

Year 11 Foundations of Maths – Practice Exam 1

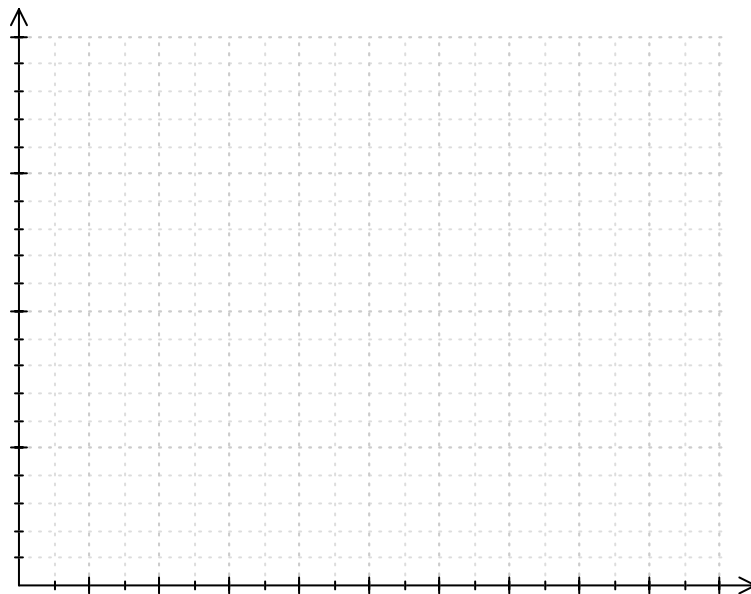
1. [4, 5, 5, 6 marks]

The following table shows the weights of 40 male university students' records to the nearest kilogram.

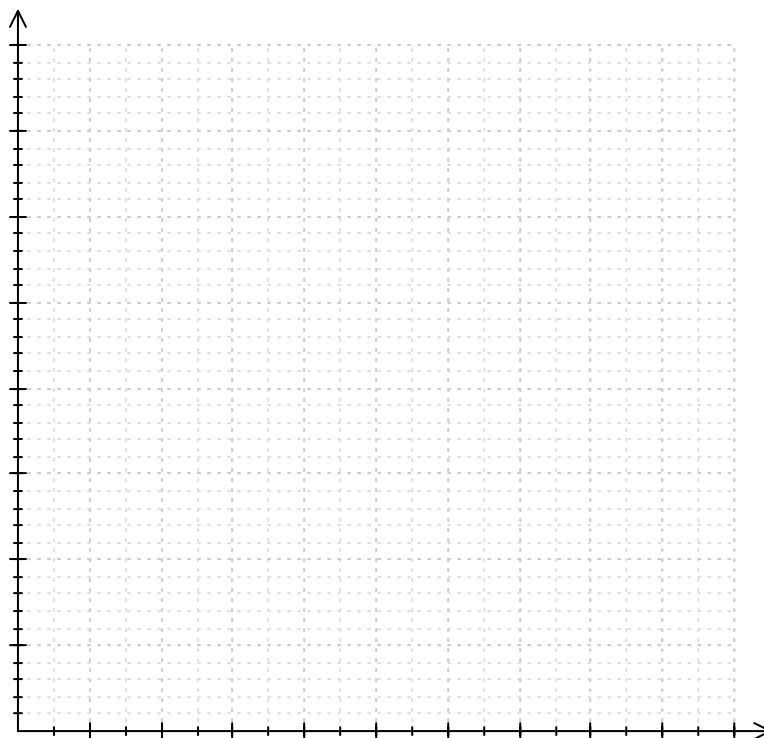
69	82	75	72	63	74	79	66
73	79	70	74	68	74	76	72
84	63	69	88	82	59	72	82
73	87	71	74	68	77	72	82
81	73	68	71	75	78	72	64

- (a) Show the results in a frequency table using class intervals of 55 – 59, 60 – 64, 65 – 69 etc. Extend the table to show cumulative frequency.

- (b) Draw a histogram and a frequency polygon on the grid below.



- (c) Draw a cumulative frequency graph on the grid below.



- (d) From the cumulative frequency graph read off:
- the number of students weighing less than 75 kg.
 - the percentage of students weighing less than 80 kg.
 - the weight below which 20 students lie.
 - the weight below which 25% of students lie
 - the interquartile range

2. [3 marks]

- (a) At the cinema, Laura and her friends bought 5 drinks and 4 bags of popcorn, spending \$14. Aidan and his mates bought 4 drinks and 3 bags of popcorn, spending \$10.80. How much did each drink and bag of popcorn cost?

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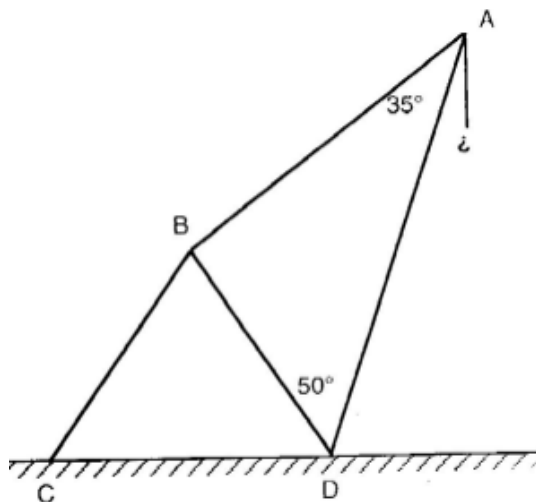
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3 [3, 5, 2 marks]

The sketch shows part of the framework of a crane designed to lift loads suspended from point A. The base CD is fixed at ground level and triangle BCD is isosceles with $BC = BD = 7\text{m}$ and $CD = 4\text{m}$. The size of angle BDA is 50° and the size of angle BAD is 35° . Calculate,



(a) the length of AD

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(b) the height of A above the ground level, to the nearest metre.

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(c) the area of triangle BCD, to the nearest square metre.

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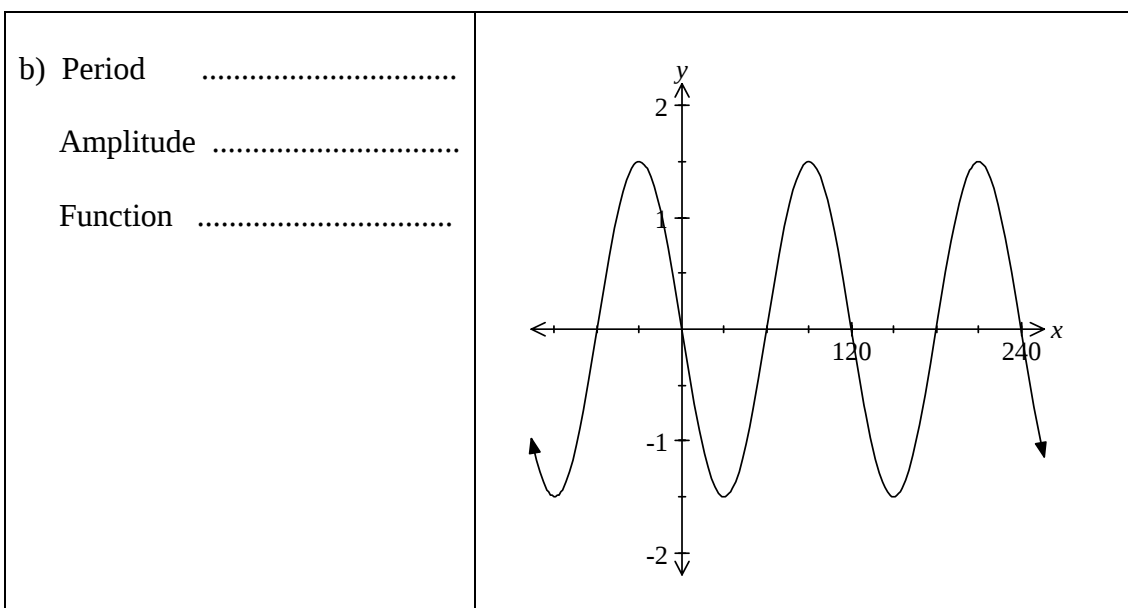
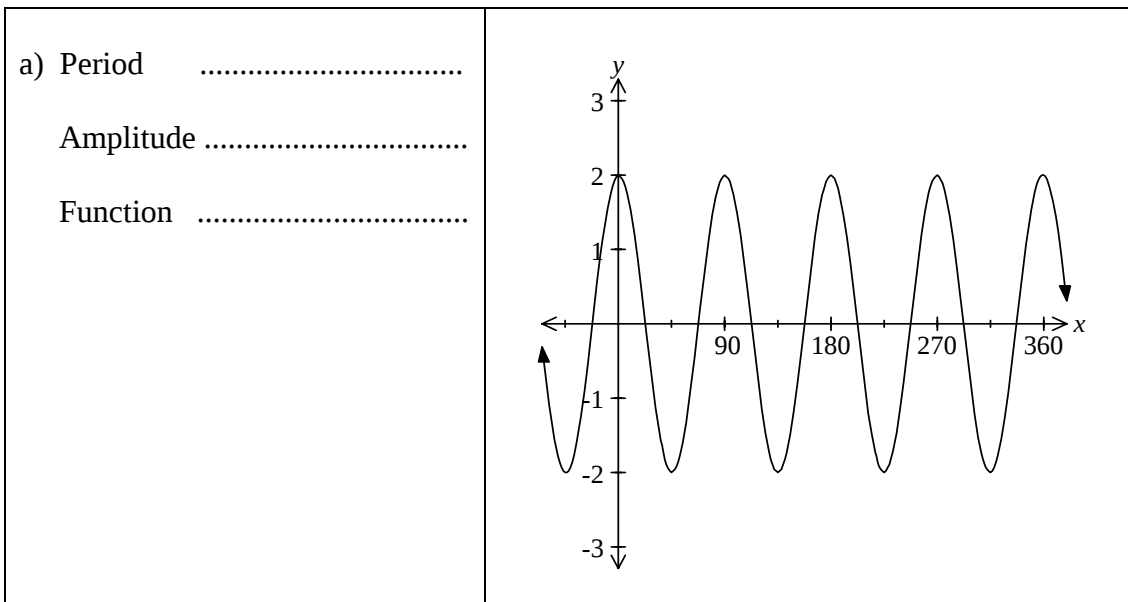
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4. [3, 3 marks]

For each of the following graphs, state the:

- period of the graph,
- amplitude of the graph, and
- the function that would give the graph.



5. [2, 2 marks]

State the amplitude and period of the functions:

i. $y = -3\cos 2x$

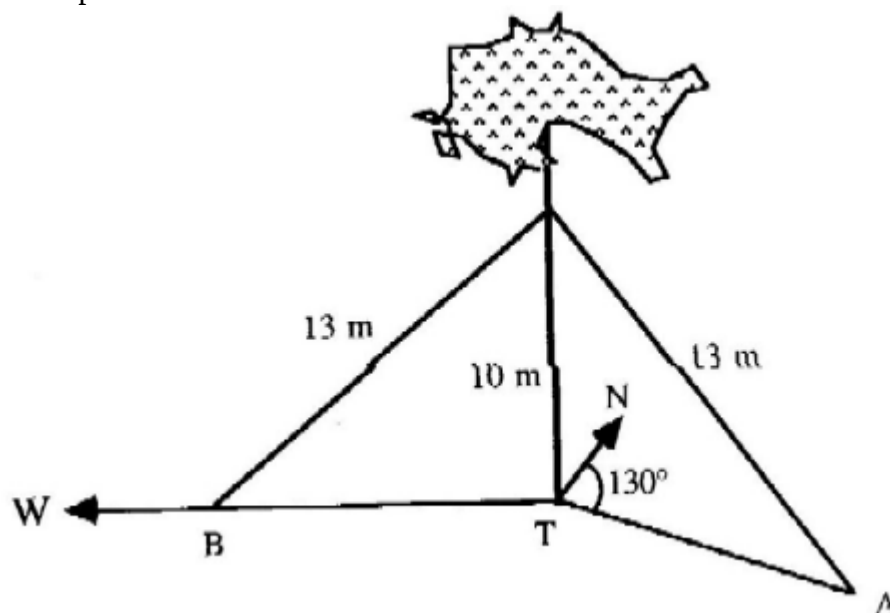
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ii. $y = \sin \frac{x}{3}$

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6. [2, 2, 4 marks]

A tree is supported by two ropes, which are 13m long. The ropes are attached to the tree at a height 10m above the ground and are anchored to the level ground at points A and B. Point A is on a bearing of 130° from the base of the tree and point B is due West of the tree.



[Answers to 1 decimal place]

- i. Calculate the angle each rope makes with the ground.

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- ii. Find the distance from Point B to the base of the tree.

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- iii. Hence find the distance between A and B. (Hint: $BT=AT$)

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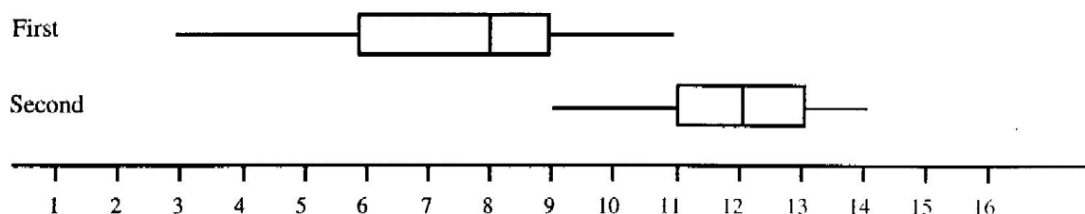
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7. [1, 1, 1, 1, 2 marks]

Julian is using a computer game to improve his reflexes. The maximum score he can achieve is 20. Here are his first 15 attempts.

4, 7, 9, 6, 8, 11, 9, 8, 8, 9, 5, 6, 7, 8, 6

Julian has a further 15 attempts. The box plot for his second set of results has been graphed together with the box plot for his first 15.



- What is the highest score?
- State the median for the 2nd group.
- State the upper quartile for group 1.
- 25% of Julian's scores in the second group were below which score?
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- Comment on the spread of the 2 sets of scores.
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8. [3 marks]

Solve the following.

$$2x + y = 16 \text{ and } x = y + 4$$

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9. [3, 4, 4 marks]

The latitude and longitude of three cities are as follows:

Perth	32°S, 116°E
Peking	40°N, 116°E
Madrid	40°N, 4°W

Assuming the earth to be a sphere of radius of 6400km,

(a) Calculate the distance from Perth to Peking.

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(b) Calculate the distance from Peking to Madrid as measured along a parallel of latitude (correct to the nearest 10km).

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(c) Philadelphia is 6000km due west of Madrid. What longitude is Philadelphia on?(to the nearest degree)

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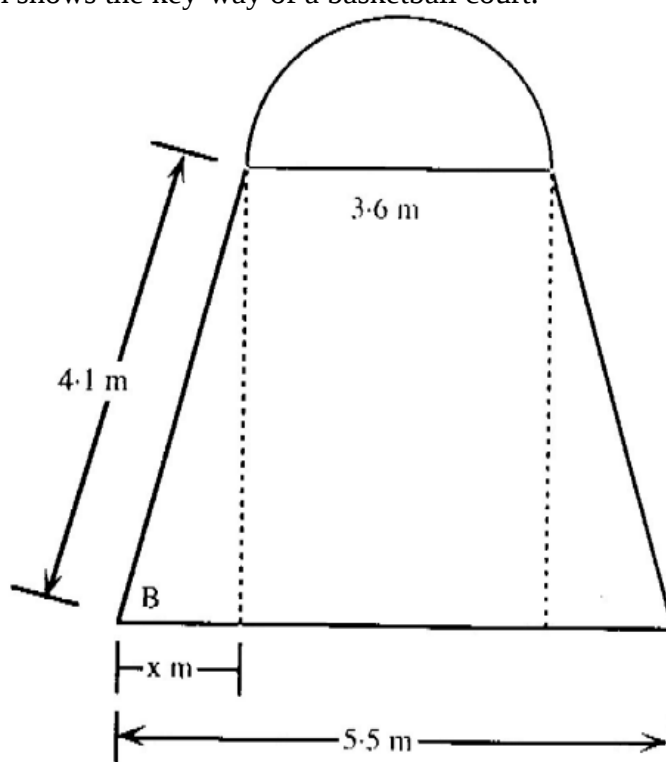
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10. [1, 2, 2 marks]

The diagram shows the key-way of a basketball court.



The dimensions are in metres.

(a) Find the value of x .

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(b) Find the size of angle B to the nearest degree.

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(c) Find the perimeter of the key-way to the nearest metre.

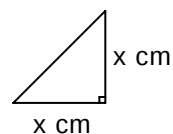
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11. [2, 1, 2, 1, 1, 1 marks]
For the triangle shown;



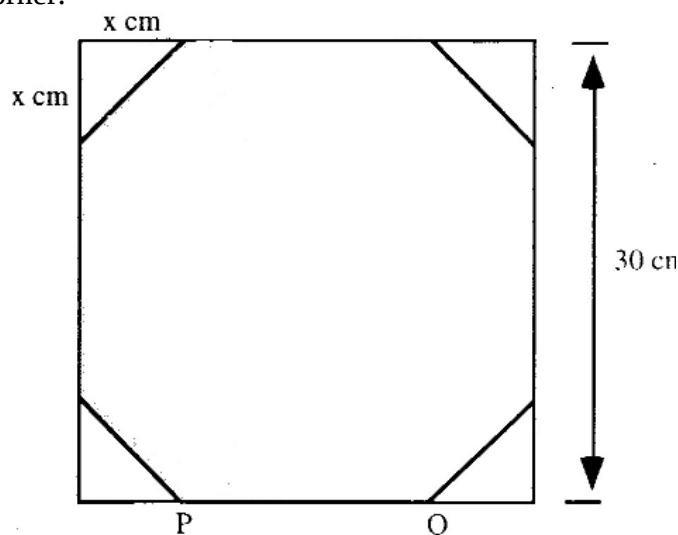
- i. write down an expression for the area of this right isosceles triangle.

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- ii. In what units will the area be measured?

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A square piece of timber, side 30cm, has a right isosceles triangle cut from each corner.



These triangles are congruent.

- iii. write down an expression, in terms of x , for the area of the shaded region remaining, after 4 triangles have been cut off.

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- iv. If the shaded area is 772 cm^2 , write an equation which could be used to find x .

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- v. Solve the equation you wrote in part iv.

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vi. Hence find the distance PQ.

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12. [1, 4, 4 marks]

A surveyor needs to know the distance from A to B. However, a large swamp prevents direct measurement. The surveyor takes off from A on a bearing of 155° and walks for 230m to a suitable landmark. She then walks the 580m to B in a straight line on a bearing of 075° .

(a) Draw a diagram to represent this situation.

Calculate:

(b) the distance AB:

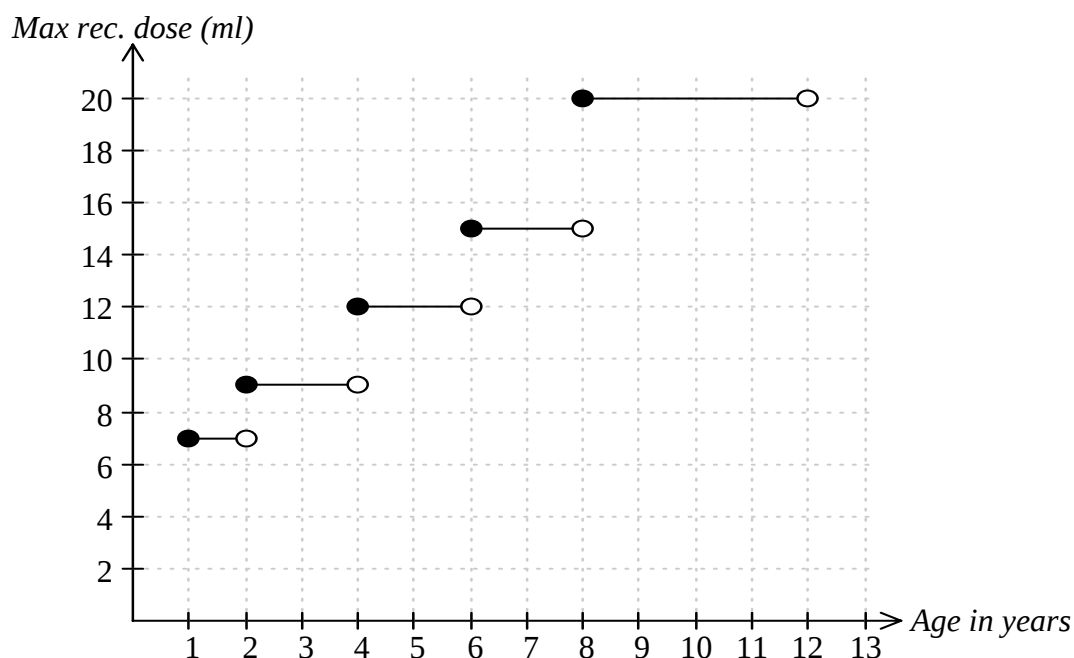
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(c) the bearing of B from A.

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13. [1, 1, 1, 2, 2, 2 marks]

The recommended dosage given on the bottle of a children's cough syrup is represented on the given graph.



- (a) Use the above graph to state the maximum recommended dosage which should be given to a child of age
- (i) 18 months,
- (ii) 4 years
- (iii) 9 years 4 months
- (b) If a 5 ml dose is recognised as being a teaspoonful, how many teaspoonfuls of the syrup should be given to a 7 year old?
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- (c) The dosage can be repeated every 4 hours for a maximum of 4 times per day. What is the maximum dosage (in mls) that can be given to a 5-year-old child in one day?
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- (d) Up to how many teaspoonsful of the syrup may be given to a 15-month-old child during a day if you wish to avoid giving him more than the recommended maximum dosage?

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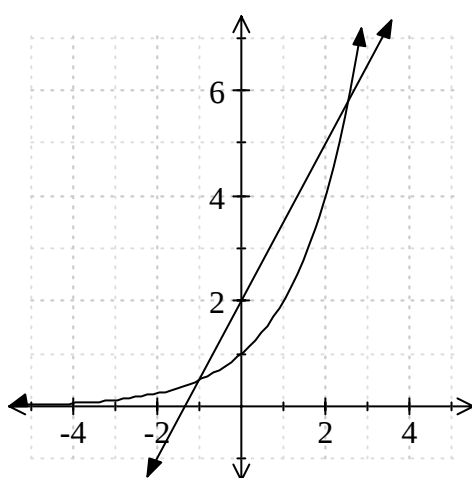
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14. [1, 2, 2 marks]

The graphs shown represent the functions $f(x) = 2^x$ and $g(x) = \frac{3}{2}x + 2$



- (a) label the graphs $f(x)$ and $g(x)$.
- (b) From the graph, find the solutions to the problem $2^x = \frac{3}{2}x + 2$

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- (c) Use your calculator to refine the solution to 2 decimal places.

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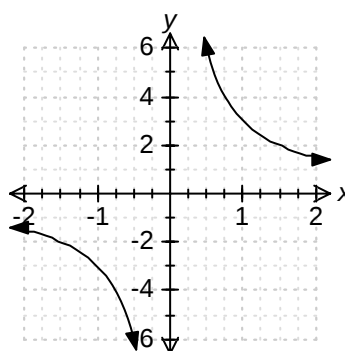
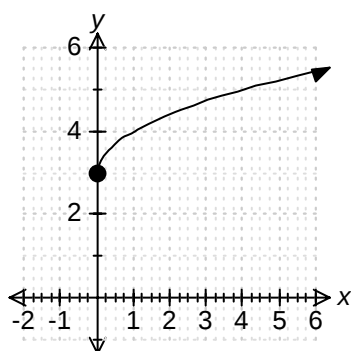
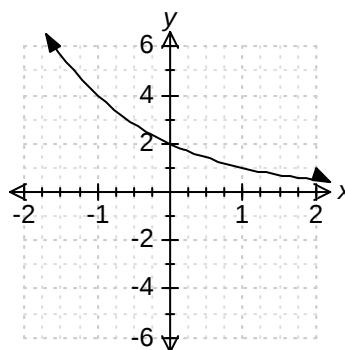
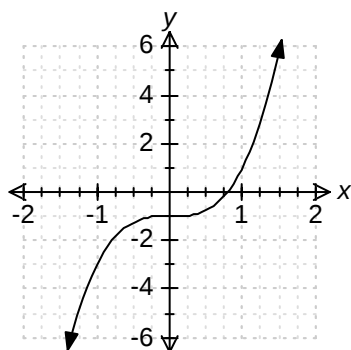
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16. [2, 2, 2, 2 marks]

Write down an equation for each graph.



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