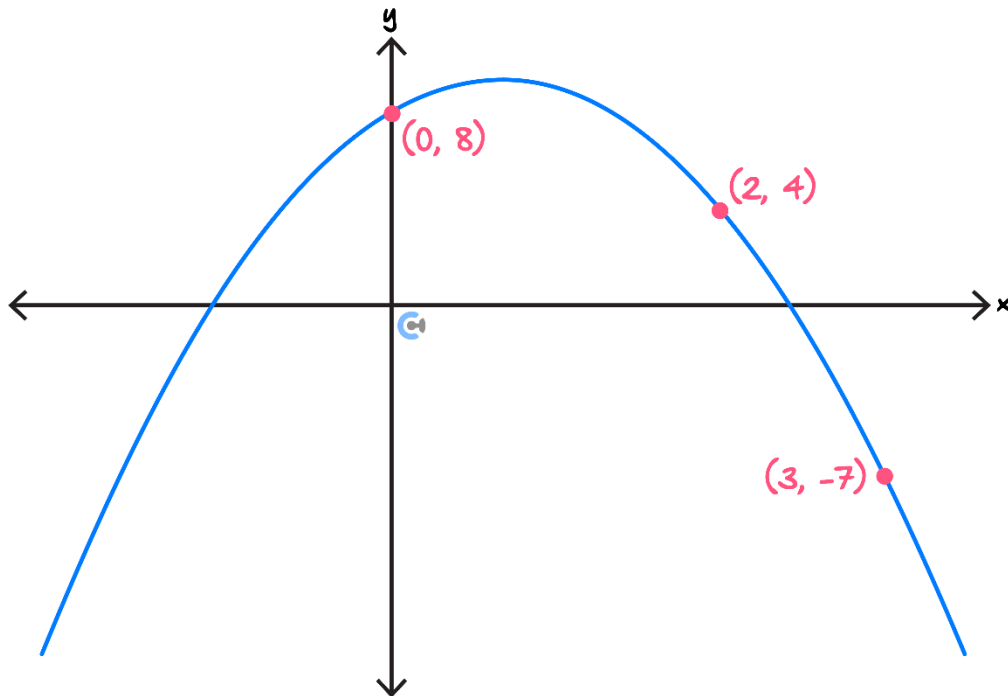


Find the rule of this parabola.

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Question 12 Tech-Active.

The graph of a parabola is shown below.



Find the rule of this parabola.

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Sub-Section [1.3.4]: Solving Quadratic Inequalities and Hidden Quadratics.

Question 13



a. Solve $x^2 - 4 < 0$ for x .

b. Solve $(x - 3)(x + 2) \geq 0$ for x .

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Question 14


Solve $x^4 - 5x^2 + 4 = 0$.

Question 15


Solve $x(6 - x) < 4$ for x .

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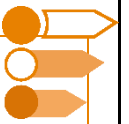
Question 16 Tech-Active.

Solve $-2 < x^2 - 8x + 13 \leq 1$ for x .

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Section B: Supplementary

Sub-Section [1.3.1]: Rewriting quadratics in different forms



Question 17



Find the factorised forms of these quadratics.

a. $x^2 - 4$

b. $x^2 - 3x$

c. $5x^2 + 10x$

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Question 18

a. Express $x^2 + 4x + 3$ in intercept form, $(a(x - b)(x - c))$.

b. Express $x^2 - 2x + 3$ in turning point form, $(a(x - h)^2 + k)$.

c. Factorise: $x^2 + 6x + 9$.

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Question 19

a. Factorise: $3x^2 - 12x - 15$.

b. Express $2x^2 - 12x + 9$ in turning point form.

c. Express $2(x - 1)(x + 3)$ in turning point form.

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Question 20


Factorise $6x^2 - \sqrt{5}x - 5$.

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Sub-Section [1.3.2]: Find solutions and number of solutions to quadratic equations.

Question 21



Find all real solutions to the following equations:

a. $x^2 = -5x$

b. $4x^2 - 16 = 0$

c. $2x^2 - 18x = 0$

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Question 22

- a. Find all real solutions to the equation $x^2 - 10x + 25 = 0$.

- b. How many solutions does the equation $x^2 + 2x - 15$ have?

- c. Find all real solutions to the equation $3(x + 1)^2 = 12$.

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Question 23

- a. Find all real solutions to the equation $x^2 - 6x = 4$.

- b. For what values of a does the equation $ax^2 - 6x = 18$ have no real solutions?

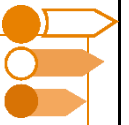
c. Find all real solutions to the equation $5x^2 + 20x = 15$.

Question 24



For what values of b does the equation $2x(b - x) = 5$ have no real solutions?

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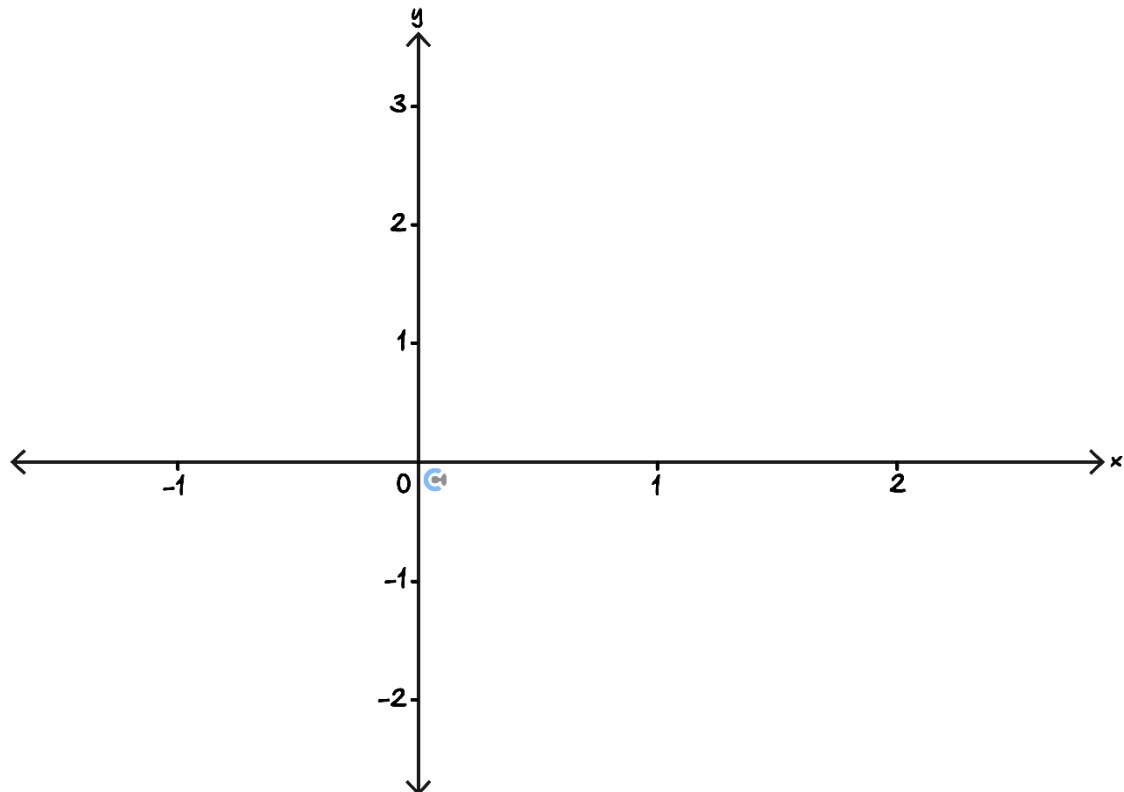


Sub-Section [1.3.3]: Graph and find rules from the graph of quadratic equations.

Question 25



Sketch the graph of $y = (x + 1)(x - 2)$ on the axis below.

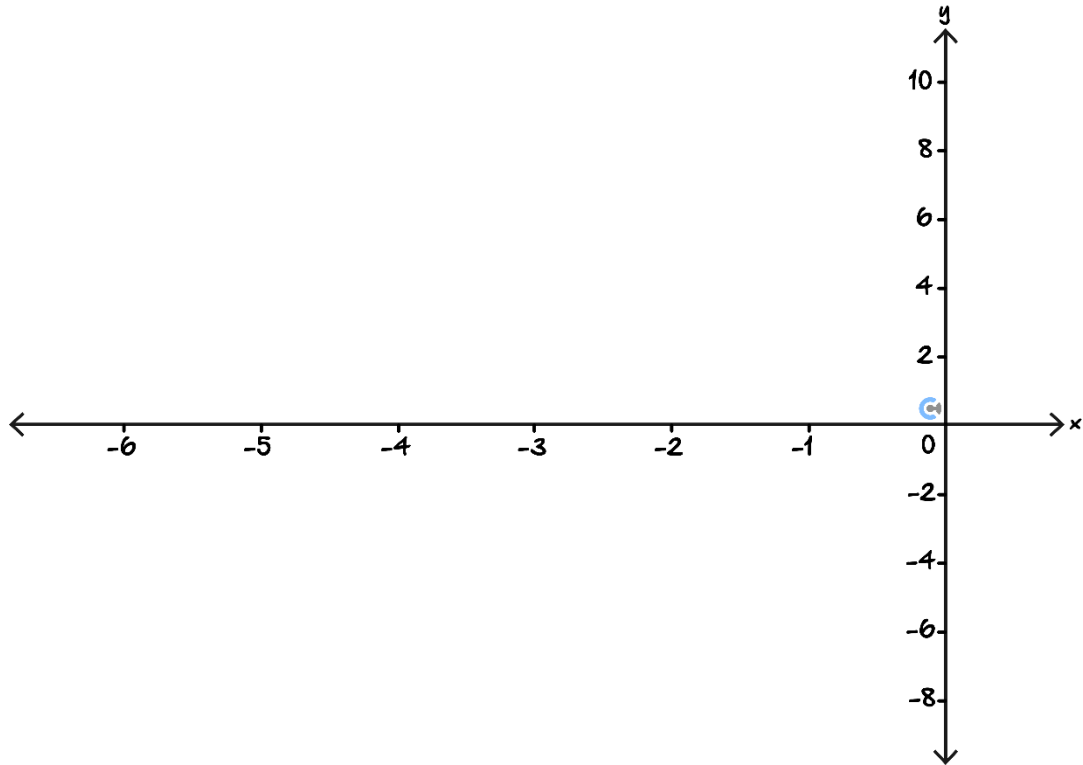


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Question 26

Sketch the graph of $y = 2(x + 3)^2 - 8$ on the axis below, labelling axis intercepts and turning points with their coordinates.

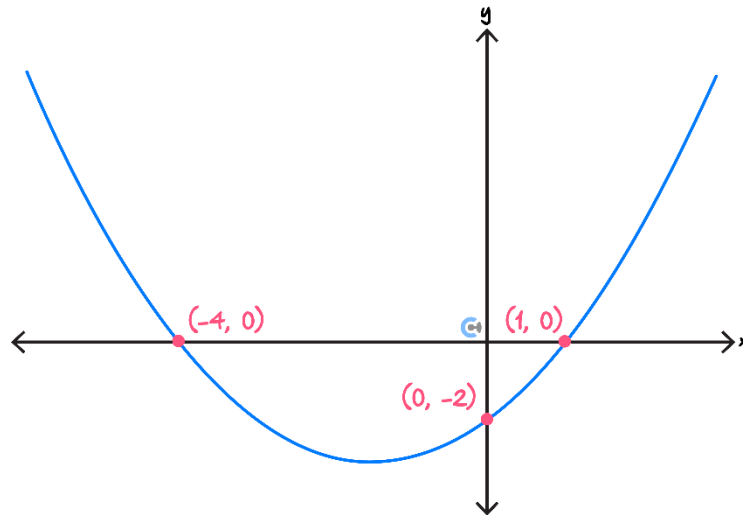


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Question 27

The graph of a parabola is shown below.

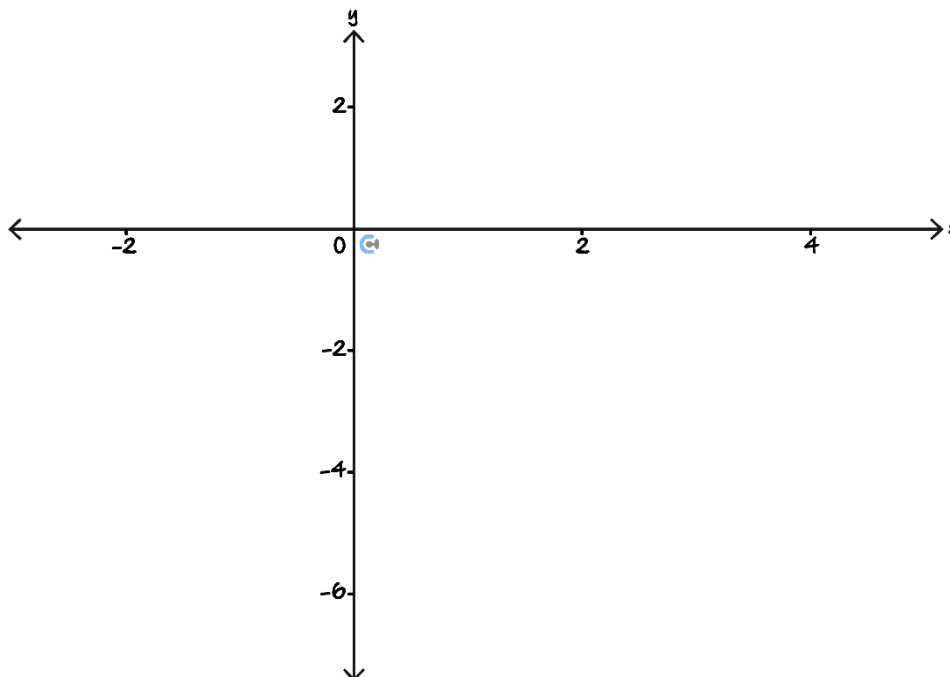


Find the rule of this parabola.

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Question 28

Sketch the graph of $3y = 5 - (x - 1)^2$ on the axis below, labelling axis intercepts and turning points with their coordinates.



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Sub-Section [1.3.4]: Solving Quadratic Inequalities and Hidden Quadratics.

Question 29



a. Solve $x^2 > 1$ for x .

b. Solve $x(x - 2) \leq 3$ for x .

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Question 30


Solve $(x - 1)^4 - (x - 1)^2 = 12$ for x .

Question 31


Solve $x^2 + 6x + 8 \geq 2$ for x .

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Question 32


For what values of x is $ax^2 + bx + c < d$, where $a, b, c, d \in R$, $a < 0$ and $c > d$?

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