Ridgewood Mathematics Transition Tasks

Deadline:

This work is due Friday 11th September

Task	Pages	Completed ?
Algebraic Manipulation and Proof	2-5	
Indices and Surds	6-9	
Quadratics	10-13	
Straight Lines and Circles	14-18	
Trigonometry	19-24	

GCSE to A-level Maths Transition Name:

Algebraic Manipulation and Proof (1)

Q1.

Expand and simplify $(2x + 5y)(3x - 8y)$

Answer _____

(Total 3 marks)

Q2.

Expand and simplify fully $(x - 3)(x + 2)(x + 5)$

Answer _____

(Total 3 marks)

Q3.

Rearrange $y = \frac{4 - 3x}{x - 5}$ to make x the subject.

Answer _____

(Total 4 marks)

Q4.

Circle the identity.

$(x - 3)^2$ $\quad$ $(x - 3)^2 > 5$

$(x - 3)^2 = 1 - 6x$ $\quad$ $(x - 3)^2 \equiv x^2 - 6x + 9$

(Total 1 mark)

Q5.

Work out the values of a and b in the identity

$5(7x + 8) + 3(2x + b) \equiv ax + 13$

a =_____ b = _____

(Total 4 marks)

Q6.

Prove that $3(x + 1)(x + 7) - (2x + 5)^2$ is never positive.

(Total 5 marks)

Q7.

Expressions for consecutive triangular numbers are

$$\frac{n(n+1)}{2} \quad \text{and} \quad \frac{(n+1)(n+2)}{2}$$

Prove that the sum of two consecutive triangular numbers is always a square number.

_____

_____

_____

_____

_____

_____

_____

(Total 4 marks)

GCSE to A-level Maths Transition Name:

Indices and Surds (1)

Q1.

Write down the value of 7^0

Answer _____

(Total 1 mark)

Q2.

Given that $3^x = 9^{x+1}$ work out the value of x.

_____

_____

_____

_____

_____

x = _____

(Total 2 marks)

Q3.

Simplify $2^5 \times 2^3$

Circle your answer.

4^8 2^8 2^{15} 4^{15}

(Total 1 mark)

Q4.

Simplify $(5^4)^2$

Circle your answer.

5^6 5^8 25^6 25^8

(Total 1 mark)

Q5.

Circle the value of $9^{-\frac{1}{2}}$

$\frac{1}{81}$ $\frac{1}{3}$ -3 $-4\frac{1}{2}$

(Total 1 mark)

Q6.

Show that $\frac{14}{\sqrt{7}}$ can be written in the form $a\sqrt{b}$ where a and b are integers.

_____

_____

_____

_____

_____

(Total 2 marks)

Q7.

(a) Write $\sqrt{72}$ in the form $a\sqrt{2}$ where a is an integer.

_____

_____

Answer _____

(1)

(b) Work out $(\sqrt{6}+\sqrt{12})^2$

Give your answer in the form $c+d\sqrt{2}$ where c and d are integers.

Answer _____

(3)

(Total 4 marks)

Q8.

Show that $\dfrac{\sqrt{150}-\sqrt{6}}{\sqrt{2}\times\sqrt{3}}$ simplifies to an integer.

(Total 3 marks)

Q9.

Simplify $\sqrt{80} + \sqrt{2\frac{2}{9}}$

Give your answer in the form $\frac{a\sqrt{5}}{b}$ where a and b are integers.

Answer _____

(Total 3 marks)

Q10.

Expand and simplify fully $(\sqrt{10} + \sqrt{2})(\sqrt{15} - \sqrt{3})$

Give your answer in the form $\sqrt{b}$, where a and b are integers.

Answer _____

(Total 4 marks)

GCSE to A-level Maths Transition Name:

Quadratics (1)

Q1. Circle the **two** roots of $(x - 5)(x + 3) = 0$

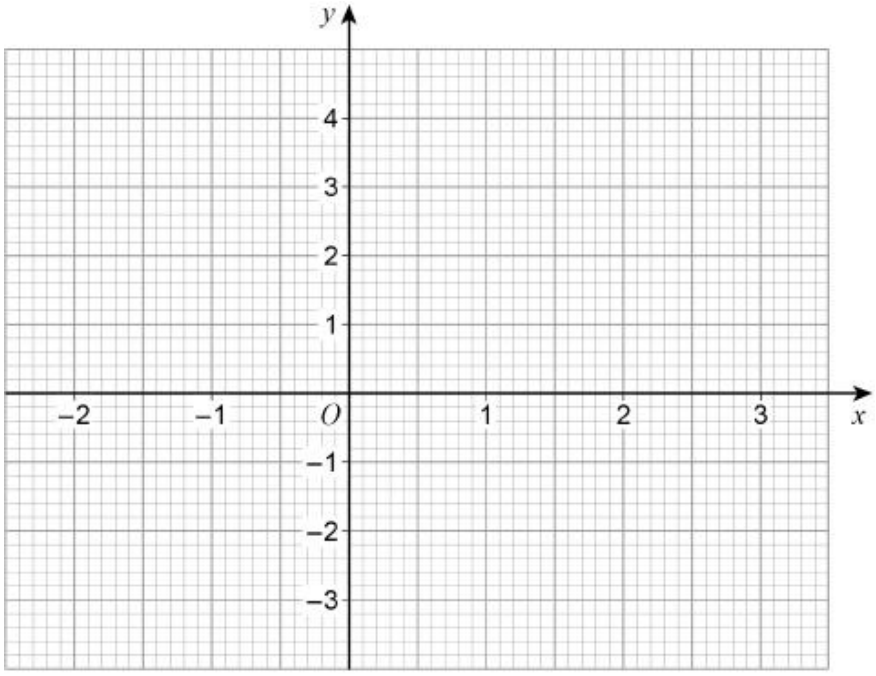
−5 −3 3 5 **(Total 1 mark)**

Q2. (a) Complete the table of values for $y = x^2 - x - 2$

x	−2	−1	0	1	2	3
y			−2	−2		4

(2)

(b) Draw the graph of $y = x^2 - x - 2$ for values of x from −2 to 3



(2)

(c) Write down the x-coordinate of the turning point of the graph.

Answer _____

(1)

(Total 5 marks)

Q3.

The equation of a curve is $y = (x + 3)^2 + 5$

Circle the coordinates of the turning point.

(5, 3) (5, −3) (3, 5) (−3, 5)

(Total 1 mark)

Q4.

(a) Write $x^2 + 6x + 10$ in the form $(x + a)^2 + b$

_____

_____

_____

Answer _____

(2)

(b) Hence, write down the coordinates of the turning point of the curve $y = x^2 + 6x + 10$

Answer (_____)

(1)

(Total 3 marks)

Q5.

(a) Factorise $x^2 + 5x - 24$

_____

_____

Answer _____

(2)

(b) Solve $x^2 + 5x - 24 = 0$

_____

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Answer _____

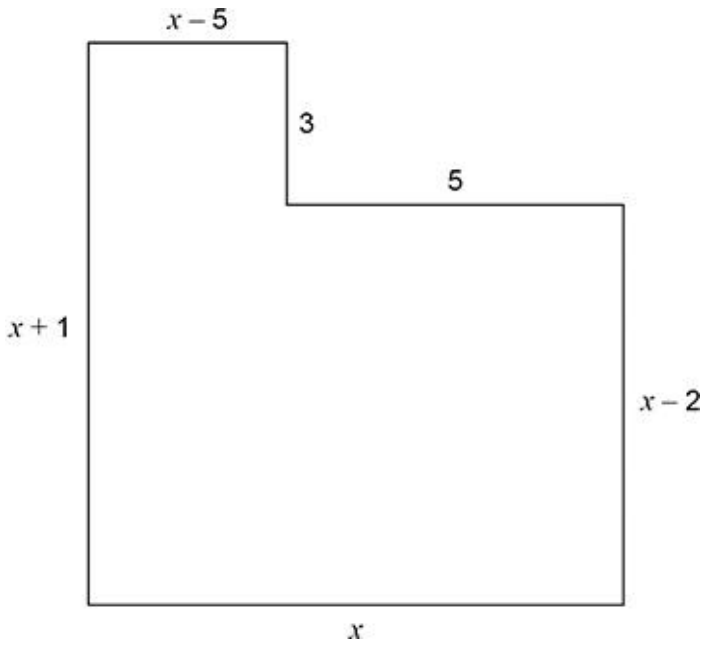
(1)

(Total 3 marks)

Q6.

Here is the plan of the floor of an L-shaped room.

All lengths are in metres.



Not drawn accurately

(a) The area of the floor is 75 m^2

Show that $x^2 + x - 90 = 0$

_____

_____

_____

_____

_____

_____

(3)

(b) By factorising $x^2 + x - 90$ work out the value of x.

You **must** show your working

_____

_____

x = _____

(2)

(Total 5 marks)

Q7.

The expression $\frac{x^2 - 9}{x^2 + bx - 15}$ simplifies to $\frac{x + 3}{x + 5}$

Work out the value of b.

_____

_____

_____

_____

_____

_____

_____

_____

b = _____

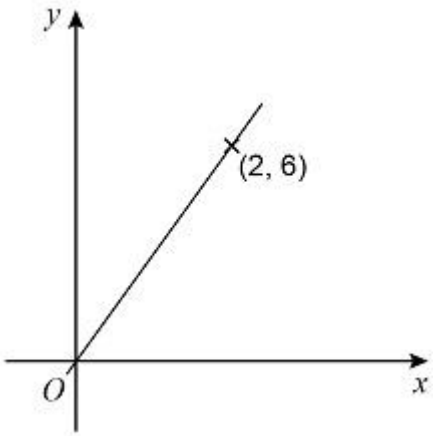
(Total 3 marks)

GCSE to A-level Maths Transition Name:

Straight Lines and Circles (1)

Q1.

A straight line passes through O and (2, 6)



Circle the equation of the line.

$y = x + 4$ $y = 6$ $y = 3x$ $y = \frac{1}{3}x$

(Total 1 mark)

Q2.

The equation of a straight line is $2y = 3x + 5$

Circle the gradient of the line.

$\frac{2}{3}$ $\frac{3}{2}$ 3 5

(Total 1 mark)

Q3.

(a) Show that the lines $y = 3x + 7$ and $2y - 6x = 8$ are parallel.

Do **not** use a graphical method.

_____

_____

_____

_____

_____

_____

_____

_____

(3)

(b) Is the point (−5, −6) above, below or on the line $y = 3x + 7$?

Tick **one** box.

☐ Above ☐ Below ☐ On the line

You **must** show your working

Do **not** use a graphical method.

_____

_____

_____

_____

_____

_____

_____

(2)

(Total 5 marks)

Q4.

Line A has equation $y = 4x - 1$

Line B is

perpendicular to line A

and

passes through the point (8, 5)

Work out the coordinates of the point where line B intersects the x-axis.

_____

_____

_____

_____

_____

_____

_____

_____

Answer (_____ , _____)

(Total 4 marks)

Q5.

A circle has equation $x^2 + y^2 = 4$

Circle the length of its radius.

2 4 8 16

(Total 1 mark)

Q6.

The equation of a circle is $x^2 + y^2 = 9$

Work out the length of the **diameter**.

Circle your answer.

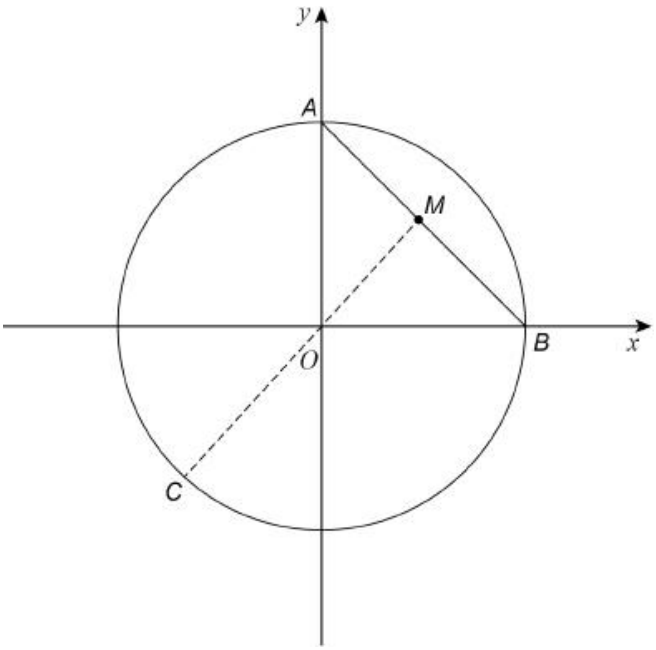
3 6 9 18

(Total 1 mark)

Q7.

A, *B* and *C* are points on the circle $x^2 + y^2 = 36$ as shown.

A is on the y-axis.
B is on the x-axis.
M is the midpoint of *AB*.
COM is a straight line.



(a) Show that the coordinates of *A* are (0, 6)

_____

_____

(1)

(b) Work out the coordinates of *B*.

_____

_____

Answer (_____ , _____)

(1)

(c) Show that the equation of the straight line passing through *C*, O and *M* is $y = x$

_____

_____

_____

(2)

(d) Work out the coordinates of *C*.
Give your answers in surd form.

_____

_____

Answer (_____ , _____)

(3)

(Total 7 marks)

GCSE to A-level Maths Transition

Name:

Trigonometry (1)

Q1.

Circle the value of cos 30°

$\frac{1}{2}$ $\frac{\sqrt{3}}{2}$ 0 1

(Total 1 mark)

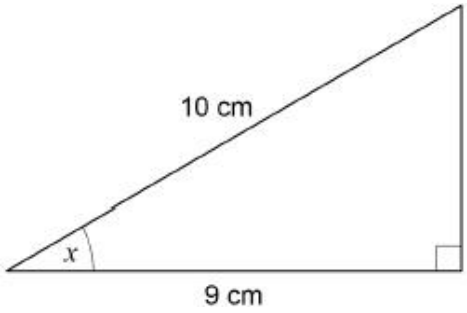
Q2.

Show that the value of cos 30° × tan 60° + sin 30° is an integer.

(Total 3 marks)

Q3.

Use trigonometry to work out the size of angle x.



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_____

_____

_____

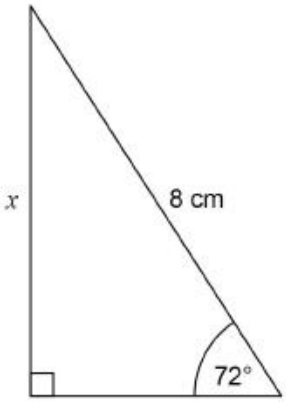
_____

Answer _____ degrees

(Total 2 marks)

Q4.

Use trigonometry to work out the length x.



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_____

_____

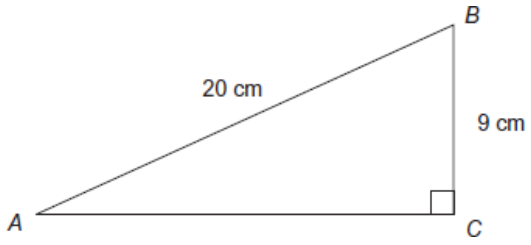
_____

_____

Answer _____ cm

(Total 2 marks)

Q5.



Work out the length *AC*.

_____

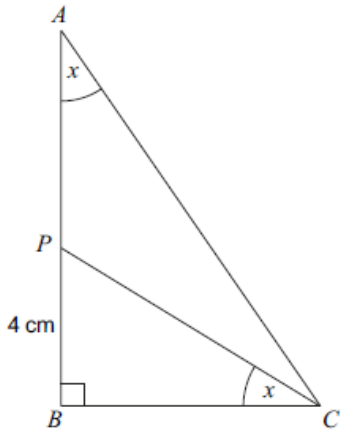
_____

Answer _____ cm

(Total 3 marks)

Q6.

ABC is a right-angled triangle.
P is a point on AB.



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BP = 4cm and $\tan x = \frac{2}{3}$

(a) Work out the length of BC.

_____

_____

_____

Answer _____ cm

(2)

(b) Work out the length of AP.

_____

_____

_____

_____

_____

Answer _____ cm

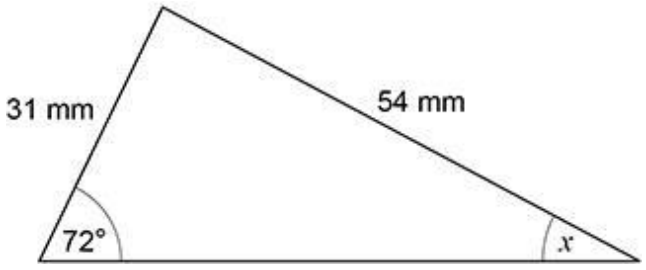
(3)

(Total 5 marks)

Q7.

Here is a triangle.

Not drawn accurately



Leah tries to use the sine rule to work out the size of angle x.

Here are the first two lines of her working.

$$\frac{x}{\sin 31} = \frac{54}{\sin 72}$$

$$x = \frac{54 \sin 31}{\sin 72}$$

What error has she made in this working?

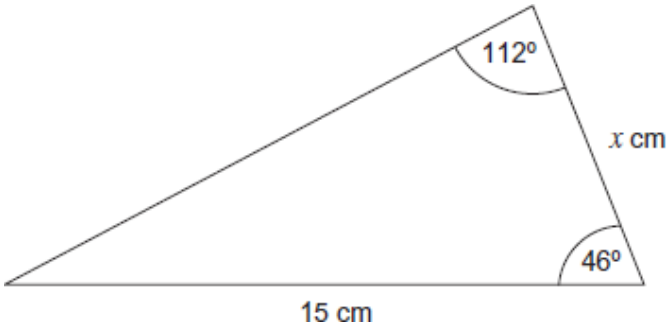
_____

_____

_____

(Total 1 mark)

Q8.



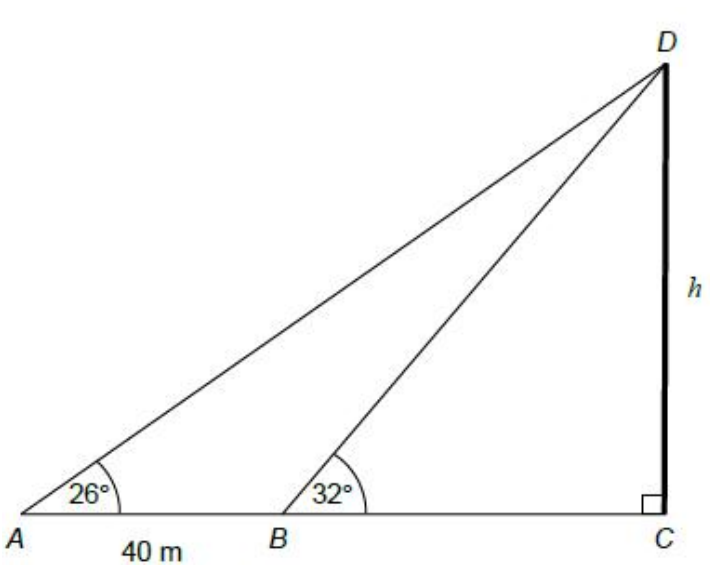
Work out the value of x.

Answer _____

(Total 4 marks)

Q9.

The diagram shows a vertical tower *CD* of height, h, metres.
ABC is horizontal.
AB = 40 metres.



Work out the height, h, of the tower.

Answer _____ metres

(Total 5 marks)