Centre Number						Candidate Number				
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Other Names										
Candidate Signature										

For Examiner's Use	
Examiner's Initials	
Pages	Mark
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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

For this paper you must have:
- mathematical instruments.

You must **not** use a calculator.

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 = ... y = ... *(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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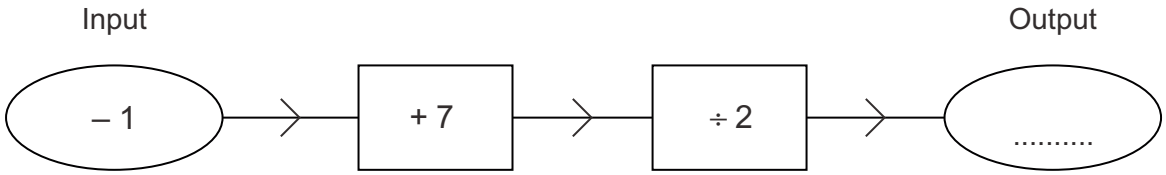
Answer .....% *(3 marks)*

Turn over for the next question

11

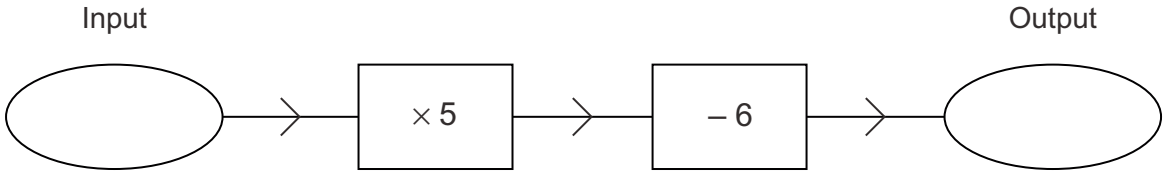
5 (a) Here is a number machine.



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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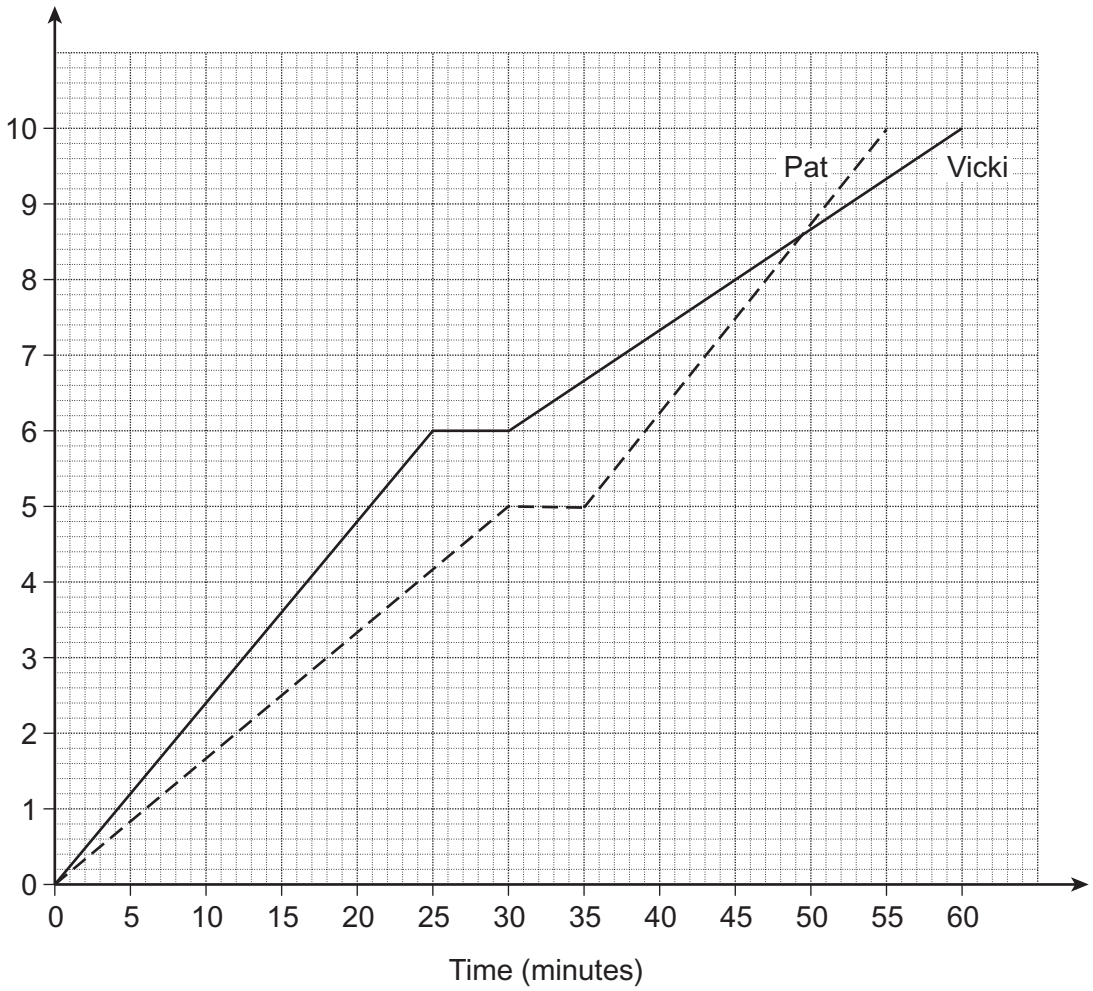
Answer ..... *(3 marks)*

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

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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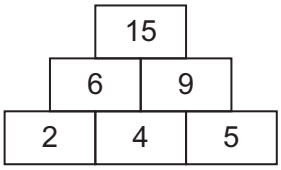
Answer ..... *(2 marks)*

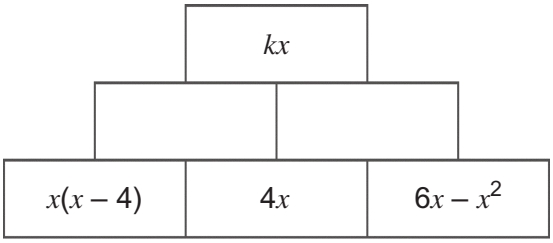
16

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.

…. 12 52 ….

Work out the first term of the sequence.

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Answer ..... *(4 marks)*

13

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

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(1 mark)

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

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Answer ..... *(3 marks)*

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

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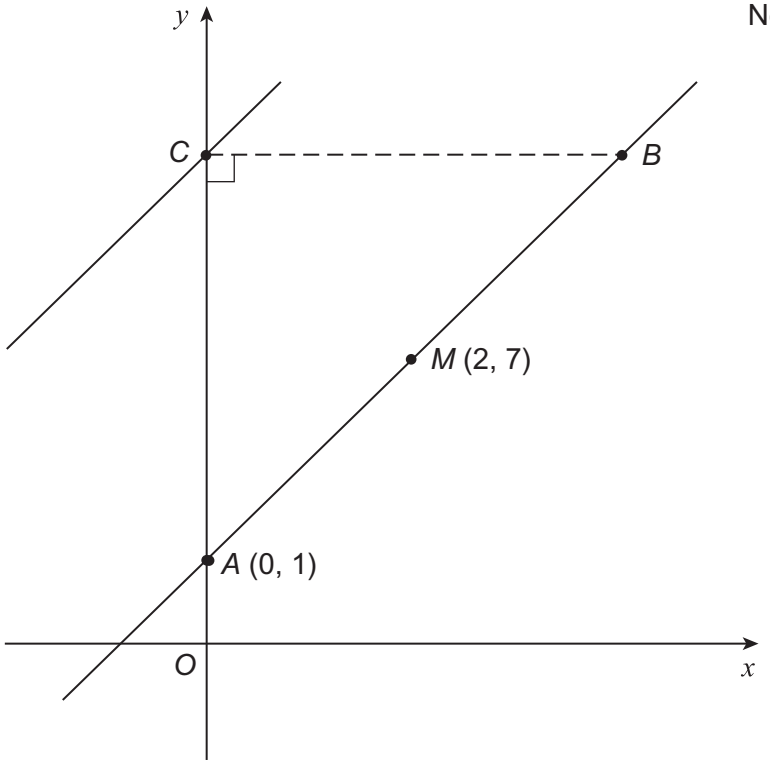
Answer ..... *(4 marks)*

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



Not drawn accurately

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

11

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)

8

END OF QUESTIONS