Algebra 5H Assessment

THE ANSWERS

Higher Level

All questions

Clip	Grade	Title of clip	Question(s)	Marked out of	Score	%
193	7	Algebraic Proof	1	7	___	__
194	7	Exponential Functions	2 - 3	7	___	__
195	7	Trigonometric Graphs	4 - 6	10	___	__
196	7	Transformation of Functions	7 - 8	8	___	__
197	7	Equation of a Circle	9 - 10	10	___	__
198	7	Regions	11 - 12	8	___	__

Out of 50

TOTAL SCORE _____

Final Percentage [ ] %

1) a) Prove algebraically that the difference between the squares of any two consecutive numbers is always an odd number.

$(n+1)^2 - n^2$

$n^2 + 2n + 1 - n^2$

$2n + 1$ $2n$ is always even so $2n + 1$ must always be odd

3

b) Prove that $(5n+1)^2 - (5n-1)^2$ is a multiple of 5 for all positive integer values of n

$(25n^2 + 10n + 1) - (25n^2 - 10n + 1)$

$25n^2 + 10n + 1 - 25n^2 + 10n - 1$

$20n$

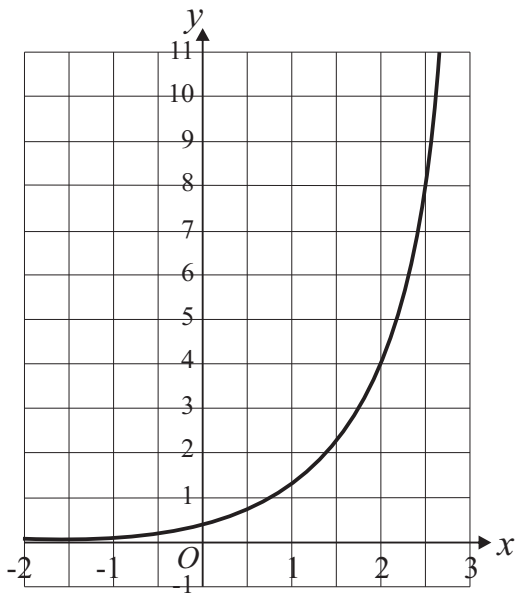
$5(4n)$ which is always a multiple of 5

4

2) The graph shows the sketch of $y = ab^x$
The curve passes through the points (0, 0.25) and (2 , 4).

a) Find the value of a and the value of b.

$a =$ 0.25 $b =$ 4 **3**



b) The point C(-0.5, k) lies on the curve.

Find the value of k.

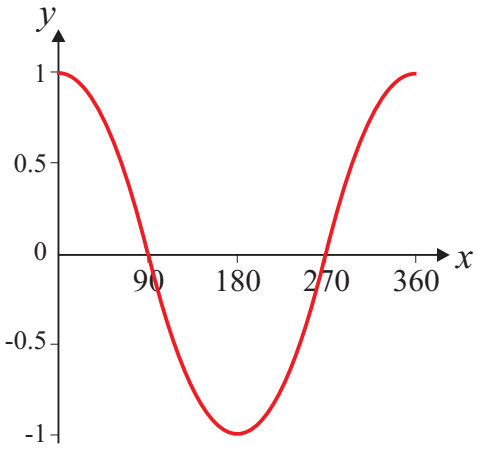
$k =$ 0.125 **2**

3) The price of a house on Percy Street increases exponentially.
Its price increases by 2.5% every year.
When the house is 5 years old it is worth £275 000.

What was the original price of the house (to the nearest £1 000) when new?

£ 243 000 **2**

4) a) Sketch the graph of $y = \cos x$ in the interval $0° \leqslant x \leqslant 360°$



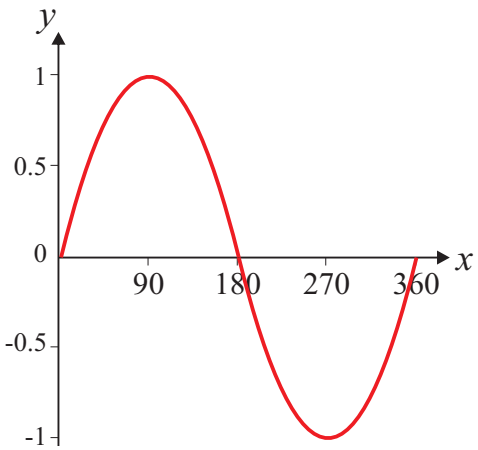
2

b) In the interval $0° \leqslant x \leqslant 360°$, find the values of x for which $\cos x = 0.2588$
Give your answers to the nearest degree.

$x =$ 75 ° , 285 °

2

5) a) Sketch the graph of $y = \sin x$ in the interval $0° \leqslant x \leqslant 360°$



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b) In the interval $0° \leqslant x \leqslant 360°$, find the values of x for which $\sin x = -0.1769$
Give your answers to the nearest degree.

$x =$ 190 ° , 350 °

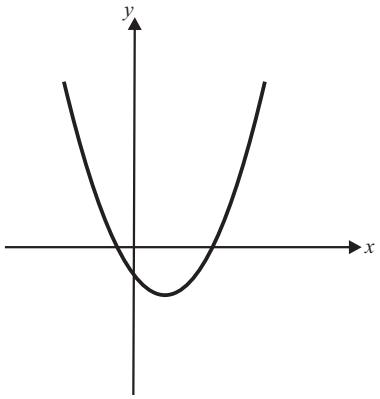
2

6) In the interval $0° \leqslant x \leqslant 360°$, find the values of x for which $\tan x = 1.926$
Give your answers to the nearest degree.

$x =$ 63 ° , 243 °

2

7) The diagram shows the graph of $y = f(x)$

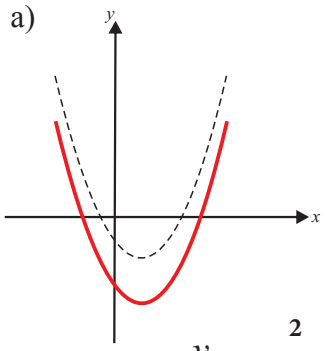


On the axes below, sketch the graph of each of these functions (the graph of $y = f(x)$ is shown dotted to help you).

a) $y = f(x) - 2$

b) $y = f(x - 2)$

a)



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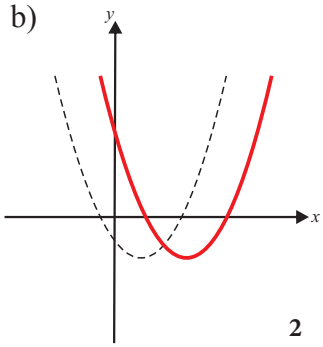
b)



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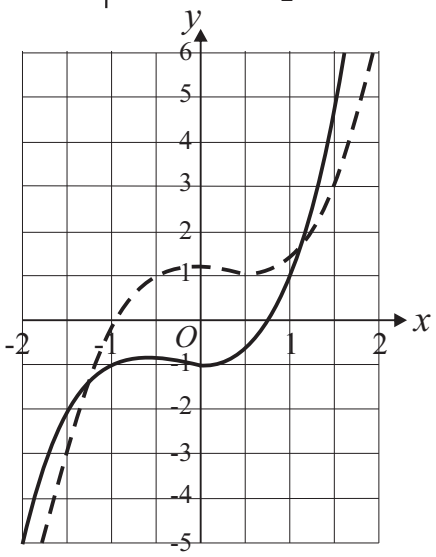
8) The solid curve has equation $y = x^3 + x^2 - 1$

a) Write down an equation of the dotted curve.

$y =$ $(x-1)^3 + (x-1)^2 + 1$

2



b) Describe the transformation that maps the solid curve onto the dotted one.

Translation by $\begin{bmatrix} 1 \\ 2 \end{bmatrix}$

2

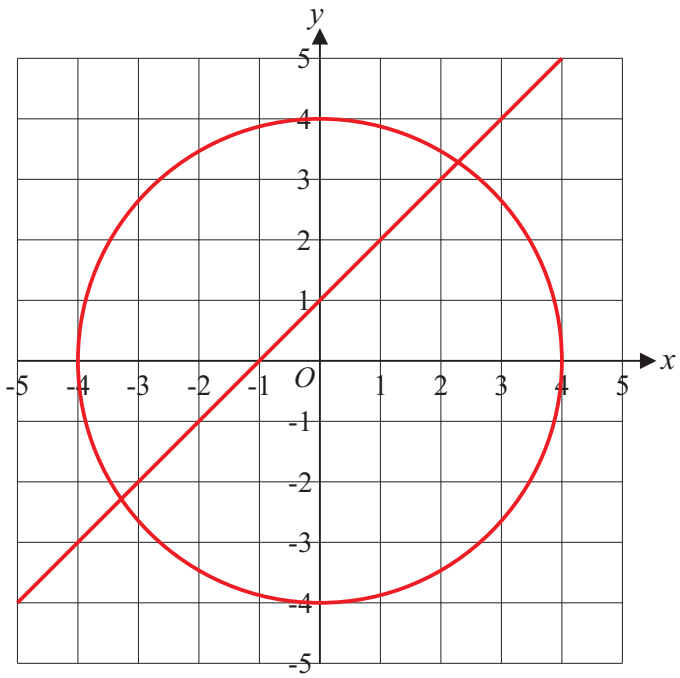
9) a) A circle has its centre at the origin and a radius of 5.

What is its equation? $x^2 + y^2 = 25$ **2**

b) A circle has equation $x^2 + y^2 = 64$

What is the length of the radius? $r =$ 8 **2**

10) a) Draw the graph of $x^2 + y^2 = 16$



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b) Using your graph, estimate the solutions of the equations

$x^2 + y^2 = 16$

$y = x + 1$

Give your answers to 1 decimal place.

$x =$ 2.3	$x =$ -3.3
$y =$ 3.3	$y =$ -2.3

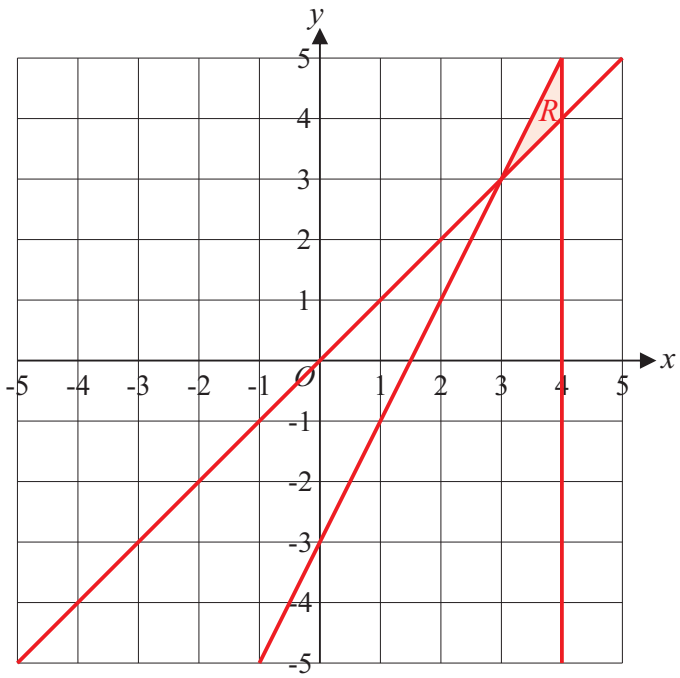
4

11) Put a label, *R*, in the region on the grid on the right satisfied by all three inequalities below.

$x \leqslant 4$

$y \geqslant x$

$y \leqslant 2x - 3$



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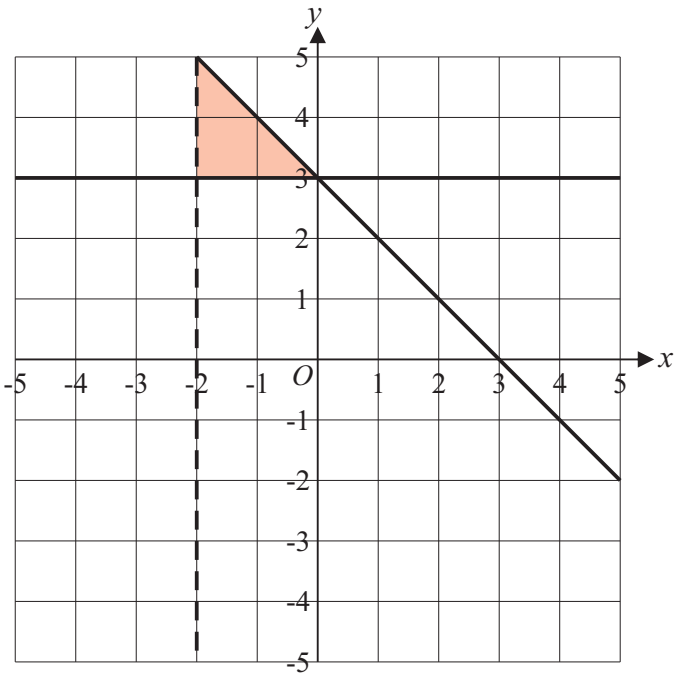

12) Use inequalities to describe the shaded area on the grid on the left.

$x > -2$

$y \geqslant 3$

$x + y \leqslant 3$

4