

Centre Number						Candidate Number				
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For Examiner's Use	
Examiner's Initials	
Pages	Mark
2-3	
4-5	
6-7	
8-9	
10-11	
12	
TOTAL	



General Certificate of Secondary Education
Higher Tier
November 2010

Mathematics

43602H

Unit 2

Friday 12 November 2010 9.00 am to 10.15 am

H

<p>For this paper you must have:</p> <ul style="list-style-type: none"> mathematical instruments. <p>You must not use a calculator.</p>	
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Time allowed

- 1 hour 15 minutes

Instructions

- Use black ink or black ball-point pen. Draw diagrams in pencil.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- Do all rough work in this book.

Information

- The marks for questions are shown in brackets.
- The maximum mark for this paper is 66.
- The quality of your written communication is specifically assessed in questions 8, 13 and 18. These questions are indicated with an asterisk (*)
- You may ask for more answer paper and graph paper. These must be tagged securely to this answer booklet.

Advice

- In all calculations, show clearly how you work out your answer.



Answer **all** questions in the spaces provided.

- 1** Use approximations to estimate the value of $\frac{\sqrt{98.7}}{1.94}$
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- Answer (2 marks)

- 2** You are given that $23.5 \times 64 = 1504$

- 2 (a)** Work out 23.5×6.4
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- Answer (1 mark)

- 2 (b)** Work out $\frac{1504}{640}$
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- Answer (1 mark)

- 2 (c)** Work out 23.5×65
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- Answer (2 marks)



3 The value of $\frac{x(y + 2)}{9}$ is -10

Work out a possible pair of values for x and y .

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Answer $x = \dots\dots\dots y = \dots\dots\dots$ (2 marks)

4 Liz has a £20 voucher for an online music shop.
She buys ten songs costing 80p each.

What percentage of her voucher has Liz spent?

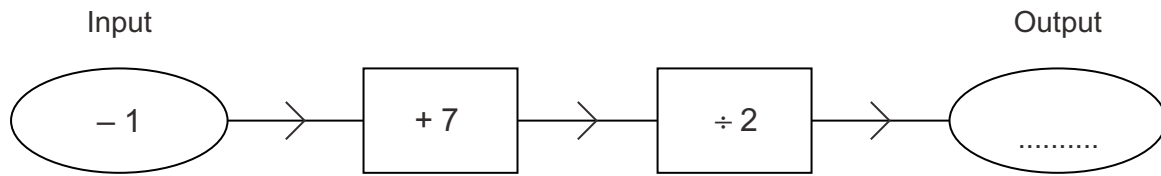
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Answer% (3 marks)

Turn over for the next question



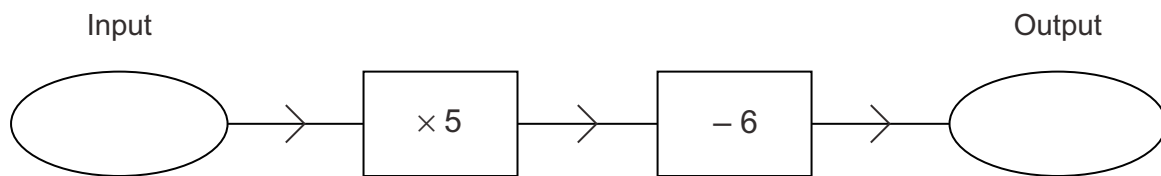
5 (a) Here is a number machine.



Calculate the output when the input is -1

(1 mark)

5 (b) Here is a different number machine.



The output is equal to the input.

Work out the input.

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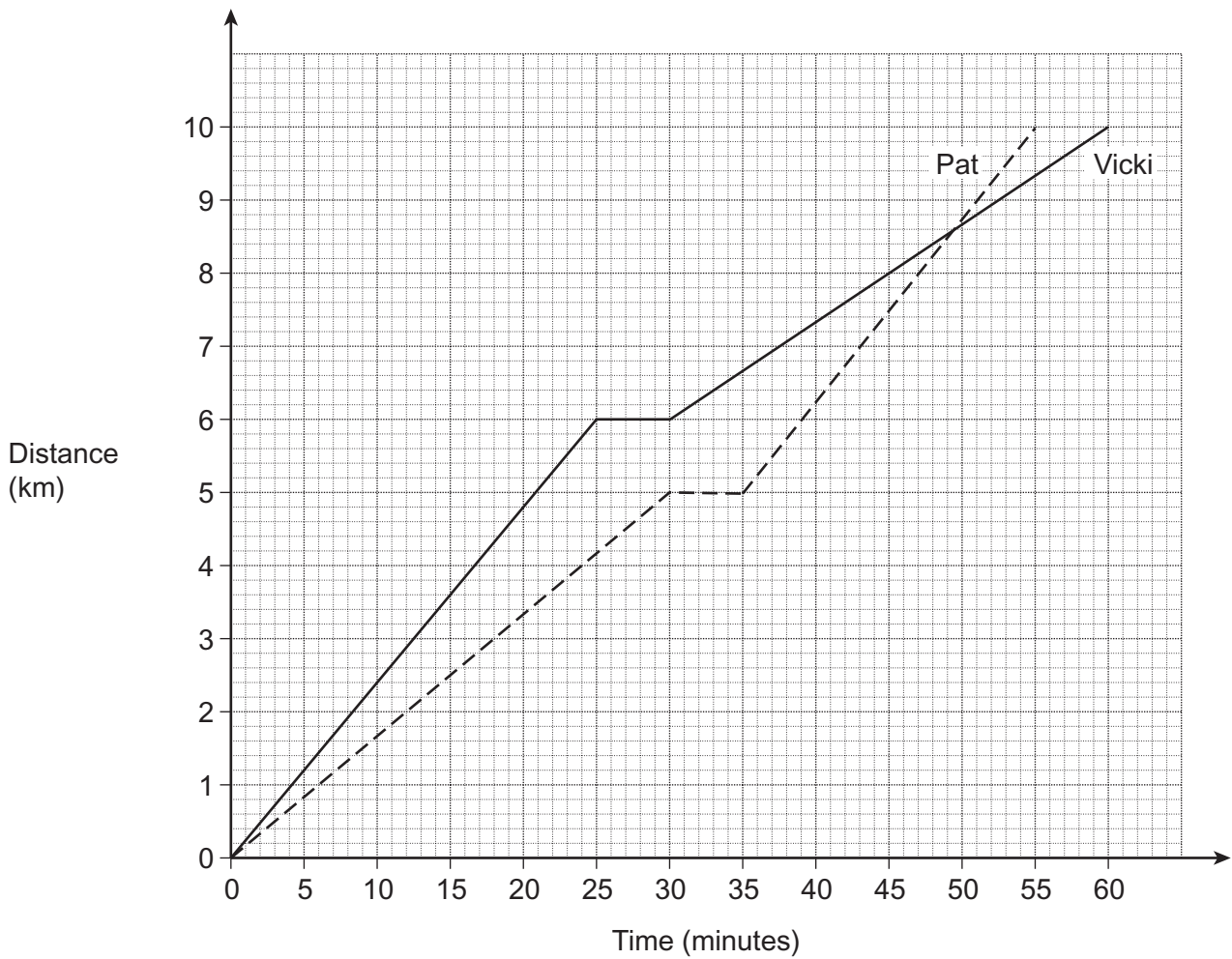
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Answer

(3 marks)



6 The graph shows two training runs by Pat and Vicki.



6 (a) After how many minutes does Pat overtake Vicki?

Answer minutes (1 mark)

6 (b) How far ahead is Vicki when Pat starts again after her rest?

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Answer km (2 marks)



7 Divide £600 in the ratio 9 : 6 : 5

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Answer £ : £ : £ (3 marks)

*8 Martha sells jars of jam at a farmers' market.
She has 80 jars to sell at £3 each.
She sells 50 jars and then reduces the price by 40%.
Martha then sells the remaining jars at the reduced price.

It costs her £95 to make the jars of jam.
Her target is to make a profit of at least £100.

Does she meet her target?
You **must** show your working.

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(5 marks)



9 (a) Solve $\frac{x}{5} = -6$

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Answer $x =$ (1 mark)

9 (b) Factorise fully $4t - 20$

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Answer (1 mark)

9 (c) Expand and simplify $3(2m - 4) + 5(m + 2)$

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Answer (2 marks)

9 (d) Simplify fully $4gk^2 \times 2g^3k^3$

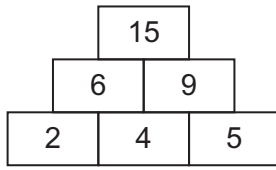
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Answer (2 marks)

9 (e) Factorise fully $10q^2 - 15qr$

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Answer (2 marks)

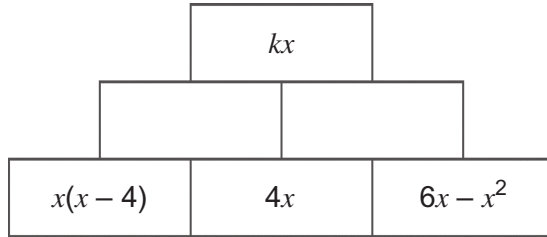


10 Here is an addition pyramid.



Each number is the sum of the two numbers below it.

Here is an algebraic addition pyramid.



Work out the value of k .

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Answer $k =$ (4 marks)

11 Work out the value of $27^{\frac{2}{3}}$

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Answer (2 marks)



12 Dan has lost weight.
He now weighs 108 kg.
He has lost 10% of his weight since March.

How much did he weigh in March?

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Answer kg (3 marks)

*13 The rule for finding the next term in a sequence is

Subtract a and then multiply by 4

The second term is 12.
The third term is 52.

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Work out the first term of the sequence.

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Answer (4 marks)

13

Turn over ►



14 (a) Show clearly that $(x + 5)(x - 5) \equiv x^2 - 25$

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(1 mark)

14 (b) Simplify $\frac{3x^2 - 19x + 20}{x^2 - 25}$

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Answer (3 marks)

15 Make y the subject of the formula $3y - p = h(2 + y)$

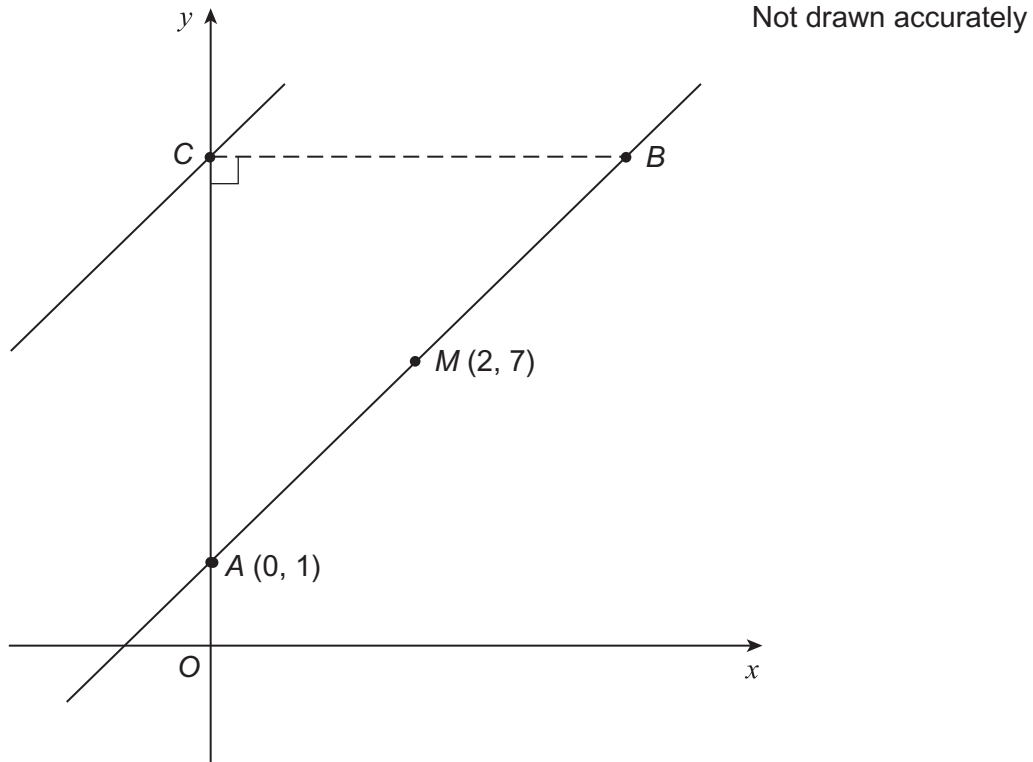
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Answer (4 marks)



16

On the grid, A is the point $(0, 1)$.
The midpoint, M , of AB is $(2, 7)$.
The gradient of AB is 3.



Work out the equation of the line through C that is parallel to AB .

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Answer (3 marks)

Turn over for the next question



17 Write $\frac{6}{\sqrt{3}} + \sqrt{75}$ in the form $a\sqrt{3}$, where a is an integer.

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Answer (4 marks)

*18 Two integers have a difference of 3.
The difference between the squares of the two integers is three times the sum of the integers.

For example, $13 - 10 = 3$, $13^2 - 10^2 = 169 - 100 = 69$
and $3 \times (13 + 10) = 3 \times 23 = 69$

Prove this result algebraically.

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(4 marks)

END OF QUESTIONS

8

