Name:

Exam Style Questions

Exponential Graphs

Corbettmaths

Equipment needed: Ruler, Pencil, Calculator and Pen

Guidance

1. Read each question carefully before you begin answering it.
2. Check your answers seem right.
3. Always show your workings

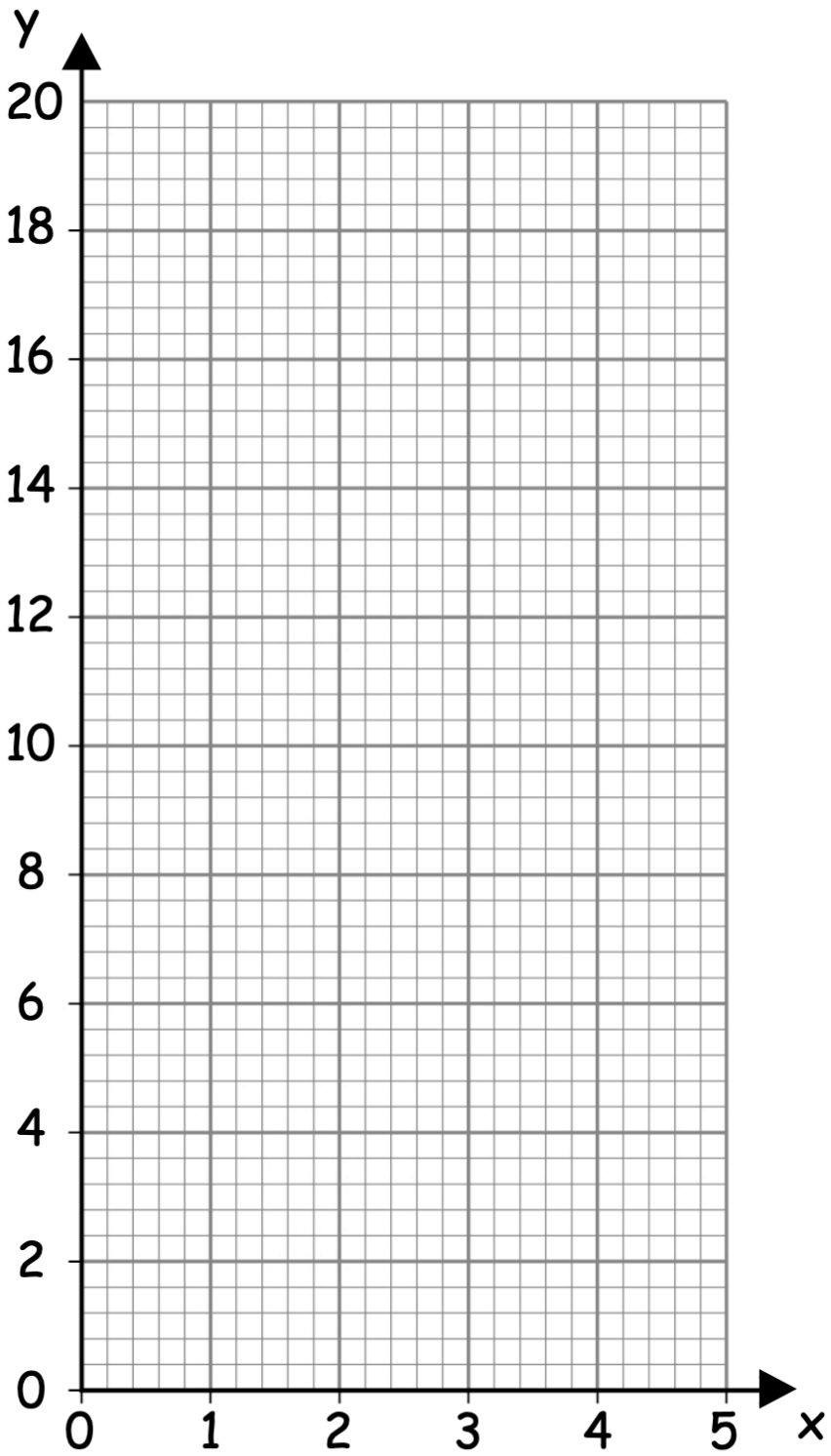
Video Tutorial

www.corbettmaths.com/contents

Video 345

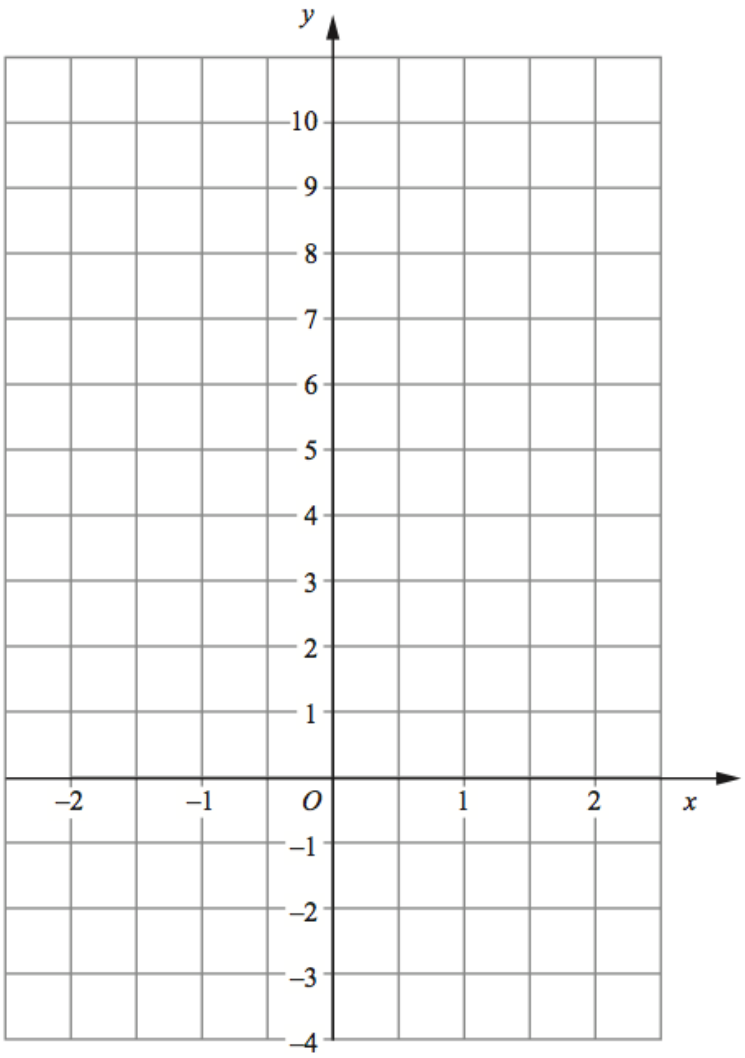
Answers and Video Solutions

1. Draw the graph of $y = 2^x$ for values of x from 0 to 4



(3)

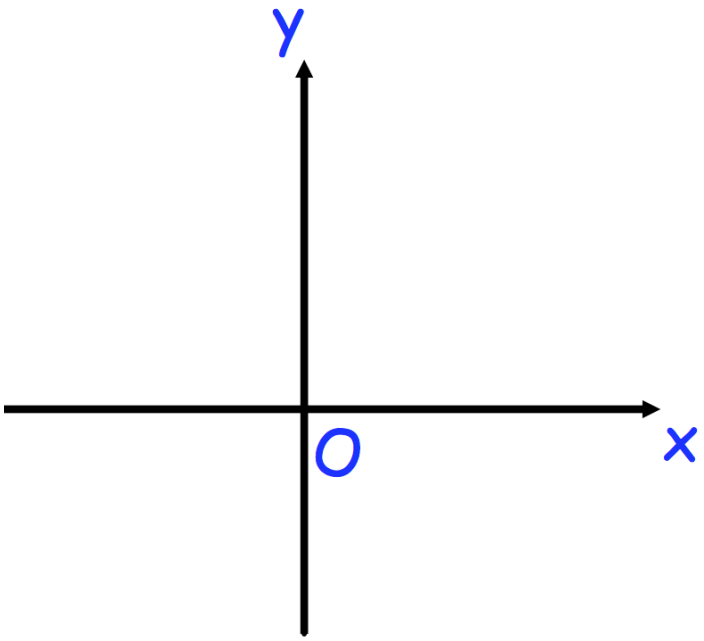
2. Draw the graph of $y = 3^x$ for values of x from -2 to 2



(3)

3. Sketch the graph of $y = 4^x$

Label the coordinates of any points of intersection with the axes.



(2)

4. Circle coordinates of the point that lies on the graph of $y = 5^x$

$(0, 1)$ $(0, 5)$ $(25, 2)$ $(4, 20)$

(1)

5. Circle coordinates of the point that **does not lie** on the graph of $y = 10^x$

$(-1, 0.1)$ $(0, 0)$ $(1, 10)$ $(2, 100)$

(1)

6. A point on the graph of $y = 2^x$ has a y-coordinate of 128

Work out the x-coordinate of the point.

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(1)

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7. A point on the graph of $y = 5^x$ has a y-coordinate of $\frac{1}{25}$

Work out the x-coordinate of the point.

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(1)

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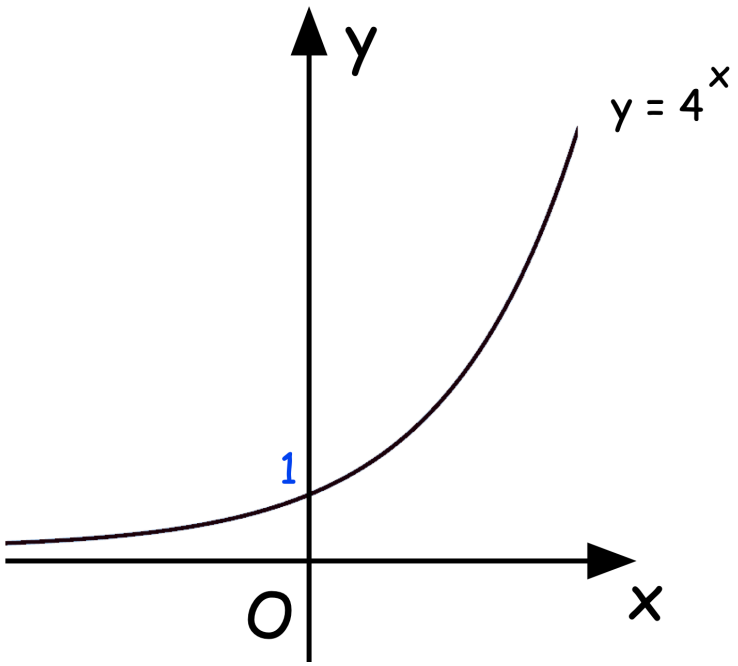
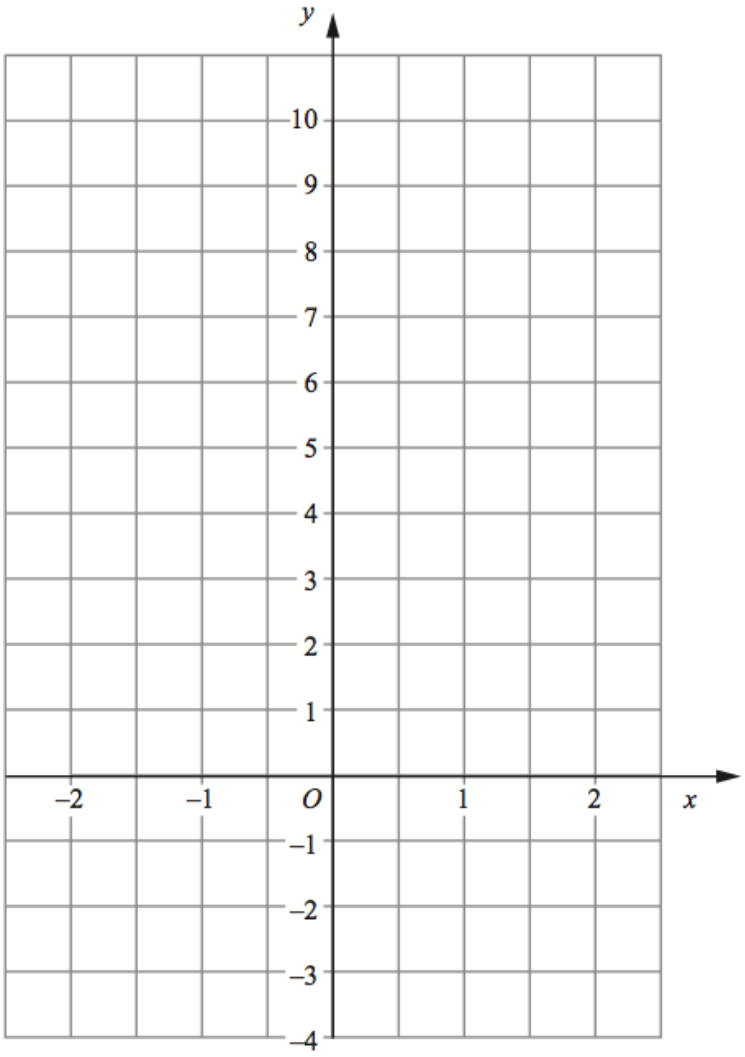
8. Shown below is a sketch of $y = 4^x$



On the same axes, sketch the graph of $y = 5^x$

(2)

9. Draw the graph of $y = \left(\frac{1}{2}\right)^x$ for values of x from -2 to 2



(2)

10. Between which two consecutive integers does the solution of $2^x = 60$ lie?

.....and .....

(1)

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11. Between which two consecutive integers does the solution of $10^x = \frac{1}{200}$ lie?

.....and .....

(1)

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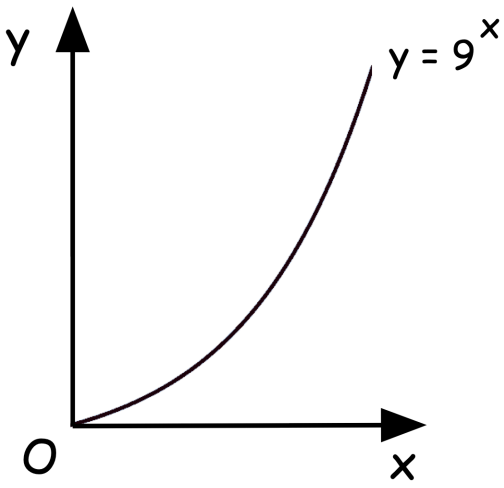
12. Dominic sketches the graph of $y = 9^x$



Make one criticism of the sketch.

.....

.....

.....

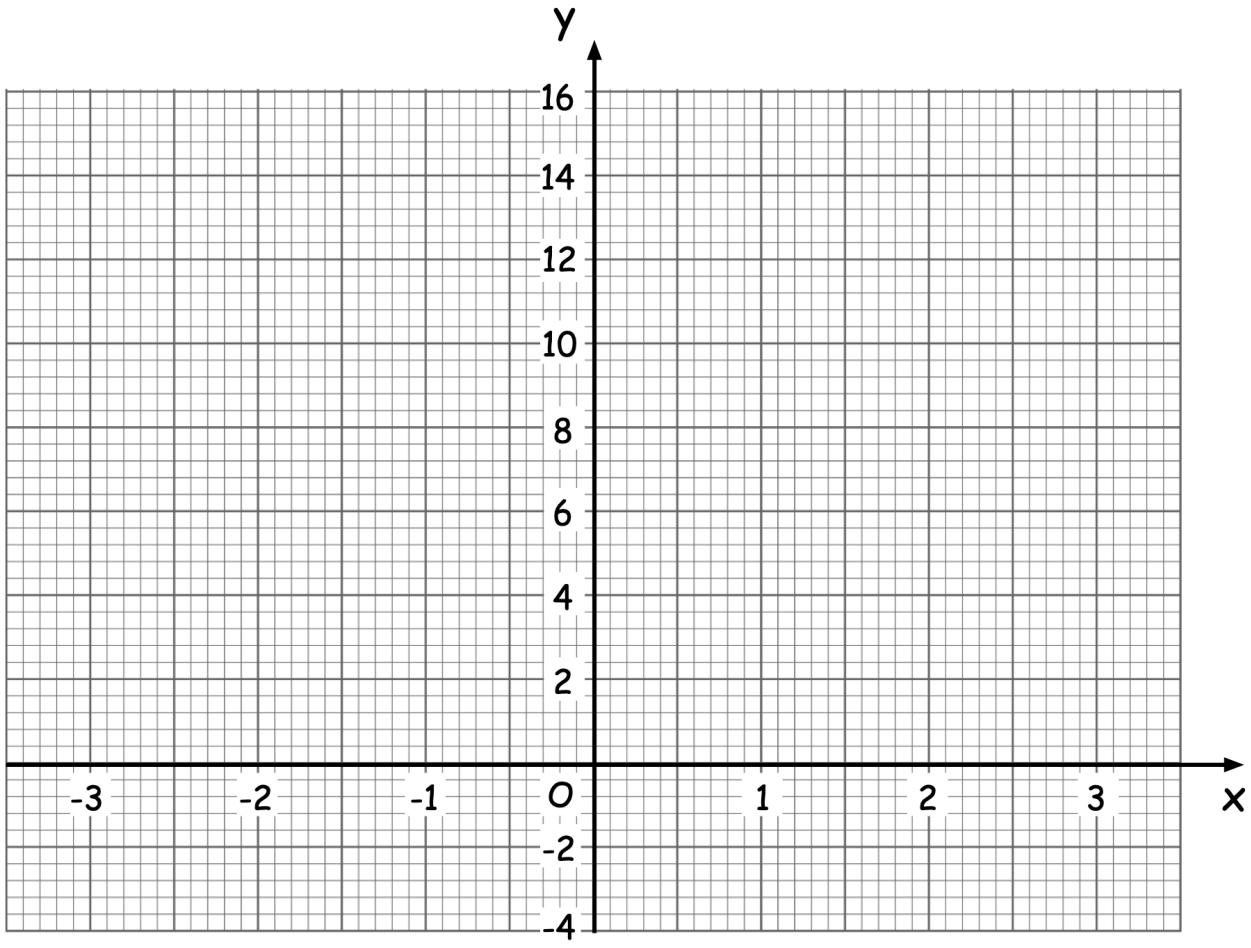
(1)

13. (a) Complete the table of values for $y = 0.4^x$

x	-3	-2	-1	0	1	2	3
y							

(2)

(b) On the grid, draw the graph of $y = 0.4^x$ for the values of x from -3 to 3



(2)

14. Jozef draws the graph of $y = a^x$, where a is a positive constant.

The points $(4, 81)$ and $(-1, c)$ lies on the graph.

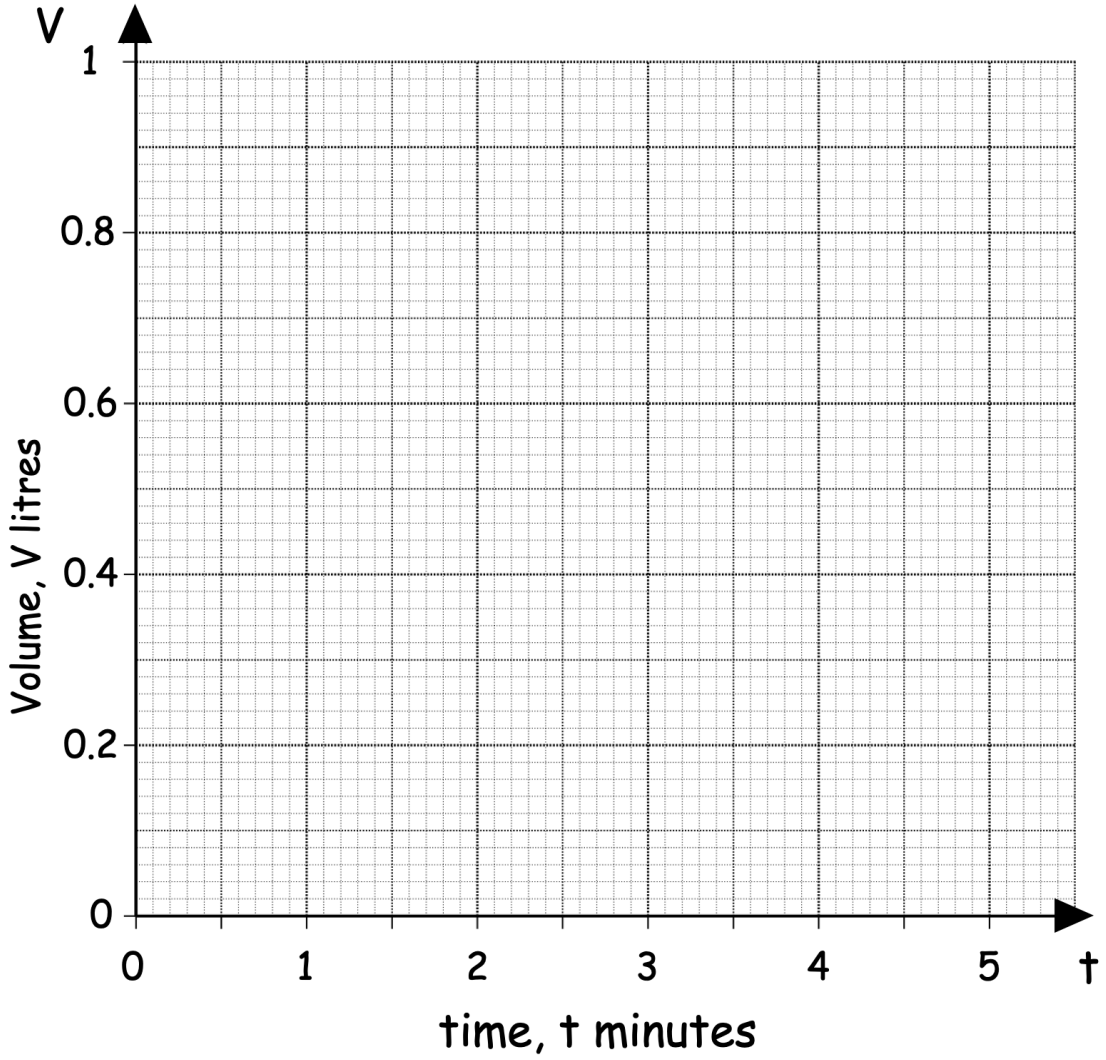
Find the value of c

.....

(3)

15. The volume, V litres, of water in a container, t minutes after springing a leak is found by the formula $V = 0.6^t$

(a) Draw a graph to show the volume of water in the container over the first 5 minutes after springing a leak.



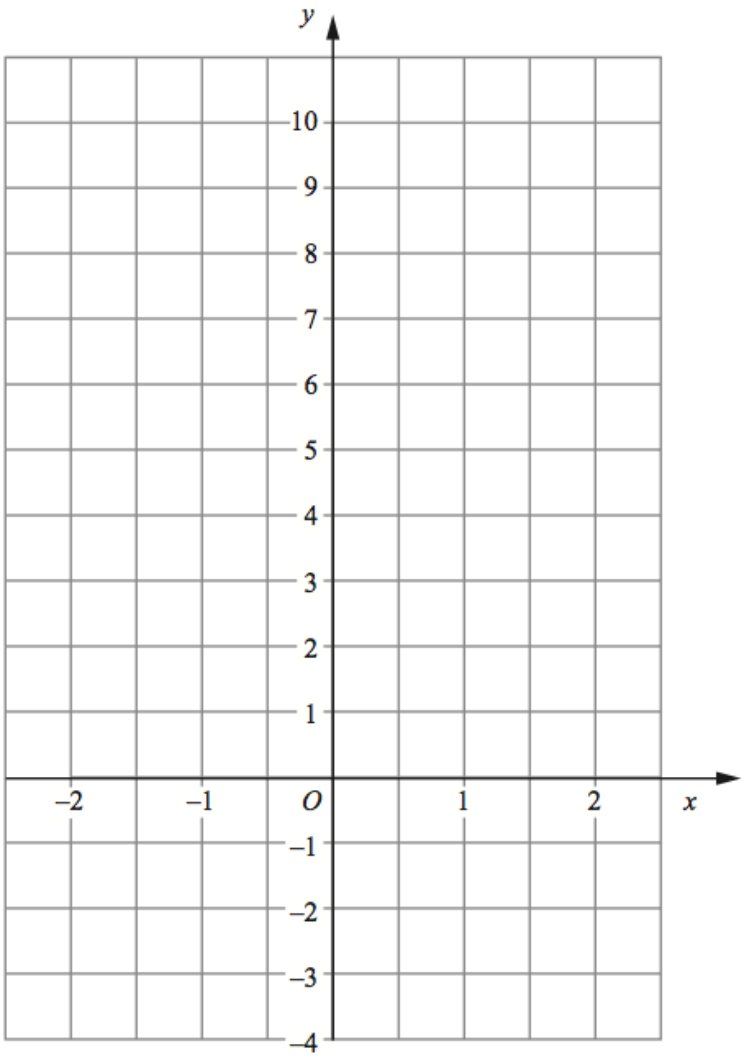
(3)

(b) Use your graph to find an estimate of the time after springing a leak when the container was half full.

.....minutes

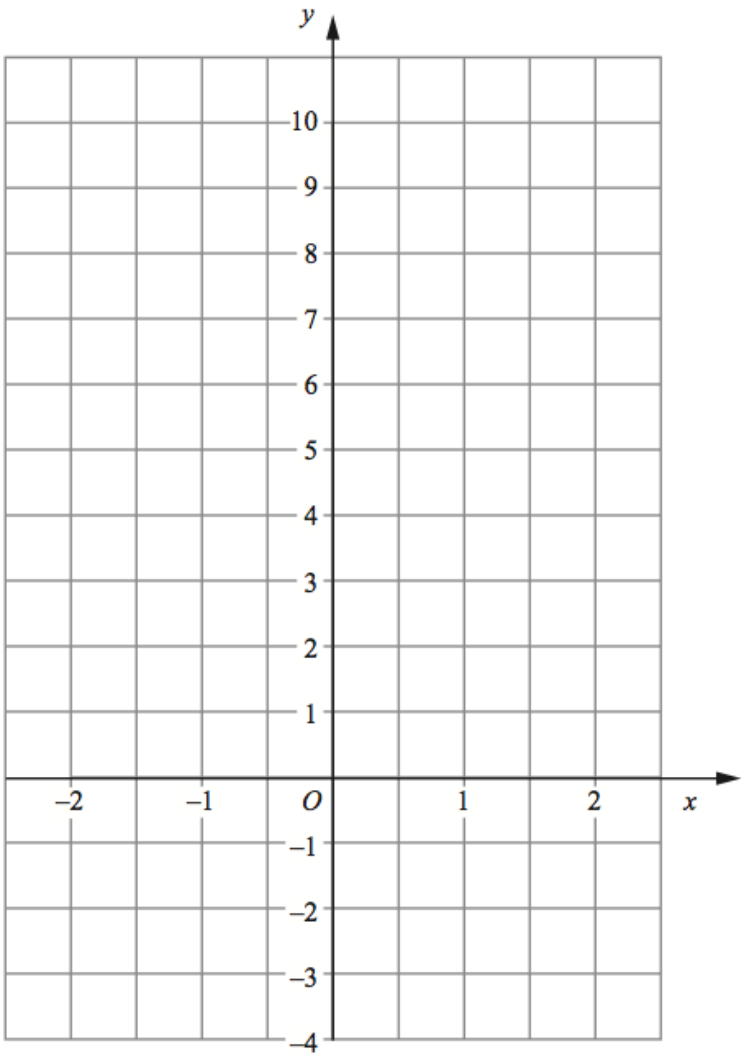
(1)

16. Draw the graph of $y = 2.5 \times 2^x$ for values of x from -2 to 2



(2)

17. Draw the graph of $y = 3^{-x}$ for values of x from -2 to 2



(2)

18. The number of bacteria on a petri dish is measured every hour and is modelled by the formula:

$$N = A \times 2.25^{0.4t}$$

N = number of bacteria
t = time (in hours)

At the beginning of the experiment there were 50 bacteria.

(a) Show $A = 50$

(2)

(b) How many hours would it take for there to be at least 800 bacteria on the petri dish?

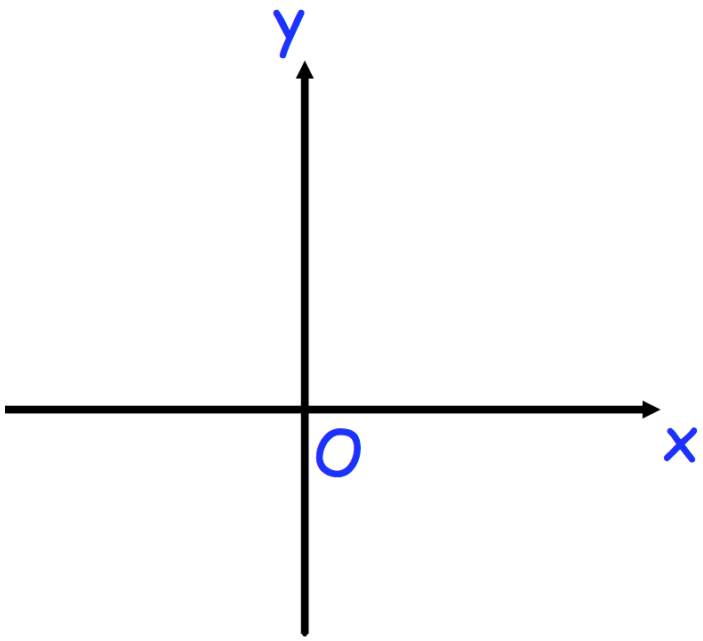
.....hours
(2)

(c) How many bacteria would there be after one day?

.....
(1)

19. Sketch the graph of $y = 100 \times 4^{-x}$

Label the coordinates of any points of intersection with the coordinate axes.



(2)

20. The population of birds on an island is increasing exponentially.

Jenson began monitoring the population of birds on the island each year.

At the end of Year 6, the population of birds was 2000
At the end of Year 8, the population of birds was 4000

Work out the population of birds at the end of Year 2.

.....

(3)

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21. The population of an island is decreasing exponentially.

Rachel began monitoring the population of the island each year.

At the end of Year 4, the population of birds was 9000
At the end of Year 6, the population of birds was 6000

Work out the population at the end of Year 10.

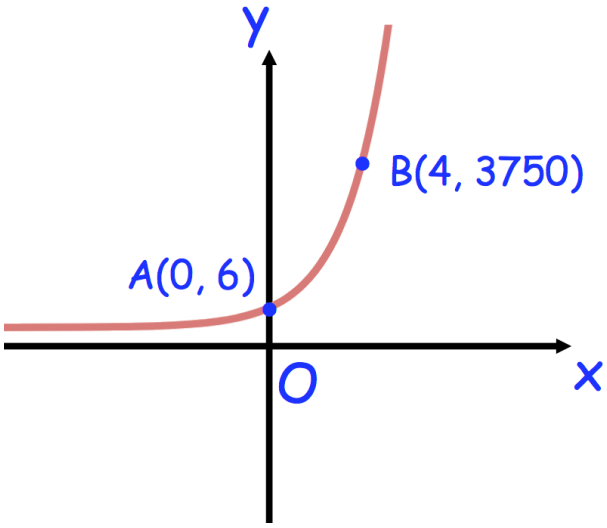
.....

(3)

22. The sketch shows a curve with equation

$y = ab^x$ where a > 0 and b > 0

The curve passes through the points (0, 6) and (4, 3750)



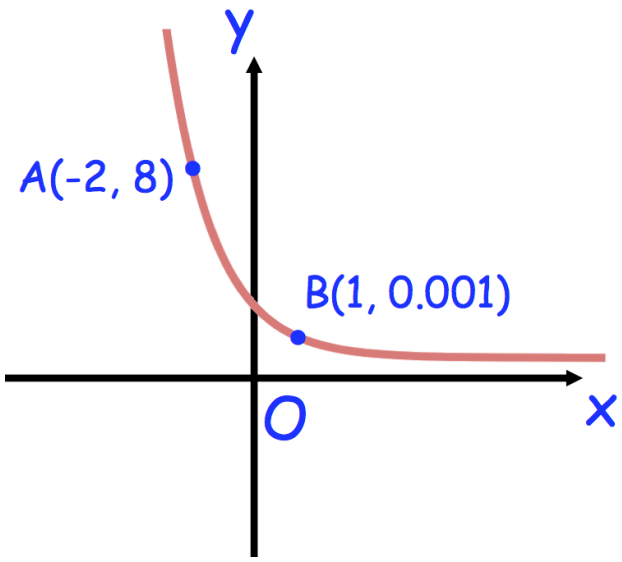
Calculate the value of a and b

.....

(3)

23. The sketch shows a curve with equation

$y = ab^{-x}$ where a > 0 and b > 0



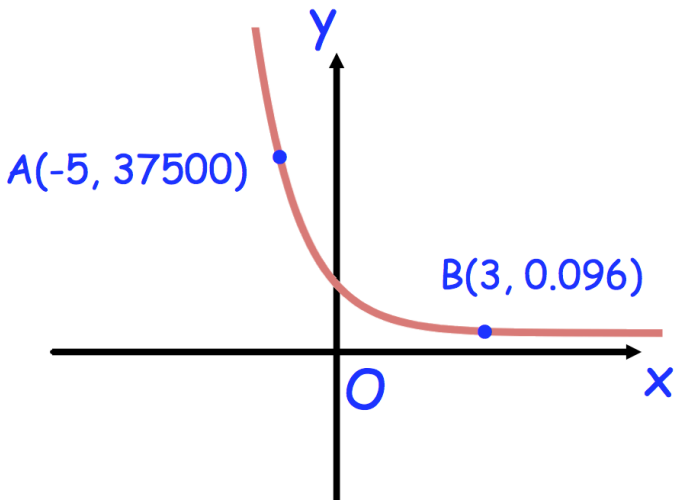
The curve passes through the points (–2, 8) and (1, 0.001)

Calculate the value of a and b

.....

(4)

24. The sketch shows a curve with equation $y = ab^x$ where a > 0 and b > 0



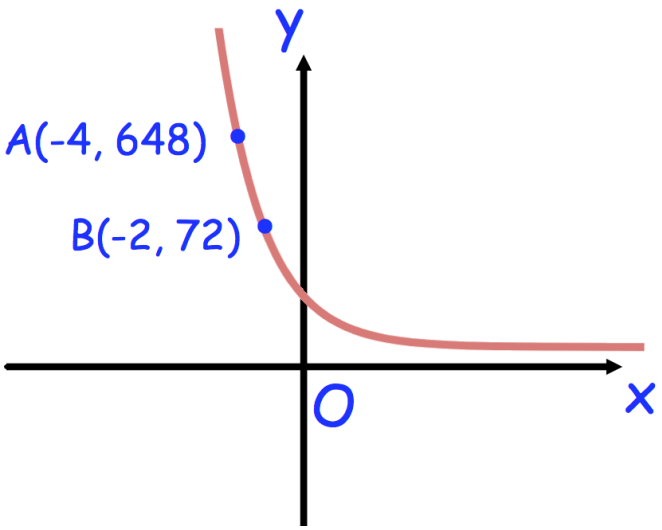
The curve passes through the points (–5, 37500) and (3, 0.096)

Calculate the value of a and b

.....

(4)

25. The sketch shows a curve with equation $y = ab^{-x}$ where a > 0 and b > 0



The curve passes through the points (–4, 648) and (–2, 72)

Calculate the value of a and b

.....

(4)

26. A scientist is carrying out an experiment to remove microplastics from water.
In an experiment 20,000 microplastics are added to a sample of water.

The number of microplastics, M, after t minutes is $M = 20000 \times 2^{-t}$

(a) Calculate the number of microplastics in the water after 3 minutes.

.....

(2)

(b) After how many complete minutes does it take for the number of microplastics to fall below 100?

.....

(2)