



THIRD SPACE
LEARNING

Same Surface Different Depth Problems

6 exemplar questions
and a template for
creating your own

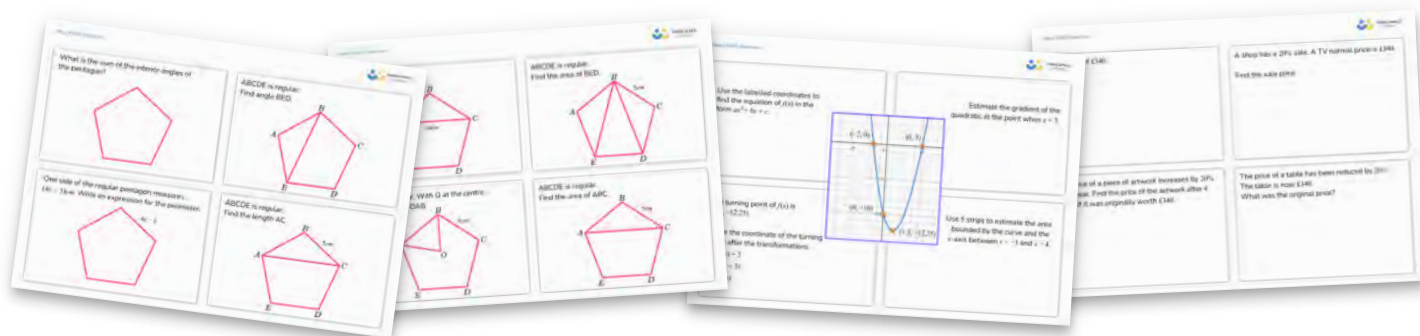
This resource in a nutshell

SSDD stands for Same Surface, Different Depth.

They are questions that look the same and have the same mathematical hook but require different mathematical processes in order to be solved.

This resource provides **6** Same Surface Different Depth problems that cover a variety of different question types and topics.

There is also a **blank template** that can be used to create your own SSDD problems.



How to use the questions in this resource

SSDD problems are an effective tool for:

- **Spaced retrieval practice** as multiple previously taught topics can be included in a single question
- **Discriminative contrast** as presenting a set of questions which, on the surface, all look the same, encourages students to look more deeply at each question
- **Preventing autopilot** and helping to prevent students applying a recently learnt skill to every question they attempt.

SSDD problems can be used:

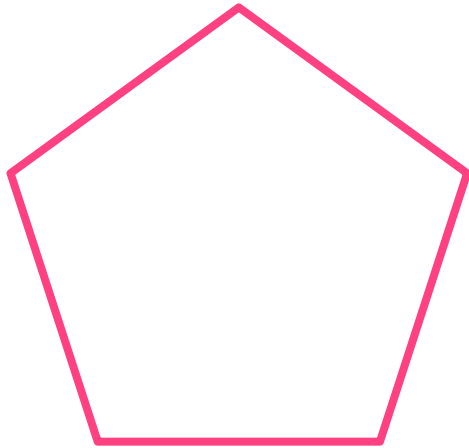
- as part of a well planned revision programme to enable students to practice a variety of topics.
- as part of a sequence of lessons to support retrieval of key skills
- to support students to develop problem solving skills
- as part of starter or homework tasks to support consolidation

Do you have KS4 students who need additional support in maths?

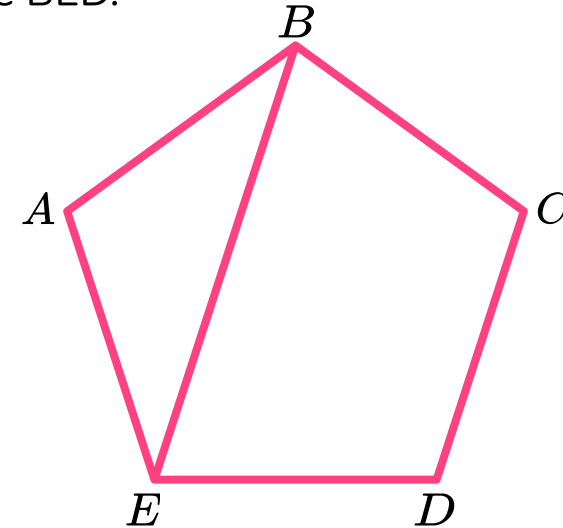
Our specialist tutors will help them develop the skills they need to succeed at GCSE in weekly one to one online revision lessons. Trusted by secondary schools across the UK.

Visit thirdspacelearning.com to find out more.

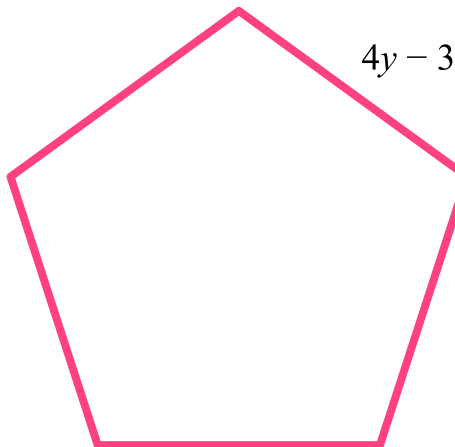
What is the sum of the interior angles of the pentagon?



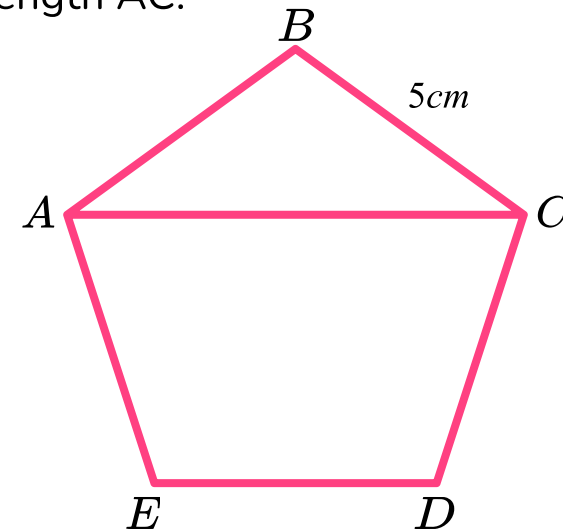
ABCDE is regular.
Find angle BED.



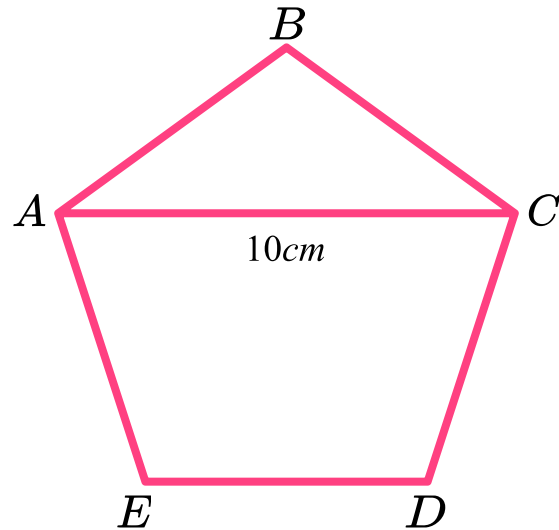
One side of the regular pentagon measures $(4y - 3)\text{cm}$. Write an expression for the perimeter.



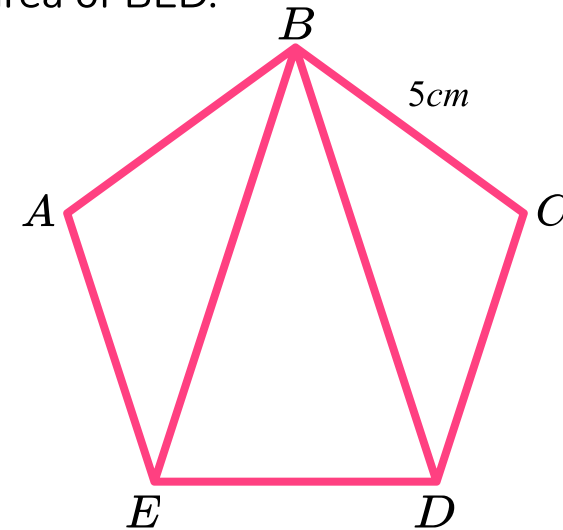
ABCDE is regular.
Find the length AC.



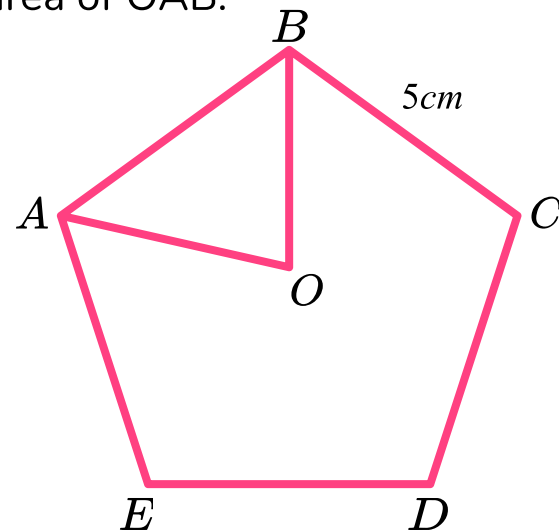
ABCDE is regular.
Find the area of ACDE.



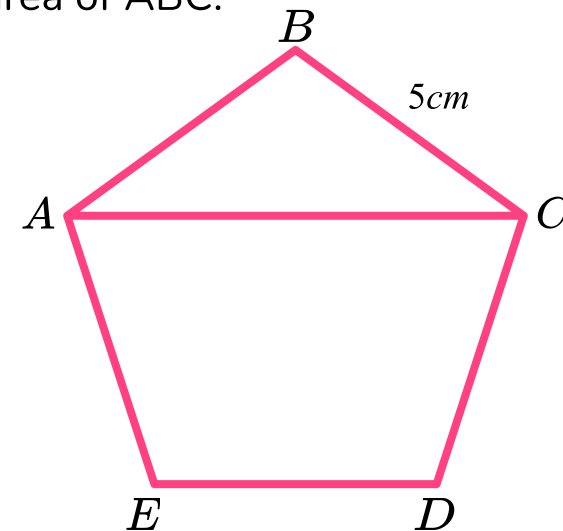
ABCDE is regular.
Find the area of BED.



ABCDE is regular. With O at the centre.
Find the area of OAB.

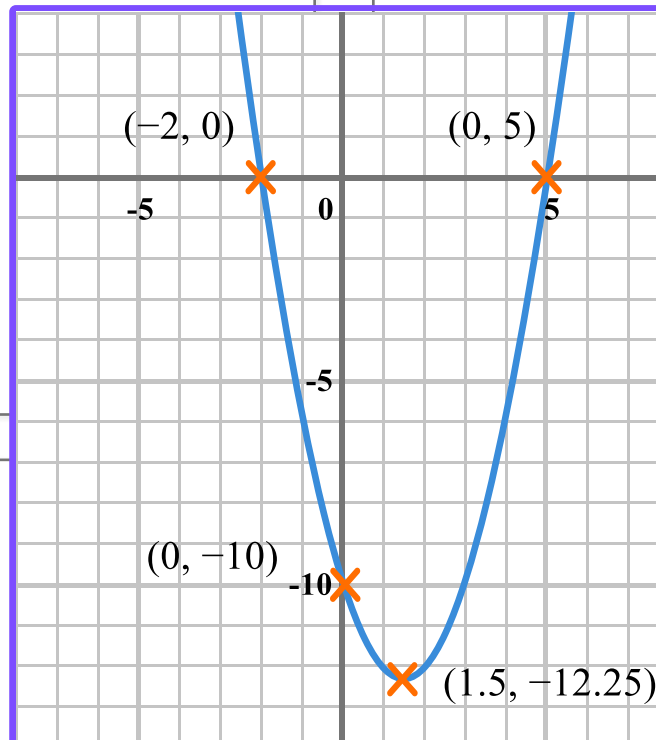


ABCDE is regular.
Find the area of ABC.



Use the labelled coordinates to find the equation of $f(x)$ in the form $ax^2 + bx + c$.

Estimate the gradient of the quadratic at the point when $x = 3$.



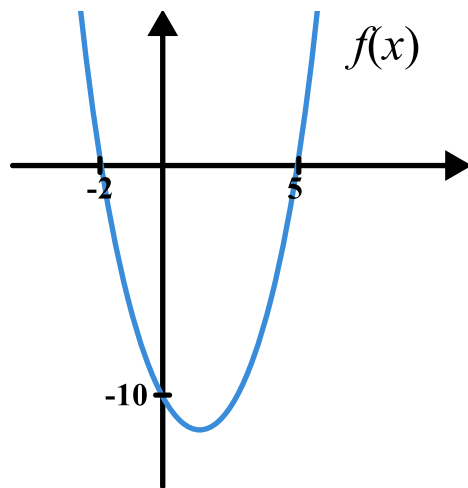
The turning point of $f(x)$ is $(1.5, -12.25)$.

Write the coordinate of the turning point after the transformations

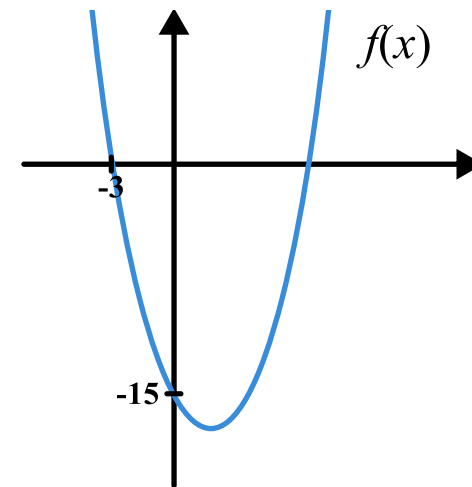
1. $f(x) + 3$
2. $f(x + 3)$
3. $-f(x)$

Use 5 strips to estimate the area bounded by the curve and the x -axis between $x = -1$ and $x = 4$.

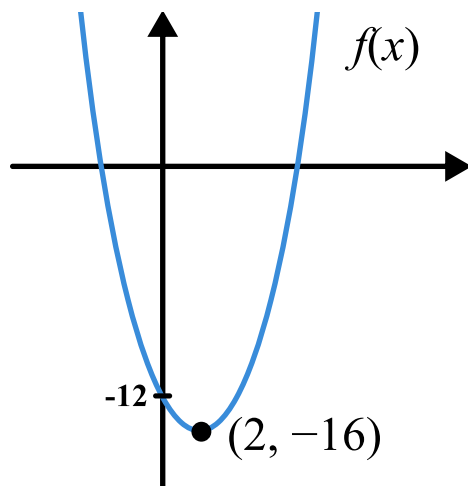
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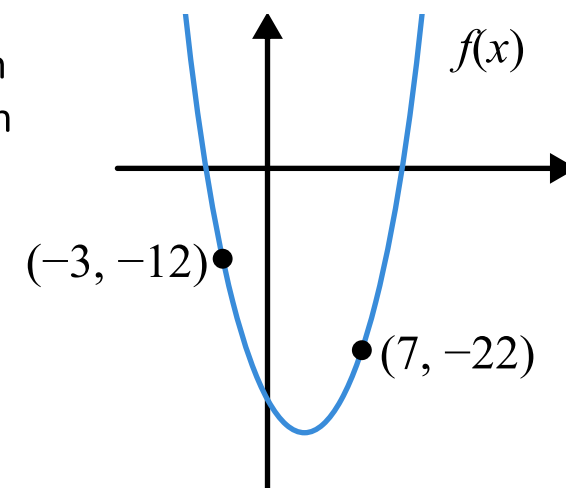
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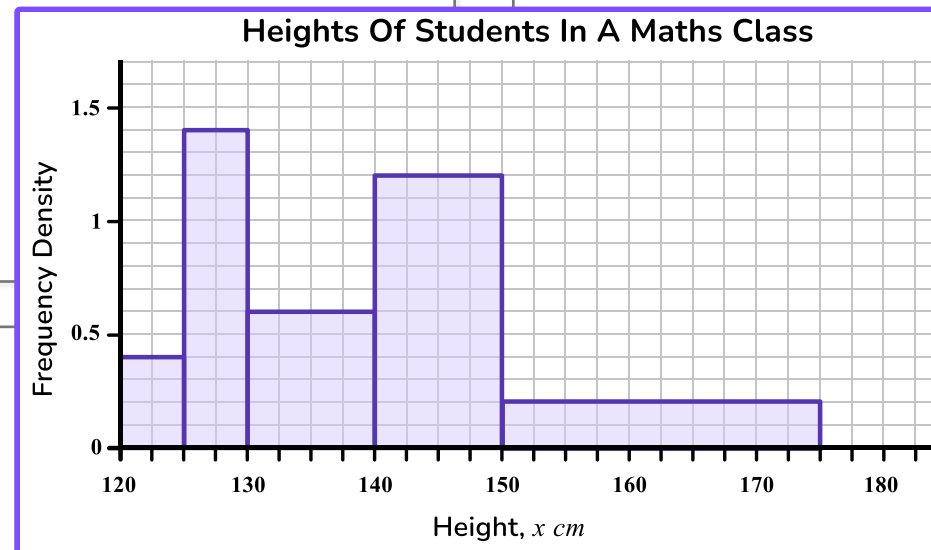


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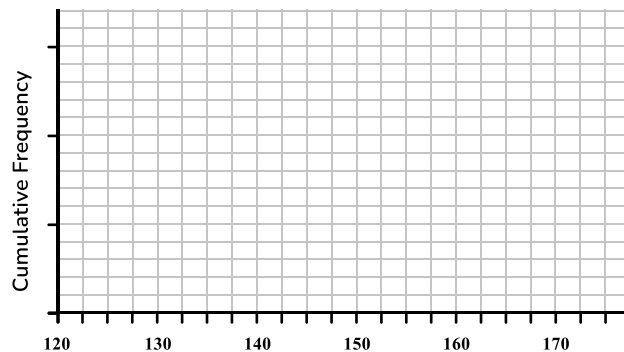


Find the an estimate for the mean height of the students in the maths class.

Find the the range of heights of the tallest 20% of the class.



Draw a cumulative frequency curve for the data.



The ratio of girls to boys in the class is 3:5. All of the students less than 130cm tall are girls, the remaining girls are taller than 150cm. Find the percentage of the class that are boys over 150cm.

Find 20% of £340.

A shop has a 20% sale. A TV normal price is £340.

Find the sale price.

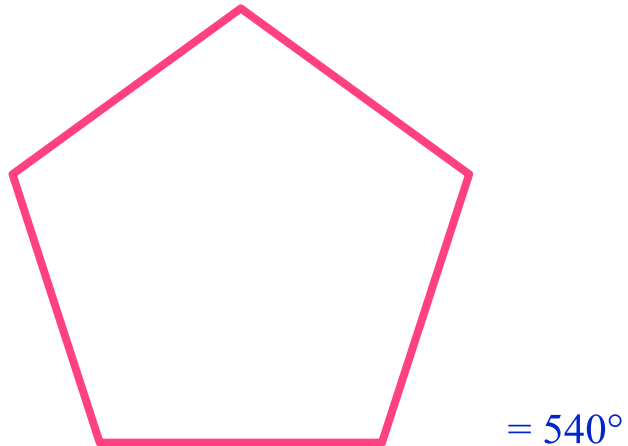
The price of a piece of artwork increases by 20% each year. Find the price of the artwork after 4 years if it was originally worth £340.

The price of a table has been reduced by 20%.
The table is now £340.
What was the original price?

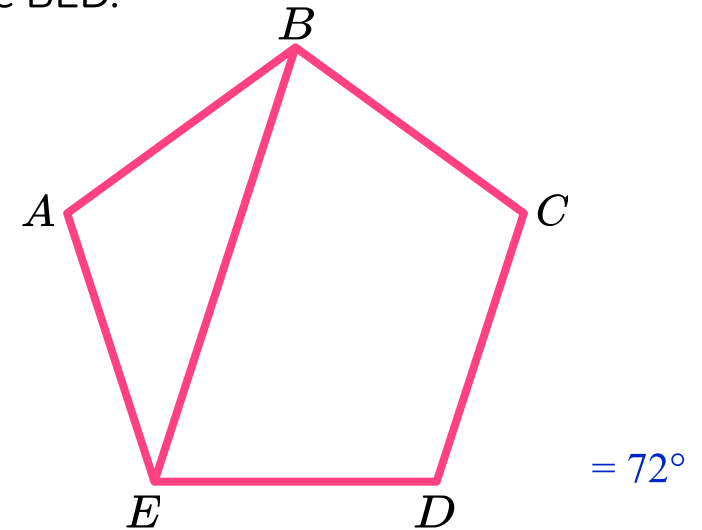
SSDD

Answers

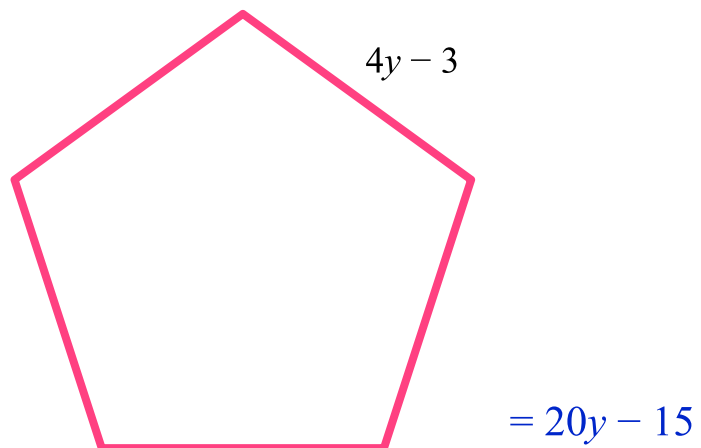
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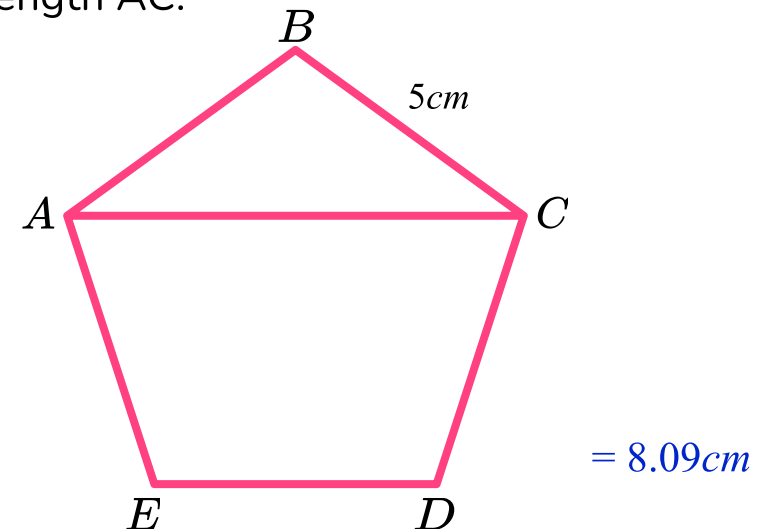
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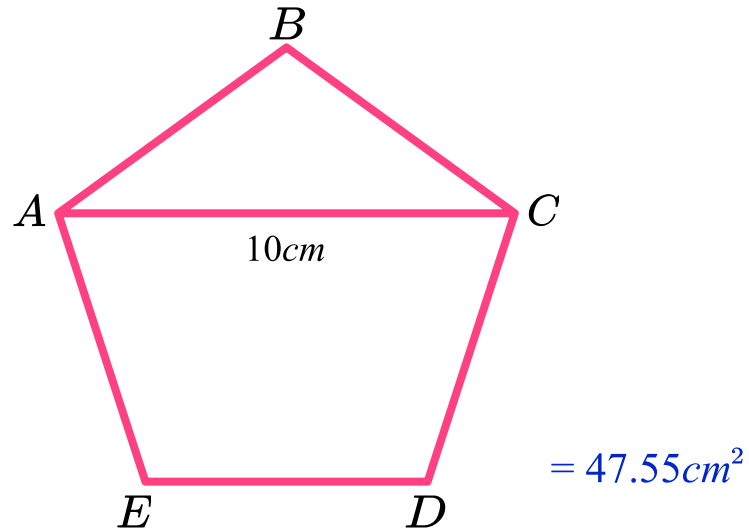
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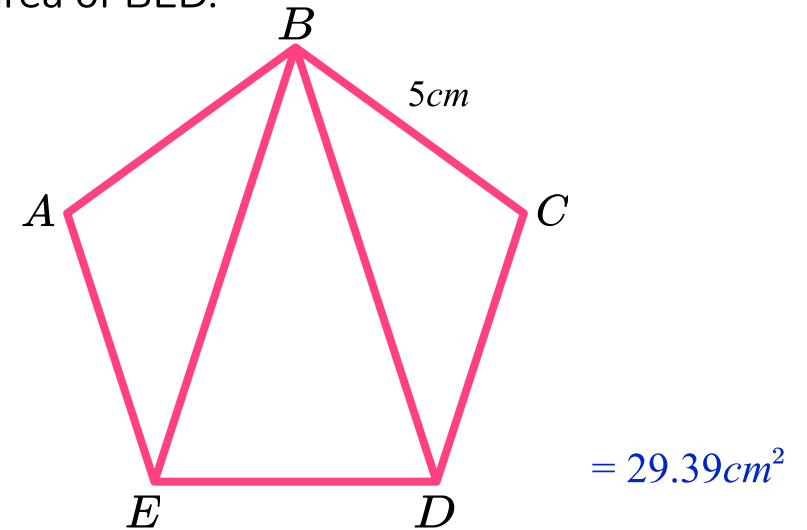
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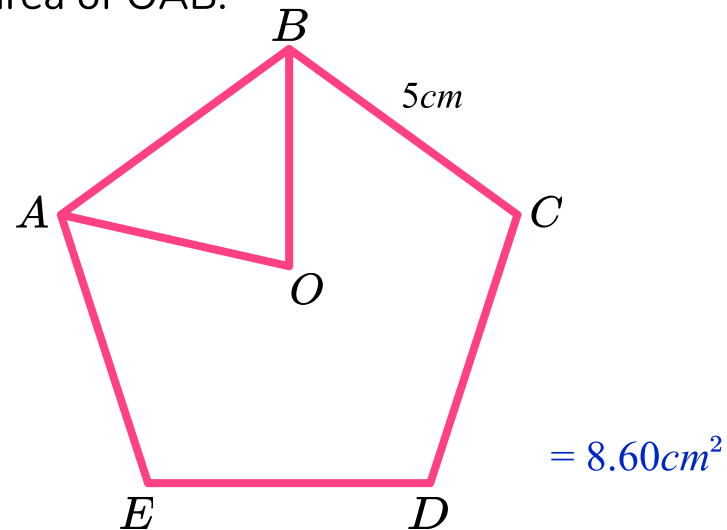
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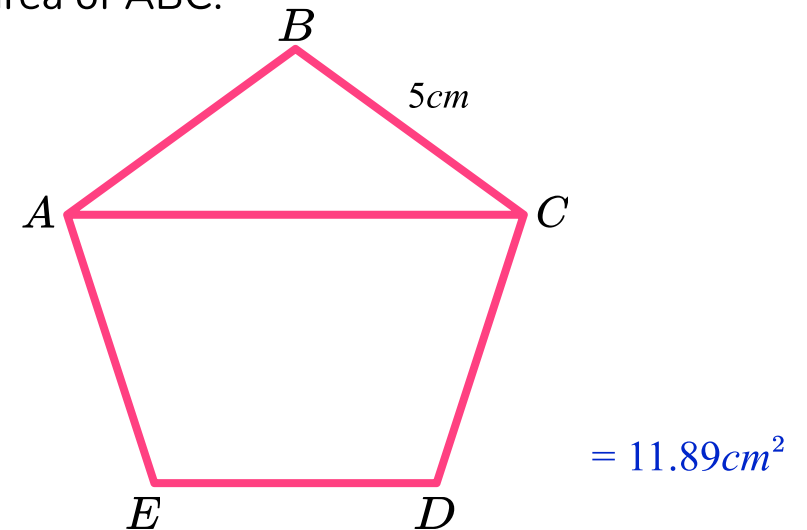
ABCDE is regular.
Find the area of BED.



ABCDE is regular. With O at the centre.
Find the area of OAB.



ABCDE is regular.
Find the area of ABC.



Use the labelled coordinates to find the equation of $f(x)$ in the form $ax^2 + bx + c$.

$$= x^2 - 3x - 10$$

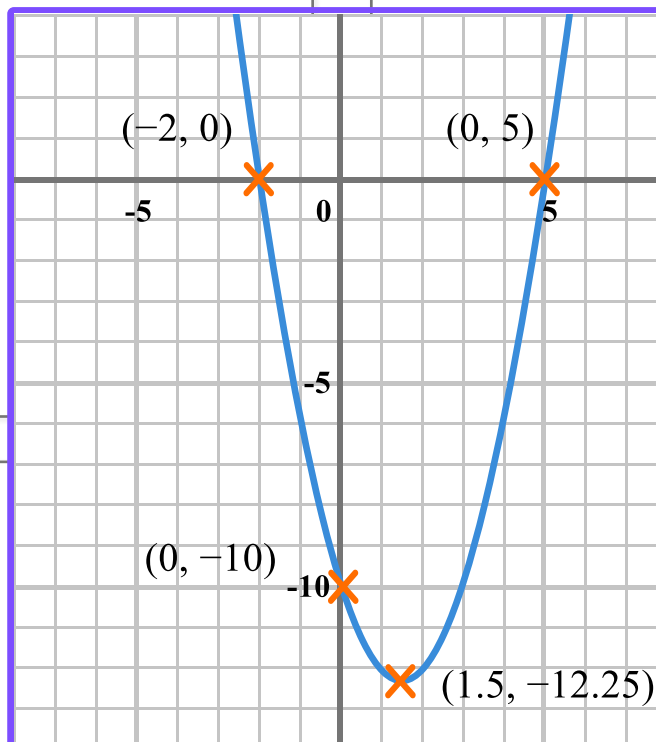
Estimate the gradient of the quadratic at the point when $x = 3$.

$$= 3$$

The turning point of $f(x)$ is $(1.5, -12.25)$.

Write the coordinate of the turning point after the transformations

1. $f(x) + 3$ $(1.5, -9.25)$
2. $f(x + 3)$ $(-1.5, -12.25)$
3. $-f(x)$ $(1.5, 12.25)$

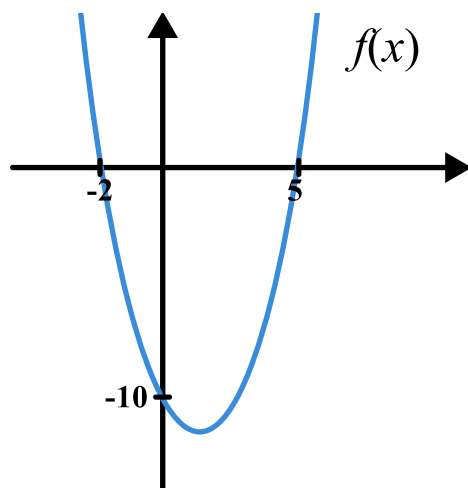


Use 5 strips to estimate the area bounded by the curve and the x -axis between $x = -1$ and $x = 4$.

$$= 50$$

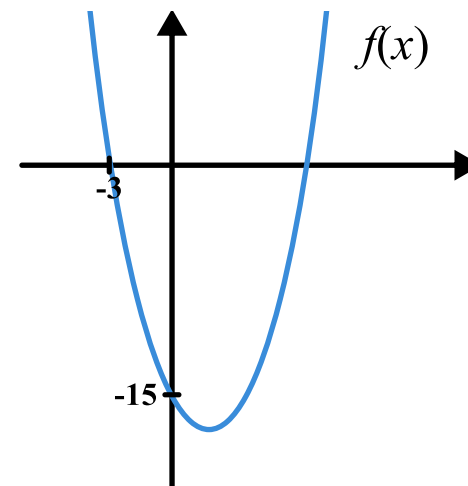
Use the labelled coordinates to find the equation of $f(x)$ in the form $x^2 + bx + c$.

$$= x^2 - 3x - 10$$



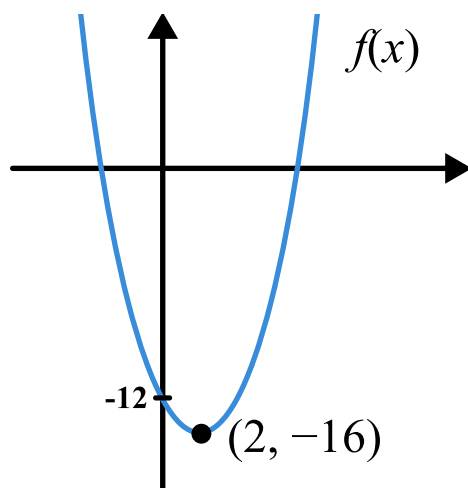
Use the labelled coordinates to find the equation of $f(x)$ in the form $x^2 + bx + c$.

$$= x^2 - 2x - 15$$



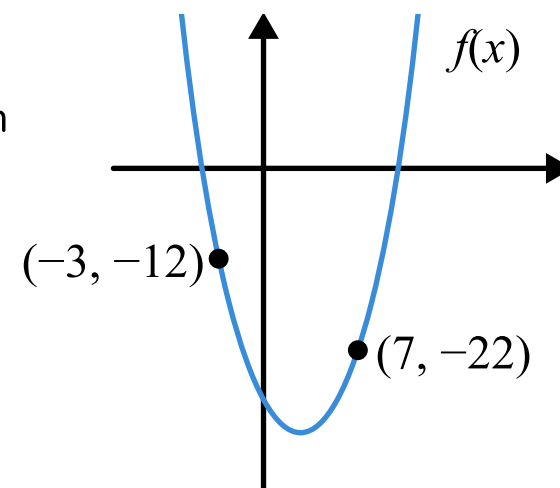
Use the labelled coordinates to find the equation of $f(x)$ in the form $x^2 + bx + c$.

$$= x^2 - 4x - 12$$



Use the labelled coordinates to find the equation of $f(x)$ in the form $x^2 + bx + c$.

$$= x^2 - 5x - 36$$

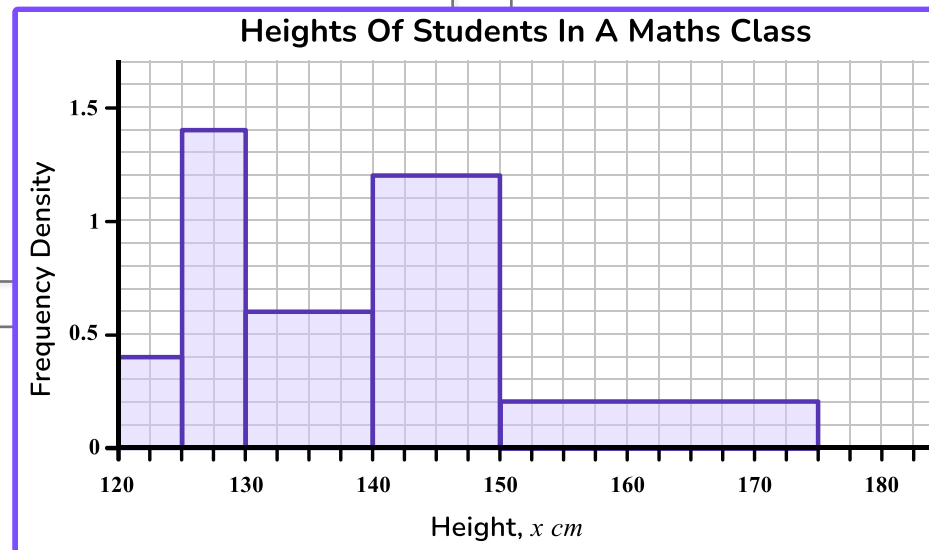


Find the an estimate for the mean height of the students in the maths class.

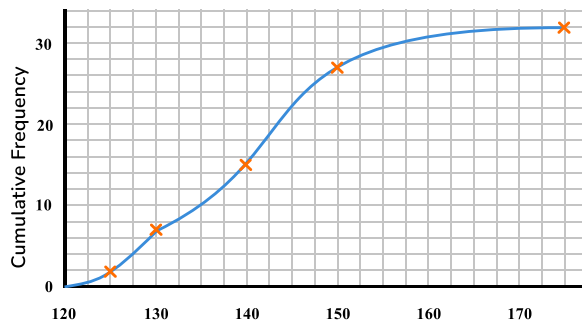
$$= 140.625cm$$

Find the the range of heights of the tallest 20% of the class.

$$= \text{Above } 148.83cm$$



Draw a cumulative frequency curve for the data.



Height, cm	Frequency	C. F.
$120 \leq x < 125$	2	2
$125 \leq x < 130$	7	9
$130 \leq x < 140$	6	15
$140 \leq x < 150$	12	27
$150 \leq x < 175$	5	32

The ratio of girls to boys in the class is 3:5. All of the students less than $130cm$ tall are girls, the remaining girls are taller than $150cm$. Find the percentage of the class that are boys over $150cm$.

$$= 6.25\%$$

Find 20% of £340.

= £68

A shop has a 20% sale. A TV normal price is £340.

Find the sale price.

= £272

The price of a piece of artwork increases by 20% each year. Find the price of the artwork after 4 years if it was originally worth £340.

= £705.02

The price of a table has been reduced by 20%. The table is now £340. What was the original price?

= £425

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