

Level 6 Fifteen Minute Warm Up 9

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Q1. Completing rules

Look at the information.

$x = 4$	$y = 13$
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Complete the rules below to show **different** ways to get y using x .
The first one is done for you.

To get y , **multiply** x by2..... and **add**5.....

This can be written as $y = \dots\dots\dots 2x + 5\dots\dots\dots$

Handwritten mark To get y , **multiply** x by and **add**

This can be written as $y = \dots\dots\dots$

1 mark

To get y , **multiply** x by and **subtract**

This can be written as $y = \dots\dots\dots$

1 mark

To get y , **divide** x by and **add**

This can be written as $y = \dots\dots\dots$

1 mark

Q2. Consideration

(a) Give an example to show the statement below is **not** correct.

When you multiply a number by 2, the answer is always greater than 2

Handwritten mark

1 mark

(b) Now give an example to show the statement below is **not** correct.

When you subtract a number from 2, the answer is always less than 2

Handwritten mark

1 mark

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(c) Is the statement below correct for all numbers?

The square of a number is greater than the number itself.

Handwritten mark

Yes

No

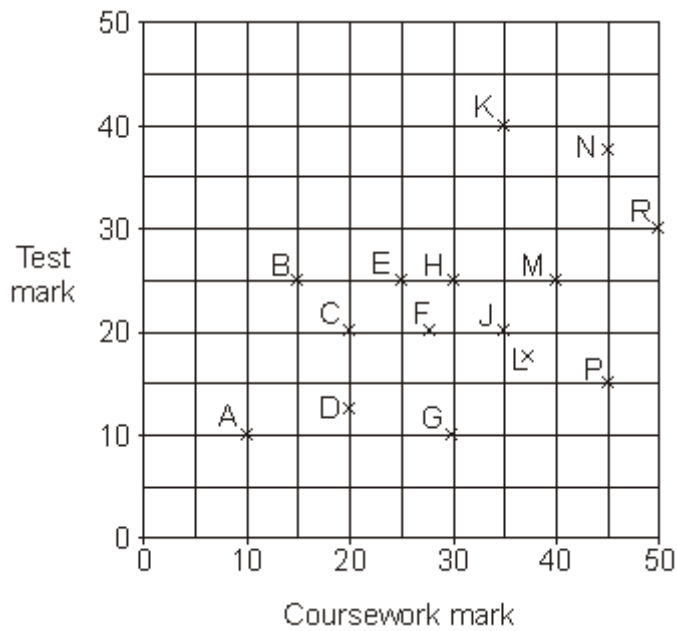
Explain how you know.

Handwritten mark

1 mark

Q3. Test

The scatter graph shows 15 pupils' coursework and test marks.



To find a pupil's **total** mark, you add the coursework mark to the test mark.

(a) Which pupil had the highest **total** mark?

Handwritten mark

.....

1 mark

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- (b) Look at the statement below. Tick (✓) True or False.

The range of coursework marks was greater than the range of test marks.



Yes

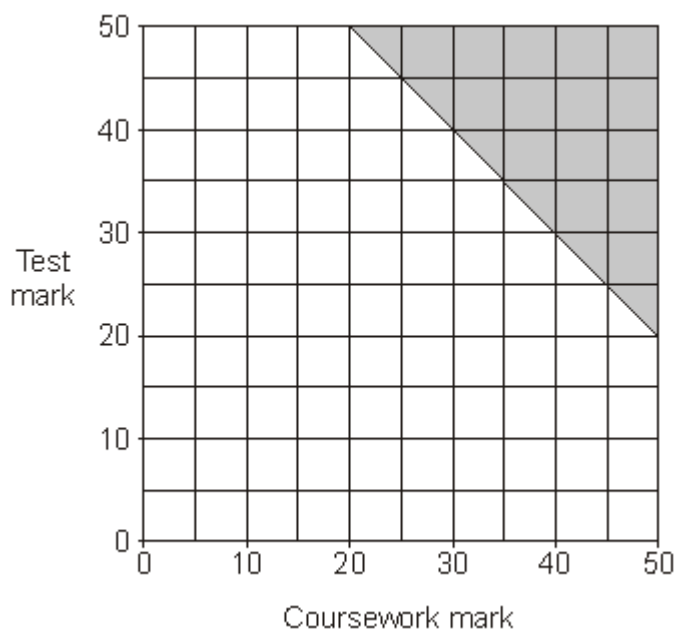
No

Explain your answer.



1 mark

- (c) Pupils with total marks in the shaded region on the graph win a prize.



What is the **smallest total mark** needed to win a prize?



.....

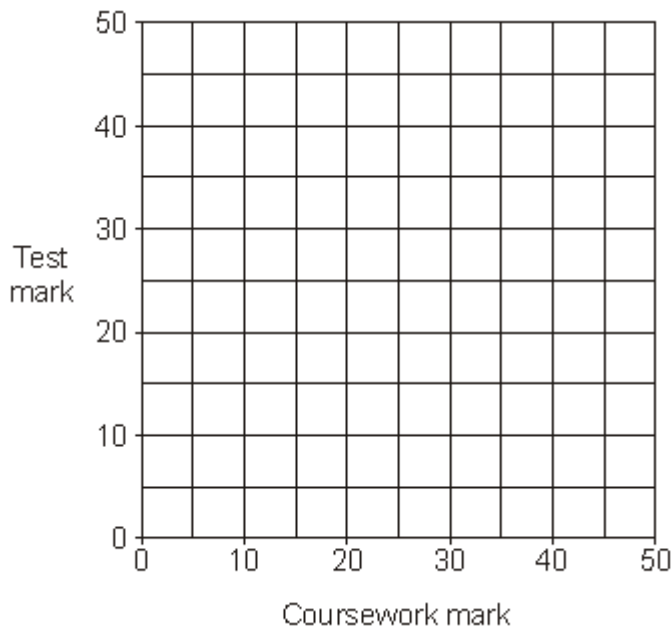
1 mark

- (d) Another school has a different rule for pupils to win a prize.

Rule: The coursework mark must be 25 or more, and the test mark must be 25 or more, and the total mark must be 65 or more.

On the graph below, shade the region of total marks for which pupils would win a prize.

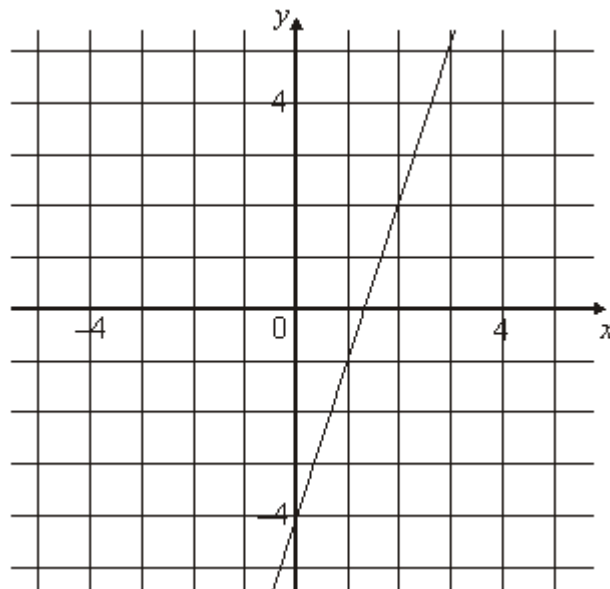
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2 marks

Q4. Straight line graph

The graph shows the straight line with equation $y = 3x - 4$



- (a) A point on the line $y = 3x - 4$ has an **x -coordinate of 50**

What is the y -coordinate of this point?

.....

1 mark

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- (b) A point on the line $y = 3x - 4$ has a **y-coordinate of 50**

What is the x -coordinate of this point?

.....

1 mark

- (c) Is the point $(-10, -34)$ on the line $y = 3x - 4$?

Yes No

Show how you know.

.....

1 mark

Q5. Simplify

Write these expressions as simply as possible.

.....

$$9 - 3k + 5k = \dots\dots\dots$$

1 mark

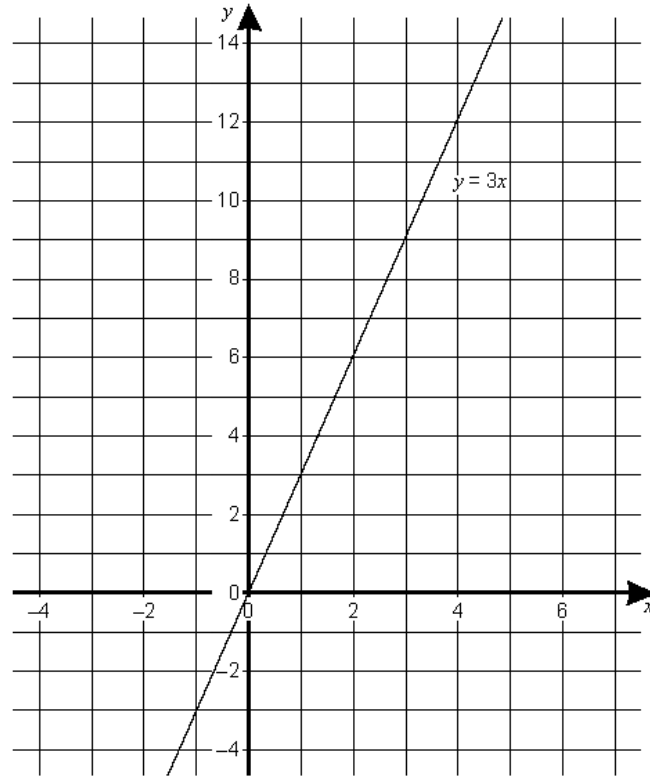
$$k + 2k + 4k = \dots\dots\dots$$

1 mark

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Q6. Straight lines

The graph shows a straight line. The equation of the line is $y = 3x$



Does the point (25, 75) lie on the straight line $y = 3x$?

Tick (✓) Yes or No.

Yes No

Explain how you know.

1 mark

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M1. Gives two correct values in the correct order, and a correct expression in x

eg

- 3, 1, $3x + 1$
- 1, 9, $x + 9$
- -2, 21, $-2x + 21$

1

Gives two correct values in the correct order, and a correct expression in x

eg

- 4, 3, $4x - 3$
- -2, -21, $-2x - -21$
- x , 3, $x^2 - 3$

1

Gives two correct values in the correct order, and a correct expression in x

eg

- 2, 11, $\frac{x}{2} + 11$
- 0.5, 5, $2x + 5$ (or $\frac{x}{0.5} + 5$)
- 1, 9, $x + 9$

1

Do not accept: for the first mark, given example repeated
! Unconventional notation

eg, for $x + 9$

- $1 \times x + 9$

Condone

[3]

M2. (a) Gives a correct counter example, using a value that is less than or equal to one

eg

- $-4 \times 2 = -8$ which is not greater than 2
- $0.1 \times 2 = 0.2$, $0.2 < 2$
- $2 \times 1 = 2$ which is not greater than 2

or

Gives a correct general explanation

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eg

- Two times a negative number is less than 2
- Double a number between 0 and 1 is not greater than 2

U1

(b) Gives a correct counter example, using a value that is less than or equal to zero

eg,

- $2 - (-3) = 5, 5 > 2$
- $2 - 0 = 2$ which is not less than 2

or

Gives a correct general explanation

eg

- Two minus a negative number is greater than 2

U1

(c) Indicates No and gives a correct counter example, using a value that is greater than or equal to zero and less than or equal to one

eg

- $1^2 = 1$ which is equal not bigger
- $0 \times 0 = 0$, so it stays the same
- $\left(\frac{1}{2}\right)^2 = \frac{1}{4}$ but $\frac{1}{4} < \frac{1}{2}$
- $0.1 \times 0.1 = 0.01$, not greater than 0.1

or

Indicates No and gives a correct general explanation

eg

- When you square a number between 0 and 1 the answer gets smaller not bigger
- Fractions bigger than zero that are not top heavy get smaller when squared

U1

! Throughout the question, the result of their counter example is not shown and/or the comparison is not explicit

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Condone provided only one of these aspects is omitted

eg, for part (a) accept

- $-4 \times 2 = -8$
- $-4 \times 2 < 2$

However, penalise only the first occurrence of both aspects omitted

eg, for part (a)

- -4×2

! Throughout the question, their general statement makes no explicit comparison

Condone

eg, for part (a) accept

- Multiply it by a negative number
- Numbers less than 1

eg, for part (b) accept

- Take away a negative number
- Numbers less than 0

eg, for part (c) accept

- Take a number from 0 to 1 and square it
- Positive numbers that are decimals starting with nought point...

! Throughout the question, other numerical examples or general reasoning given alongside a correct response

Ignore other numerical examples, even if they are incorrect or support the given statement
If a correct counter example is given, ignore any general explanation unless it contradicts the counter example given

Accept for part (c), minimally acceptable counter example

eg

- $1^2 = 1$
- 0×0 is not greater than 0

- $\left(\frac{1}{2}\right)^2 < \frac{1}{2}$

Do not accept for part (c), incorrect response

eg

- $(-2)^2 = -4$ which is less than -2
- It's not true for negative numbers

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- *It is only true for numbers that are bigger than 1*
- *It is not true for numbers that are smaller than 1*
- *It's not true for decimals or fractions*
- *It's only false when the number is 1*

[3]

M3. (a) N

! **N identified only on scatter graph**

Accept provided unambiguous

! **Highest total mark given**

Ignore if given with N

If N is not given, accept a value between 82 and 83 inclusive

1

(b) Indicates True and gives a correct explanation

eg

- The range for coursework is 40, but the range for the test is 30
- Coursework goes from 10 to 50, test from 10 to 40
- Both start at 10 but coursework goes to 50 rather than to 40

Accept minimally acceptable explanation

eg

- *30, 40 seen*
- *Highest to lowest is bigger for coursework marks than for test marks*
- *Coursework marks spread over 8 squares of the graph, test marks over 6 squares*
- *The points are more spread out along the x-axis than along the y-axis*
- *They had a wider span of marks*
- *There's more variation in the cwk marks*
- *They're more scattered (or spread out)*
- *C/w results start at the same mark as test results, but finish at a higher mark*

! **Ambiguous notation**

eg

- *Test marks 10 – 40*
Coursework 10 – 50

Condone

! **Incorrect use of % sign**

Ignore

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Do not accept incomplete explanation

eg

- Coursework has a greater range than test marks
- Coursework has lowest 10, highest 50
- Coursework went up to 50, test went up to 40
- Coursework goes from 10 to 50 but test goes from 10 to 30
except for 2 pupils
- Coursework marks were varied, but test marks were mostly
between 10 and 25

Do not accept incorrect explanation

eg

- The range for coursework was 40, but the range for test was 20
- The test marks are more scattered

1

(c) 70

Accept value on the line excluded

eg

- More than 70
- Just over 70
- 71

! Range of total marks given

Accept provided all values win prizes

eg, accept

- At least 70
- 70 or more

eg, do not accept

- About 70

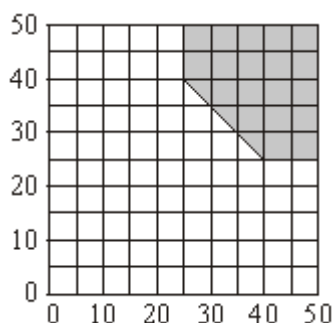
! Incorrect use of % sign

Ignore

1

(d) Indicates the correct region, ie

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Accept unambiguous indication of region

eg

- Correct region labelled R

! For 2m or 1m, lines dotted or dashed

Accept unless the intention is only to indicate specific points

! Lines not ruled or accurate

Accept provided the pupil's intention is clear

! Line(s) drawn 'below' correct position in order to allow the region to include points on the line(s)

Condone provided their line is parallel to the correct line, and is closer to the correct mark than to the correct mark -5 eg, for $x + y = 65$ accept

- Line parallel to $x + y = 65$ and closer to $x + y = 65$ than to $x + y = 60$

2

or Indicates both the lines $x = 25$ and $y = 25$, even if there are other errors

or

Indicates the line $x + y = 65$, even if there are other errors

! For 1m, line(s) not full length

Accept provided each line spans at least 10 marks

1

[5]

M4. (a) Indicates that the y-coordinate is 146

1

(b) Indicates that the x-coordinate is 18

Accept indication is within a pair of correct coordinates

eg, for part (a)

- (50, 146)

eg, for part (b)

- (18, 50)

! Answers to parts (a) and (b) transposed but otherwise correct

Mark as 0, 1

1

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- (c) Indicates Yes and gives a correct explanation with no evidence of incorrect working

eg

- When $x = -10$, $y = 3 \times -10 - 4$
 $= -30 - 4$
 $= -34$
- $3x - 4 = -34$
 $3x = -30$
 $x = -10$

Accept minimally acceptable explanation

eg

- $-30 - 4 = -34$
- $-30 \div 3 = -10$
- When $x = -10$, $3x - 4 = -34$
- The second number is equal to the first number multiplied by 3, minus 4

Do not accept incomplete or incorrect explanation

eg

- When $x = -10$, $y = -34$
- $3x - 4 = -34$
 $3x = -34 - 4$
 $3x = -30$
 $x = -10$

1

[3]

M5. $9 + 2k$

1

$k(k + 6)$ or $k^2 + 6k$

1

[2]

- M6.** Indicates 'Yes' and gives a correct explanation

eg

- When $x = 25$, $3x = 75$
- $3 \times 25 = 75$
- y must be $3 \times x$

! Explanation does not explicitly state that the line goes through the origin

eg

- $(2.5, 7.5)$ is on the line and you can times them both by 10
- The line goes up three for every one it goes across

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- $25 \div 25 = 1$, $75 \div 25 = 3$ and $(1, 3)$ is on the line

Accept minimally acceptable explanation

eg

- $y = 3 \times x$
- *You multiply the number on the x-axis by three*

Do not accept equation restated but not interpreted

eg

- $y = 3x$

Do not accept incomplete explanation

eg

- *It goes $(1, 3)$, $(2, 6)$ and so on $(2.5, 7.5)$ is on the line*

[1]