Maths

Essential GCSE Maths 29.2

Essential GCSE Maths 29.2

Express the following in completed square form:

Part A Complete the square

$$x^2-x-5$$

$$(x+1)^2-6$$

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

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

$$(x-\frac{1}{2})^2-\frac{21}{4}$$

Part B Complete the square

$$x^2 - 5x + 4$$

$$(x-5)^2-21$$

$$\left(x-\tfrac{5}{2}\right)^2-\tfrac{9}{4}$$

$$(x-5)^2+4$$



Maths

Essential GCSE Maths 29.3

Essential GCSE Maths 29.3

Express the following in completed square form:

Give your answers in the form $b(x+a)^2+c$, use improper (top heavy) fractions rather than mixed fractions in your answers.

Part A Complete the square

$$2x^2 - 8x + 2$$

The following symbols may be useful: $\boldsymbol{\boldsymbol{x}}$

Part B Complete the square

$$3x^2 - 18x - 7$$

The following symbols may be useful: $\boldsymbol{\boldsymbol{x}}$

Maths

Essential GCSE Maths 29.1

Essential GCSE Maths 29.1

Express the following in completed square form:

Part A Complete the square

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

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

$$(x+1)^2 - 8$$

$$(x-1)^2-9$$

$$(x-2)^2-12$$

Part B Complete the square

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

$$(x-3)^2-14$$

$$(x+3)^2-14$$

$$(x+6)^2-5$$

$$(x+6)^2-41$$

Maths

Essential GCSE Maths 27.4

Essential GCSE Maths 27.4

Without drawing graphs, find for each function	Without	drawing	graphs.	find for	each	function:
--	---------	---------	---------	----------	------	-----------

(i) the y-intercept (ii) where the graph crosses the x-axis.

Part A Find information about the curve

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

- (i) Find the y-intercept
- (ii) Where does the graph cross the x-axis?

Enter the lower value.

Enter the higher value.

Part B Find information about the curve

.,	_	r^2	\perp	6x	\perp	5
u	=	\boldsymbol{x}	+	$\mathbf{u}x$	_	υ

- (i) Find the y-intercept
- (ii) Where does the graph cross the x-axis?

Enter the lower value.

Enter the higher value.

Part C Find information about the curve

$$y = x^2 - 8x + 15$$

- (i) Find the y-intercept
- (ii) Where does the graph cross the x-axis?

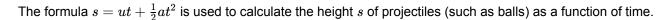
Enter the lower value.

Enter the higher value.



Home Maths Essential GCSE Maths 27.11

Essential GCSE Maths 27.11



Plot a graph of s against t for 0 t 7, given that $u=29.43\,\mathrm{m/s}$ and $a=-9.81\,\mathrm{m/s^2}$.

Part A What is the maximum height?

What is the maximum height reached? Give your answer to 3 s.f..

Part B How long to return to its starting height?

How long does a projectile modelled by this graph take to return to its starting height? You may assume the projectile was launched at t=0. Give your answer to 3 s.f..

Part C What is the relative position of the projectile?

At $t = 7 \, \text{s}$, what is the height of the projectile relative to its starting position? Give your answer to 3 s.f..



Maths

Quadratics: Graphs and Discriminants 3ii

Quadratics: Graphs and Discriminants 3ii



Part A Roots of equation

Find the roots of the equation $x^2 + 8x + 10 = 0$. Give your answer in the form $a \pm b$, where a and b are in simplified surd form.

The following symbols may be useful: \pm

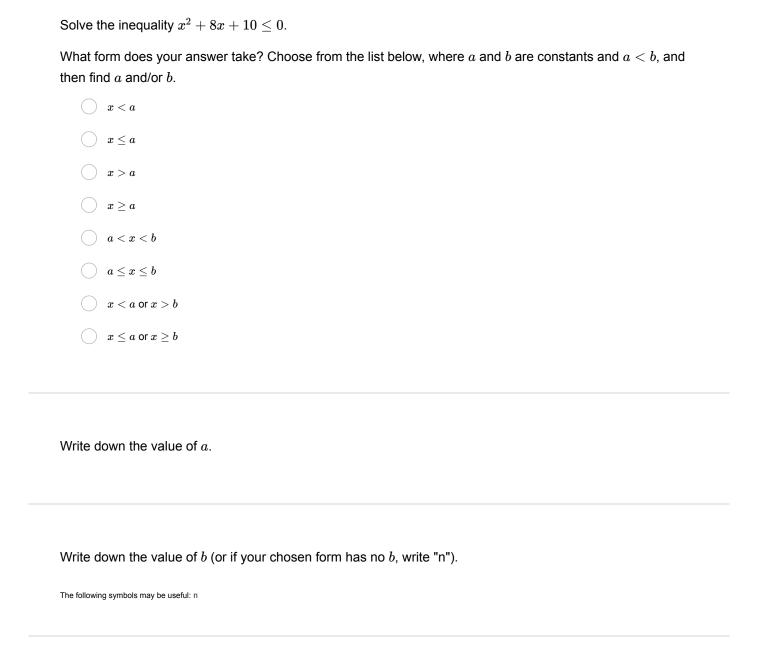
Part B Sketch the curve

Sketch the curve $y=x^2+8x+10$, giving the coordinates of the points where the curve crosses the axes.

Give the y coordinate of the point at which the curve crosses the y-axis.

The following symbols may be useful: y

Part C Solve inequality



Used with permission from UCLES, A Level, January 2008, Paper 4721, Question 6.



Maths

Quadratics: Graphs and Discriminants 2ii

Quadratics: Graphs and Discriminants 2ii



The quadratic equation $x^2 + kx + k = 0$ has no real roots for x.

Part A Find discriminant

Write down the discriminant of $x^2 + kx + k$ in terms of k.

The following symbols may be useful: \boldsymbol{k}

Hence find the set of values k can take.

	hat form does your answer take? Choose from the list below, where a and b are constants and $a < b$, and en find a and/or b .
	$\bigcirc k \leq a$
	k > a
	$igcap k \geq a$
	$\bigcirc a < k < b$
	$\bigcirc a \leq k \leq b$
	$igcap k < a ext{ or } k > b$
	$igcap k \leq a ext{ or } k \geq b$
Wr	ite down the value of a .
	rite down the value of b (or if your chosen form has no b , write "n").
Jsed with pe	rmission from UCLES, A Level, Paper 4721 (specimen).



Maths

Quadratics: Graphs and Discriminants 1ii

Quadratics: Graphs and Discriminants 1ii



Part A Find discriminant

Calculate the discriminant of $-2x^2 + 7x + 3$.

Hence choose the correct option that gives the number of distinct real roots to the equation

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

_		
)	On

The quadratic equation $2x^2 + (p+1)x + 8 = 0$ has equal roots. Find the possible values of p and enter the greatest possible value of p.

The following symbols may be useful: $\ensuremath{\mathbf{p}}$

Used with permission from UCLES, A Level, June 2007, Paper 4721, Question 4.