

Week 2

This week in a nutshell:

The questions here are designed in such a way as to allow students to access as many skills and topics as possible. Group discussion afterwards (alongside follow-up tasks) could be used to aid depth of understanding for students who would benefit from this.

Question 1: Expanding double brackets

Question 2: Relative frequency

Question 3: Trigonometric ratios

Question 4: Sampling

Question 5: Standard Constructions

This week's ideas for class discussion include:

Question 1: **Expanding double brackets**

- How important is a systematic approach to expanding brackets?
- How can you check your result is correct?

Question 2: **Relative frequency**

- How might relative frequency be used in the sciences or social sciences?

Question 3: **Trigonometric ratios**

- How are sin and cos related? Can you suggest how we could investigate the values of these functions for different angles?

Question 4: **Sampling**

- Why is the sampling method important in terms of the overall investigation process?

Question 5: **Standard Constructions**

- What is the smallest integer angle that can be constructed using basic construction methods?

Week 2: Day 1

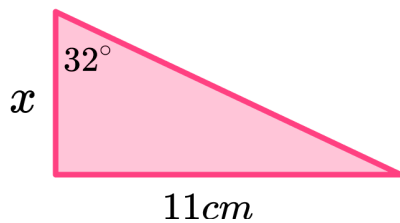
- 1) Expand

$$(x + 2)(x + 5)$$

- 2) The results of rolling a 6-sided die are
1, 4, 5, 2, 3, 1, 2, 1, 6, 1, 2, 4

What is the relative frequency of the number 1?

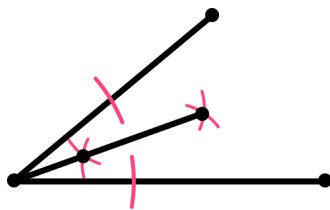
- 3) Which trigonometric ratio should be used to find the length of x ?



- 4) Jo asks the first 20 people she sees for their views on international sports.

What method of sampling is she using?

- 5) What type of construction has been performed here?



Week 2: Day 1 Answers

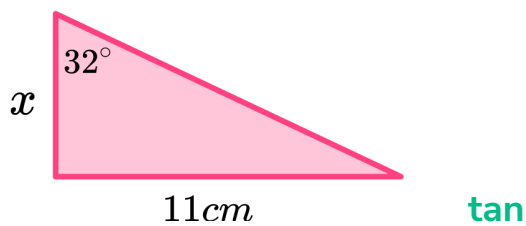
- 1) Expand

$$(x + 2)(x + 5) = x^2 + 7x + 10$$

- 2) The results of rolling a 6-sided die are
1, 4, 5, 2, 3, 1, 2, 1, 6, 1, 2, 4

What is the relative frequency of the number 1? $\frac{4}{12}$ or $\frac{1}{3}$

- 3) Which trigonometric ratio should be used to find the length of x ?



- 4) Jo asks the first 20 people she sees for their views on international sports.

What method of sampling is she using? **Convenience**

- 5) What type of construction has been performed here?



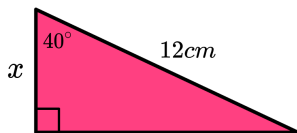
Week 2: Day 2

- 1) Expand

$$(x - 1)(x + 6)$$

- 2) For a particular biased 6-sided die, the relative frequency of rolling a 6 is $\frac{2}{5}$. If you roll the die 30 times, how many times would you expect to get a 6?

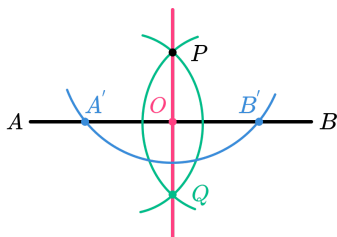
- 3) Which trigonometric ratio should be used to find the length of x ?



- 4) Ravi puts the names of his classmates in a bag and draws five names out, without looking, in order to ask their opinions on the school canteen.

What method of sampling is he using?

- 5) The line passing through PQ is a construction. What type of construction is this in relation to line segment AB?



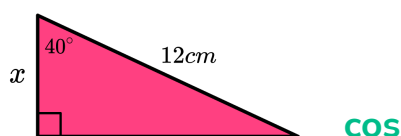
Week 2: Day 2 Answers

- 1) Expand

$$(x - 1)(x + 6) = x^2 + 5x - 6$$

- 2) For a particular biased 6-sided die, the relative frequency of rolling a 6 is $\frac{2}{5}$. If you roll the die 30 times, how many times would you expect to get a 6? **12**

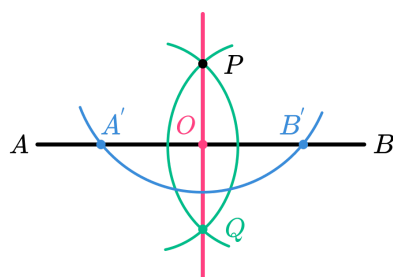
- 3) Which trigonometric ratio should be used to find the length of x ?



- 4) Ravi puts the names of his classmates in a bag and draws five names out, without looking, in order to ask their opinions on the school canteen.

What method of sampling is he using? **Random**

- 5) The line passing through PQ is a construction. What type of construction is this in relation to line segment AB? **Perpendicular bisector**



Week 2: Day 3

- 1) Expand

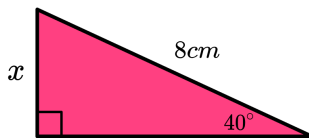
$$(x - 3)(x - 7)$$

- 2) Here are the results of rolling a 6-sided die 10 times:

4, 5, 6, 4, 4, 1, 2, 1, 4, 1.

By finding the relative frequency of rolling a 4, comment on whether the die may be biased.

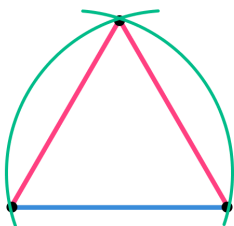
- 3) Which trigonometric ratio should be used to find the length of x ?



- 4) Belle will stop collecting data when she has interviewed 24 men and 26 women.

What method of sampling is she using?

- 5) What shape has been constructed by this method?



Week 2: Day 3 Answers

- 1) Expand

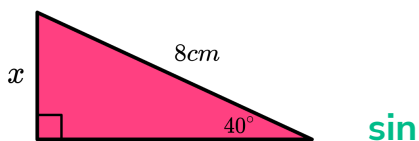
$$(x - 3)(x - 7) = x^2 - 10x + 21$$

- 2) Here are the results of rolling a 6-sided die 10 times:

4, 5, 6, 4, 4, 1, 2, 1, 4, 1.

By finding the relative frequency of rolling a 4, comment on whether the die may be biased. RF is $\frac{4}{10}$ or $\frac{2}{5}$ or 0.4. Could be biased

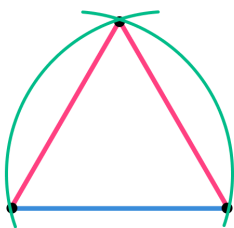
- 3) Which trigonometric ratio should be used to find the length of x ?



- 4) Belle will stop collecting data when she has interviewed 24 men and 26 women.

What method of sampling is she using? Quota

- 5) What shape has been constructed by this method?



Equilateral triangle

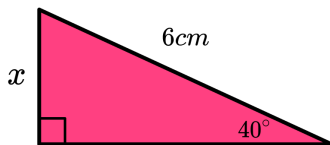
Week 2: Day 4

- 1) Expand

$$(x + 4)(x - 4)$$

- 2) It rained on 3 days in June this year. Estimate the probability that it will rain on 1st June next year.

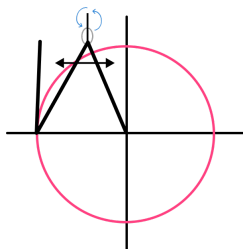
- 3) Find the length of x .



- 4) I am investigating views on mobile banking. I stand outside a local bank and ask customers their opinions.

What is wrong with my method?

- 5) Describe how this method could be continued to construct a regular hexagon.



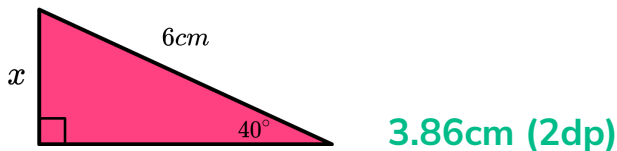
Week 2: Day 4 Answers

- 1) Expand

$$(x + 4)(x - 4) = x^2 - 16$$

- 2) It rained on 3 days in June this year. Estimate the probability that it will rain on 1st June next year. $\frac{1}{10}$

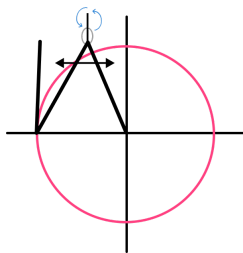
- 3) Find the length of x .



- 4) I am investigating views on mobile banking. I stand outside a local bank and ask customers their opinions.

What is wrong with my method? **In branch/not mobile.**
One bank

- 5) Describe how this method could be continued to construct a regular hexagon.



Use the radius to mark six equally spaced points on the circle with the compass

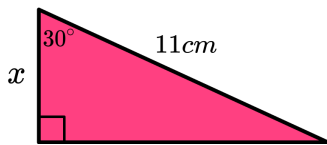
Week 2: Day 5

- 1) Expand

$$(3x - 2)(2x + 1)$$

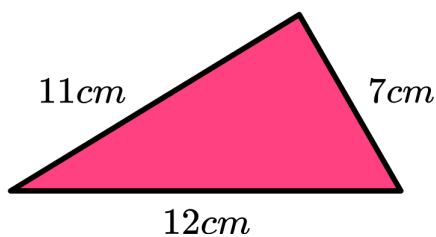
- 2) In a room of 54 people, 6 are left handed. Using this as a “typical” group, estimate the probability that a person chosen at random is right handed.

- 3) Find the length of x .



- 4) What is sampling bias?

- 5) Briefly describe how you would accurately draw a construction of this triangle.



Week 2: Day 5 Answers

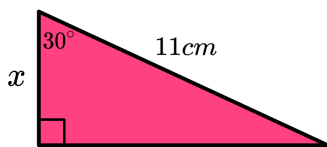
- 1) Expand

$$(3x - 2)(2x + 1) = 6x^2 - x - 2$$

- 2) In a room of 54 people, 6 are left handed. Using this as a “typical” group, estimate the probability that a person chosen at random is right handed.

$$\frac{8}{9}$$

- 3) Find the length of x .



9.53cm (2dp)

- 4) What is sampling bias?

When some members of a population are more likely to be selected in a sample than others.

- 5) Briefly describe how you would accurately draw a construction of this triangle.

Draw the 12cm base, measured accurately. Draw arcs 11cm and 7cm from the endpoints of the base using a compass. Join the intersection of arcs to the base endpoints.

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