

Instructions: Read all questions carefully to ensure you understand what is being asked. When completing your official tests / exams, your grade will be based upon your: understanding, fluency, reasoning, and problem solving, so ensure you show all lines of working and draw accurate, labelled diagrams where necessary. (ACiQ|9.0 Mathematics standard elaborations found on final page (general assessment marking standards)). [Practise tests are marked out of a score of 10]. For multiple choice questions, tick or fill in the circle next to the corresponding letter under the question.

Check your work if you have time. Remember: you don't have to start at question one, it's always best to firstly look through the test, highlight the easy looking guestions and complete them first, then secondly, go back through and work on the harder questions. Good luck! And remember to breathe!

$$\sum = \frac{10}{10} = \%$$

Part 1: Multiple Choice (2 marks)

Question 1:

a) Expand 2(x+6).

A.
$$2x + 26$$

B.
$$x + 12$$

C.
$$2x + 8$$

D.
$$2x + 12$$

 \bigcirc A

$$\bigcirc$$
 B

$$\bigcirc$$
 c

$$\bigcirc$$
 D

b) Factorise $8a^2 + 12a$.

- **A.** 4a(2a + 3)
- **B.** 4a(4a + 8)
- **C.** a(4a + 6)
- **D.** 4a(2a + 4)

() A

() B

 \bigcirc C

 \bigcirc D

Question 2:

a) Expand (y - 1)(y + 5).

- **A.** $-y^2 + 4y 5$
- **B.** $y^2 4y 5$
- **C.** $y^2 + 4y 5$
- **D.** $y^2 y 5$

 \bigcirc B

 \bigcirc c

() D

b) Factorise $x^2 + 7x + 12$.

A.
$$(x + 6)(x + 6)$$

B.
$$(x + 3)(x + 4)$$

C.
$$(x + 7)(x + 12)$$

D.
$$(x + 6)(x + 7)$$

	$\overline{}$	
(١	^
(,	-

$$\bigcirc\,\mathbf{B}$$

$$\bigcirc$$
 c

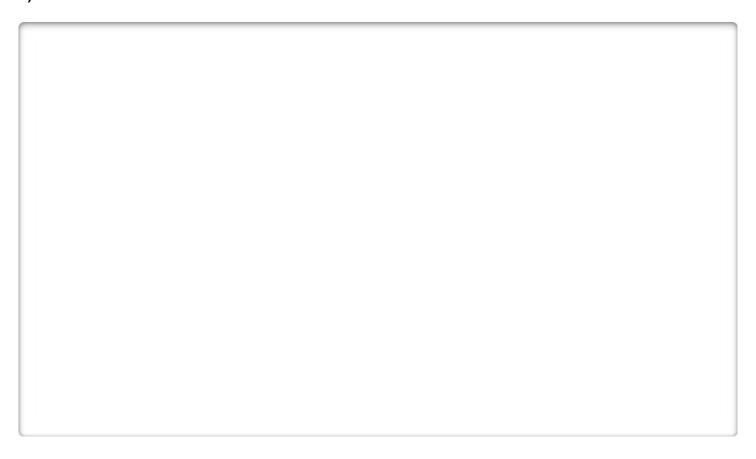
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Part 2: Short Answer (4 marks)

Question 3:

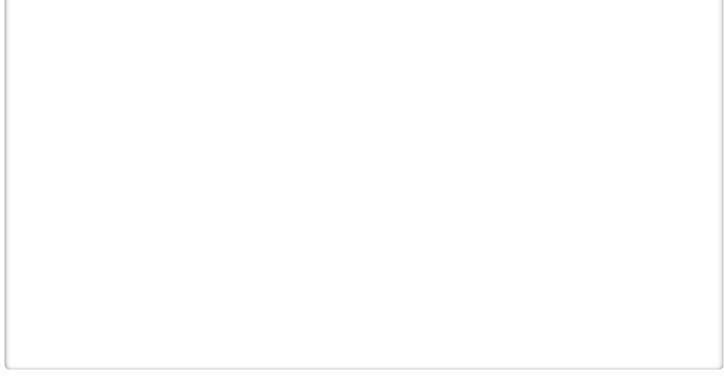
a) Factorise $8a^2 + 12a + 4a$.

		2	_	_
b)	Factorise	x^2 —	5x -	6.



Question 4:

a) Expand and simplify: 4(a-3) + 2(a+1) .

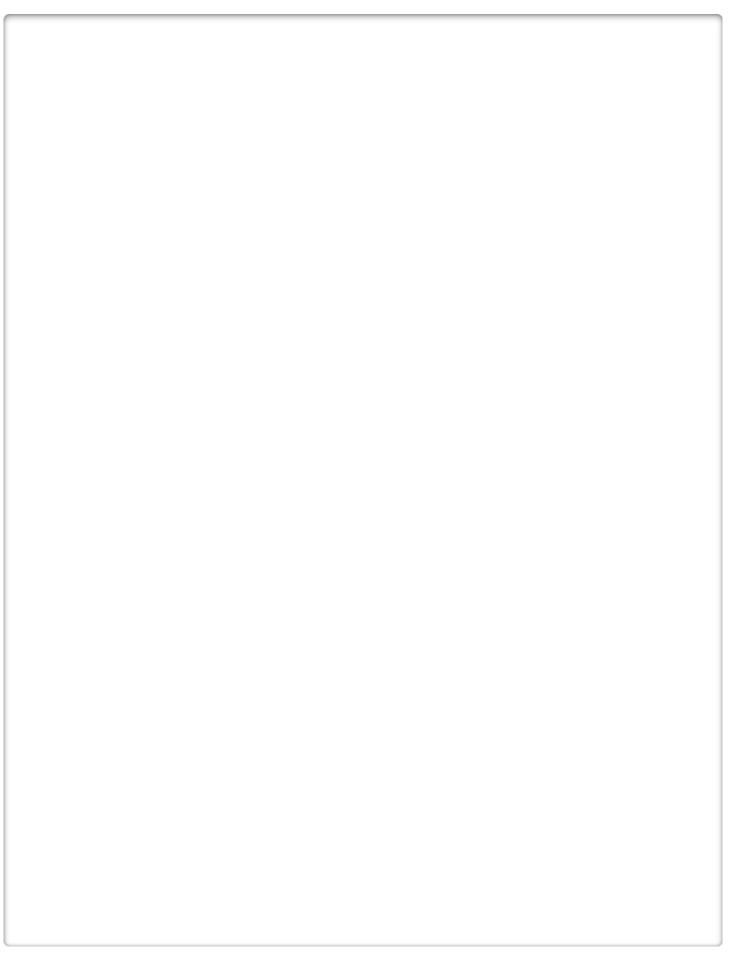


) Expand and simplify: (3y	(-1)(y+4).			
	Part 3: Probler	n Solving (4 n	narks)	
uestion 5:				
Factorise: $-a^2 - 2a + 24$.				



If the area of a rectangle is given by x^2-36 square units, what could be the dimensions of the ctangle?						
uestion 6:) If the area of a	rectangle is c	given by x^2 +	5x + 6 square	e units, what c	ould be the di	imensions of t

	b'	Factorise:	$6a^2 -$	13a +	6.
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Solutions

1. (0.5 marks)

D.
$$2x + 12$$

Using the distributive property:

$$2(x+6)$$

$$= 2 \times x + 2 \times 6$$

$$= 2x + 12$$

$$a(b+c) = ab + ac$$

b. (0.5 marks)

A.
$$4a(2a + 3)$$

The common factor is 4a:

$$→ 8a2 + 12a
= 4a · 2a + 4a · 3
= 4a · (2a + 3)
= 4a(2a + 3).$$

2a. (0.5 marks) (*Use Crab Claw***)**

C.
$$y^2 + 4y - 5$$

 $(y-1)(y+5) = y \cdot y + y \cdot 5 - 1 \cdot + y - 1 \cdot + 5$
 $(-x+=-)$ If signs are:
opposite \rightarrow change to $-$
same \rightarrow change to $+$

Combine like terms: $= y^2 + 4y - 5$.

b. (0.5 marks)

B.
$$(x + 3)(x + 4)$$

Look for two numbers that multiply to 12 (the constant term) and add to 7 (the coefficient of x): Numbers are 3 and 4, so:

$$x^{2} + 7x + 12$$

$$- \times_{-} = 12 \text{ and } _{-} + _{-} = 7$$

$$\rightarrow 3 \times 4 = 12 \text{ and } 3 + 4 = 7$$

$$= (x + 3)(x + 4).$$

$$x^{2} + 7x + 12$$

$$- \times_{-} = +12 \text{ and } _{-} + _{-} = +7$$

$$\rightarrow 3 \times 4 = +12 \text{ and } 3 + 4 = +7$$

$$= (x + 3)(x + 4).$$

3a. (1 mark)

Firstly, collect like terms:

$$8a^2 + 12a + 4a = 8a^2 + 16a$$

The common factor is 4a,

$$8a^{2} + 16a = 4a \cdot 2a + 4a \cdot 4$$
$$= 4a \cdot (2a + 4)$$
$$= 4a(2a + 4).$$

b. (1 mark)

Find pairs of numbers that multiply to -6 and add to -5: Numbers are +1 and -6, so:

$$x^{2} - 5x - 6$$

$$x^{2} - 5x - 6$$

$$- \times_{-} = -6 \text{ and } _{-} +_{-} = -5$$

$$\rightarrow +1 \times -6 = -6 \text{ and } +1 + -6 = -5$$

$$= (x + 1)(x - 6).$$

$$x^{2} - 5x - 6$$

$$- \times_{-} = -6 \text{ and } _{-} +_{-} = -5$$

$$\rightarrow +1 \times -6 = -6 \text{ and } +1 + -6 = -5$$

$$= (x + 1)(x - 6).$$

$$= (x + 1)(x - 6).$$

4a. (1 mark)

$$4(a-3) + 2(a+1)$$

Apply the distributive property to each bracket:

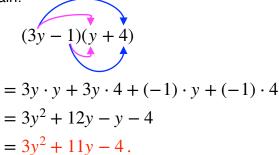
$$4(a-3) = 4a - 12$$
$$2(a+1) = 2a + 2$$

Combine:

$$4a - 12 + 2a + 2$$
$$= 6a - 10.$$

b. (1 mark)

FOIL again:



Remember, mathematicians sometimes use the symbol (·) instead of (×) so we don't get (×) confused with (x) E.g. $2 \times x \equiv 2 \cdot x$

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5a. (1 mark)

Firstly, move the negative one away from the a^2 term:

$$-a^{2} - 2a + 24$$

$$= -1 \times a^{2} - 2a + 24$$

$$= -1 \times a^{2} - 1 \times +2a - 1 \times -24$$

$$= -1 \times (a^{2} + 2a - 24)$$

Then, we factorise inside the brackets and apply the $-1 \times$ at the end:

Factorise :
$$a^2 + 2a - 24$$

We need numbers that multiply to give (-24) and add to give (+2):

$$\rightarrow$$
 _ \times _ = -24 & _ + _ = 2 ?
 \rightarrow 6 \times -4 = -24 & 6 + -4 = 2
So numbers are (+6) and (-4)

$$-1 \times (a^2 + 2a - 24) = -(a^2 + 2a - 24)$$
$$= -(a + 6)(a - 4).$$

b. (1 mark)

Area =
$$x^2 - 36$$

$$x^2 - 36 = x^2 - 6^2$$
 Difference of two squares:
 $= (x - 6)(x + 6)$. Difference of two squares:
 $x^2 - a^2$
 $= (x - a)(x + a)$.

So factorising gives:

Area =
$$(x - 6) \times (x + 6)$$

= Length × Width , which means the dimensions could be:
 $\rightarrow (x - 6)$ units by $(x + 6)$ units.

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6a. (1 mark)

Area =
$$x^2 + 5x + 6$$

 $- \times _= 6 \text{ and } _- + _= 5$
 $\rightarrow 3 \times 2 = 6 \text{ and } 3 + 2 = 5$
 $= (x + 3)(x + 2)$.

So factorising gives:

Area =
$$(x + 3) \times (x + 2)$$

= Length × Width , which means the dimensions could be:
 $\rightarrow (x + 3)$ units by $(x + 2)$ units.

b. (1 mark)

$$6a^2 - 13a + 6$$

We need numbers that multiply to give $(6 \times 6) = 36$ and add to -13:

These numbers are
$$-9$$
 and -4 , so we break $-13a$ into $-9a - 4a$,

Thus,
$$6a^2 - 13a + 6$$

 $= 6a^2 - 9a - 4a + 6$
 $= 6a \times a - 9a - 4a + 6$
 $= 2 \times 3a \times a - 3 \times 3a - 2 \times 2a + 2 \times 3$
 $= 2 \times 3a \times a - 3 \times 3a - 2 \times 2a - 2 \times -3$
 $= 2 \times a \times 3a - 3 \times 3a - 2 \times 2a - 2 \times -3$
 $= 2a \times 3a - 3 \times 3a - 2 \times 2a - 2 \times -3$
 $= 2a \times 3a - 3 \times 3a - 2 \times 2a - 2 \times -3$
 $= 3a(2a - 3) - 2(2a - 3)$
 $= 3a(2a - 3) - 2(2a - 3)$
 $= (3a - 2)(2a - 3)$

$$\sum = \frac{10}{10} = \%$$

General Assessment Marking Standards

Remember: When your official tests are marked, they won't be a score out of 10, they will be a grade (A,B,C,D,E) based on the following standards:

ACiQ v9.0

Year 8 Mathematics standard elaborations

		Α	В	С	D	E			
		The folio of student work contains evidence of the following:							
Mathematical proficiencies	Understanding	accurate and consistent identification, representation, description and connection of mathematical concepts and relationships in complex unfamiliar, complex familiar, and simple familiar situations	accurate identification, representation, description and connection of mathematical concepts and relationships in complex familiar and simple familiar situations	identification, representation, description and connection of mathematical concepts and relationships in simple familiar situations	partial identification, representation and description of mathematical concepts and relationships in some simple familiar situations	fragmented identification, representation and description of mathematical concepts and relationships in isolated and obvious situations			
	Fluency	choice, use and application of comprehensive facts, definitions, and procedures to find solutions in complex unfamiliar, complex familiar, and simple familiar situations	choice, use and application of effective facts, definitions, and procedures to find solutions in complex familiar and simple familiar situations	choice, use and application of facts, definitions, and procedures to find solutions in simple familiar situations	choice and use of partial facts, definitions, and procedures to find solutions in some simple familiar situations	choice and use of fragmented facts, definitions and procedures to find solutions in isolated and obvious situations			
	Reasoning	comprehensive explanation of mathematical thinking, strategies used, and conclusions reached in complex unfamiliar, complex familiar, and simple familiar situations	detailed explanation of mathematical thinking, strategies used, and conclusions reached in complex familiar and simple familiar situations	explanation of mathematical thinking, strategies used, and conclusions reached in simple familiar situations	partial explanation of mathematical thinking, strategies used, and conclusions reached in some simple familiar situations	fragmented explanation of mathematical thinking, strategies used, and conclusions reached in isolated and obvious situations			
	Problem- solving	purposeful use of problem- solving approaches to find solutions to problems.	effective use of problem- solving approaches to find solutions to problems.	use of problem-solving approaches to find solutions to problems.	partial use of problem-solving approaches to make progress towards finding solutions to problems.	fragmented use of problem- solving approaches to make progress towards finding solutions to problems.			

Key shading emphasises the qualities that discriminate between the A-E descriptors

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