

Troposphere



Section One

Standard form

Key skills

Factorising

Speed

Section Two

Plotting

Problem solving

Exam question

Explain it

Standard form


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Complete the following calculations.

Write your answer in standard form. $a \times 10^m$
 $\longrightarrow 1 \leq a < 10$


1 $10^2 + 10^2$

A 2×10^4

 0.3×10^4


2 $10^2 + 10^3$

B 3×10^3

 35×10^{-6}


3 $10^3 - 10^2$

C $(2 \times 10^1) + (3 \times 10^2)$

 $(2 \times 10^5) + (4 \times 10^3)$


4 $10^2 \times 10^2$

D $(4 \times 10^3) \times (3 \times 10^2)$

 $(4 \times 10^3) \times (3 \times 10^2)$


5 $10^3 \div 10^2$

E $(5 \times 10^3) - (2 \times 10^2)$

 $(5 \times 10^3) - (2 \times 10^2)$

6 $10^3 - 10^4$

F $(4 \times 10^4) \div (2 \times 10^2)$

 $(2 \times 10^4) \div (4 \times 10^2)$

Key methods

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1

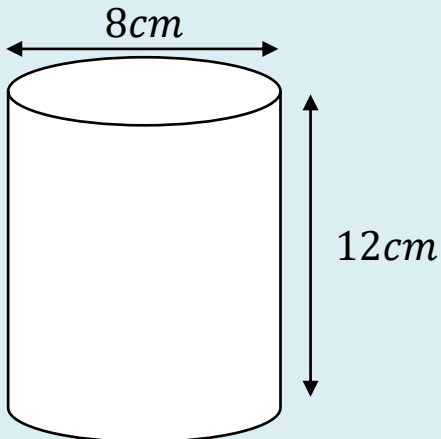
$$5\frac{3}{4} + 2\frac{3}{7} =$$

2

$$3x + 3y = 33$$

$$2x + 5y = 31$$

3



Volume =

Surface area =

If you do not have a calculator then give your answer in terms of pi.


Factorising

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Factorise the following expressions.


1 $2x + 4$

A $2x^2 + 4x$

 $12x^2 + 16x$


2 $5x + 10$

B $5x^2 + 10x$

 $54x^3y + 32x^2$


3 $4x - 2$

C $4x^3 - 2x$

 $\frac{4x^3 - 2x}{8}$


4 $8x - 6$

D $8x^3 - 6x^2$

 $\frac{8x^3 - 6x^2}{3x}$


5 $10 - 5x$

E $10xy - 5x^2$

 $\frac{10xy}{3} - \frac{5x^2}{6}$

6 $24 - 16x$


F $24x^3y - 16x^2y^3$

 $\frac{24x^3y}{a} - \frac{16x^2y^3}{3a}$

Calculate the following speeds. Choose an appropriate unit of measure.


1 An object travels 10m
in 2 seconds.

A An object travels 30m
in 2.5 seconds.

 An object travels
1.5cm in 1.2 seconds.


2 An object travels 5km
in 2 hours.

B An object travels 5km
in 20 minutes.

 An object travels
0.125km in 24 hours.

3 An object travels
400m in 15 minutes.

C An object travels
0.2km in 12 minutes.

 An object travels
 $1.6 \times 10^3 km$
in 12 seconds.

Reflect on the first section.

WWW:

EBI:

Plotting

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Plot the function.

1

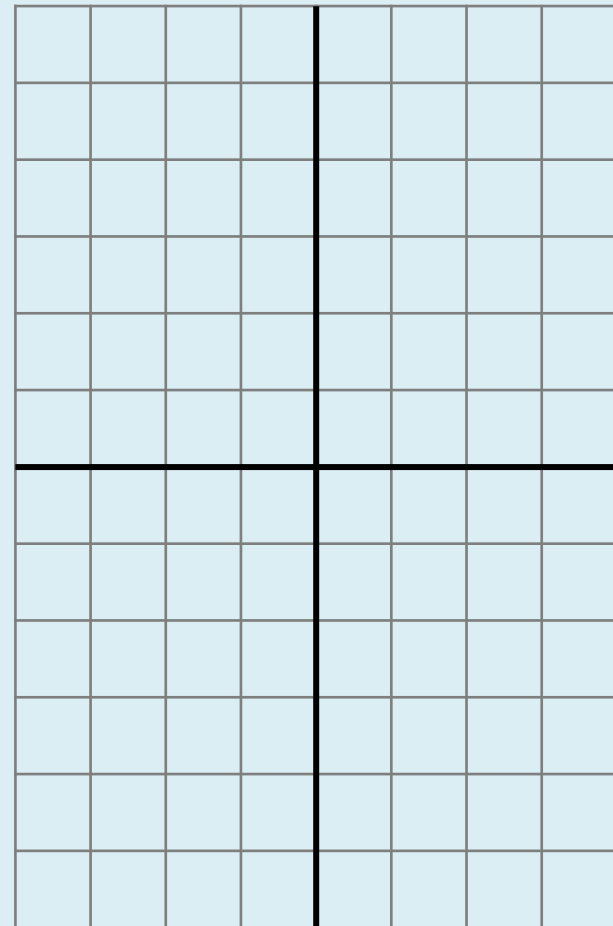
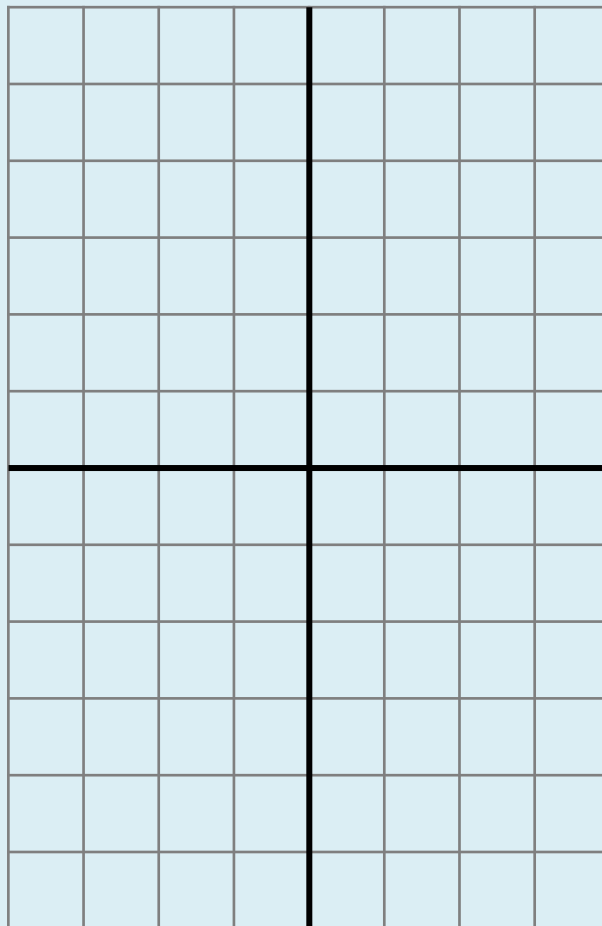
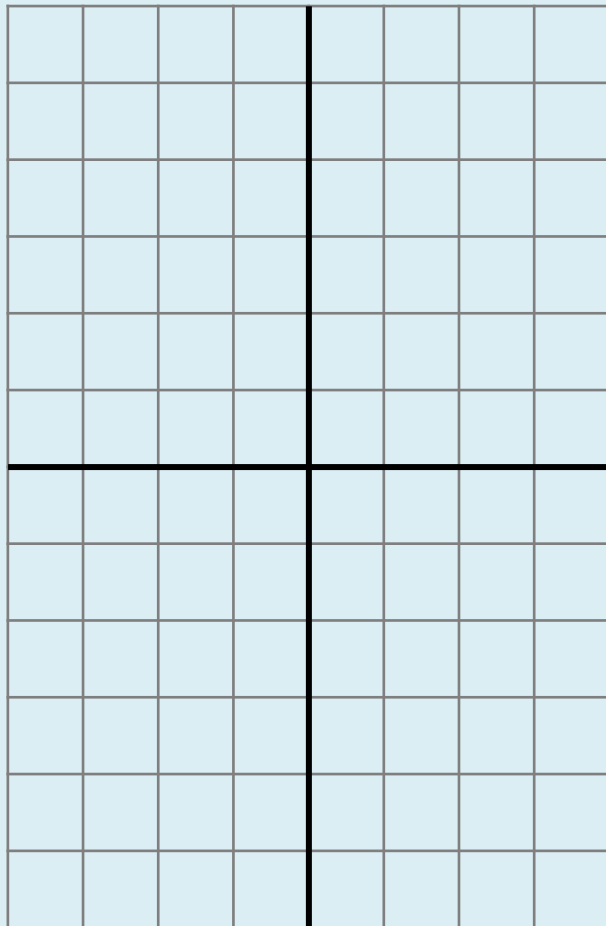
$$x + y = 4$$

A

$$x - y = 4$$



$$2x + y = 4$$



1

Last year, Australian Suzy Walsham won the annual women's race up the 1576 steps of the Empire State Building in New York for a record fifth time. Her winning time was 11 minutes 57 seconds. Approximately how many steps did she climb per minute?

A 13

B 20

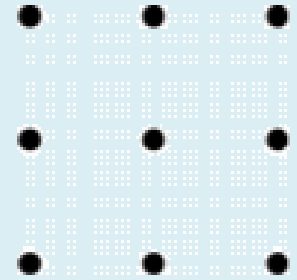
C 80

D 100

E 130

2

What is the minimum number of points which have to be removed from the adjacent diagram so that in the remaining picture no three points lie on one line?



A 1

B 2

C 3

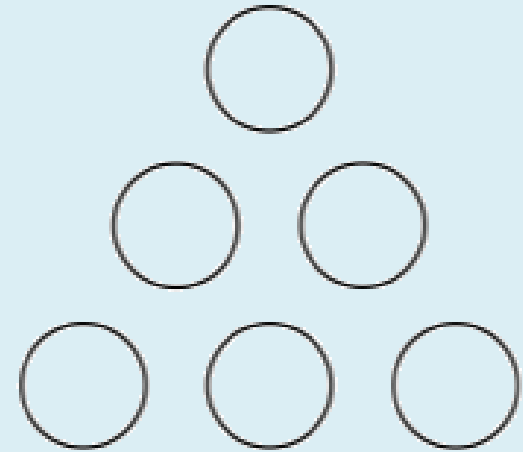
D 4

E 7

3

Lucy wants to put the numbers 2, 3, 4, 5, 6 and 10 into the circles so that the products of the three numbers along each edge are the same, and as large as possible.

What is this product?

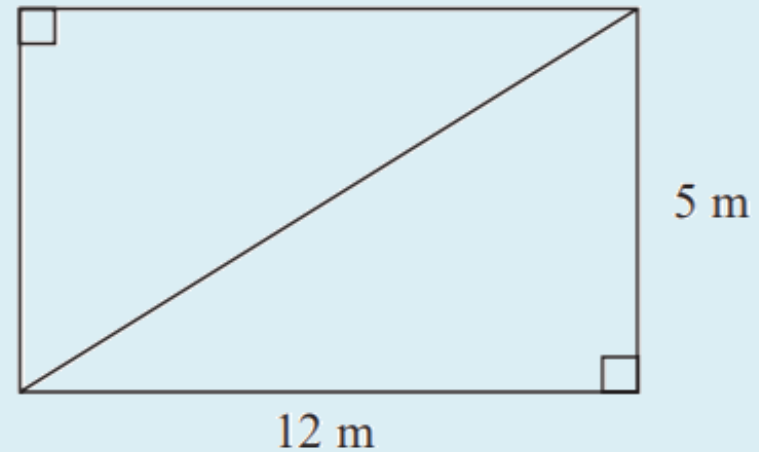


1

This rectangular frame is made from 5 straight pieces of metal.

The weight of the metal is 1.5kg per metre.

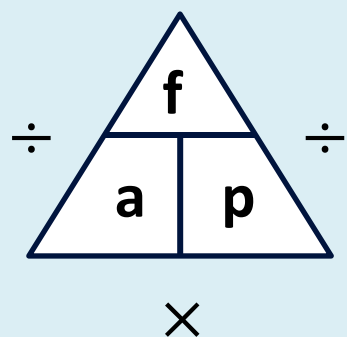
Work out the total weight of the metal in the frame.



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(5 marks)

Study the information. If you can explain the maths to a peer, or the rest of the class then you really understand it. Test your understanding first by answering the questions below. Create your own questions and include them in your explanation to test the audiences understanding.



$$\text{Force} = \text{Pressure} \times \text{Area}$$

$$\text{Pressure} = \text{Force} \div \text{Area}$$

$$\text{Area} = \text{Force} \div \text{Pressure}$$

Pressure is a compound unit of measure. This means it is a measure of more than one unit of measure. For example if area is measured in m^2 and force is measured in Newtons, pressure would be measured in Newtons per m^2 . The short hand way of writing this is N/m^2 . This unit of measure is the description of how the measure is calculated: force/area or $f \div a$. The unit N/m^2 is called a Pascal (Pa). The Pascal is the SI unit for pressure.

1 How does the triangle work?

2 What is a Newton?

3 An object on a table has a downward force of 30N and covers an area of $0.2m^2$. Calculate the pressure the object exerts on the table?

Newton: The force that would give a mass of one kilogram an acceleration of one metre per second per second.

Acceleration of Gravity $\approx 9.8 m/s^2$

Force = Mass x acceleration

End of the lesson

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Well done for completing the lesson.



Reflection