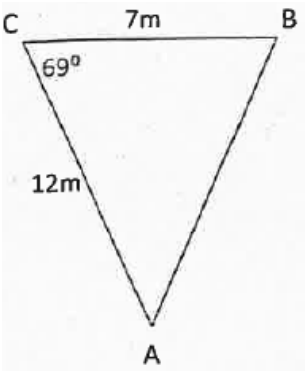
N5 SPTA Unit Revision Applications

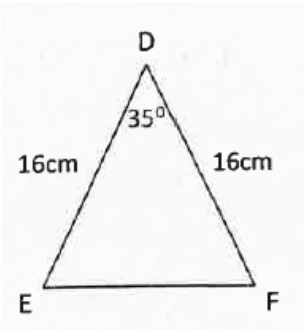
Show all working – Calculator allowed.

1. Calculate the Area of each triangle below:

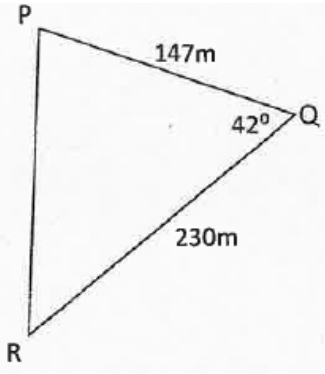
a)



(b)

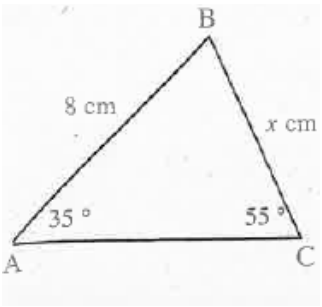


(c)



2. Calculate the values of the sides and angles marked with a letter:

a)



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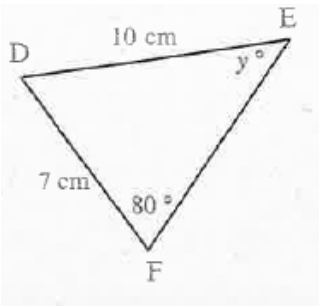

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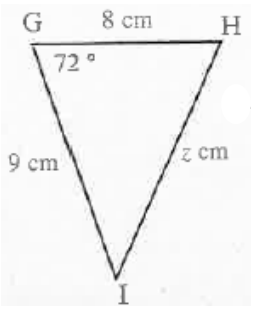

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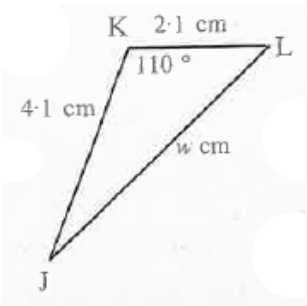

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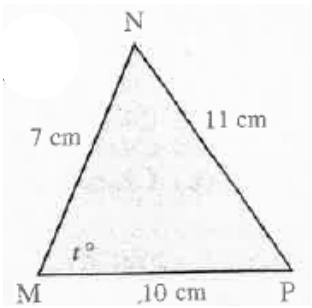
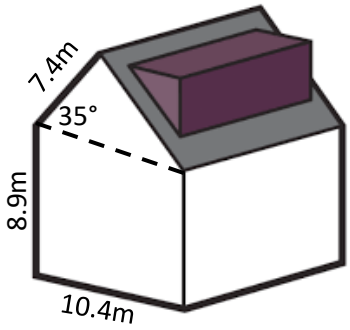


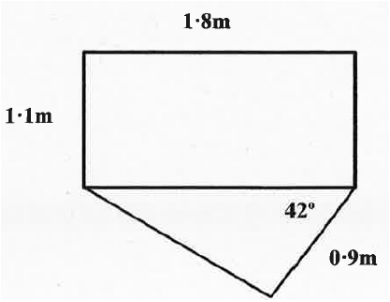
3. A telephone pole, 6 metres long, is blown over and broken in a storm.
The distance from the base of the pole to the break is 2.5m.
The angle at the break is 102°.
Calculate the distance between the top of the pole and the bottom, AB.

4.



The gable end wall of a house has measurements as shsown.
The wall consists of a rectangle and a triangle.
On average, a litre of paint will cover $9m^2$ of wall.
The painter estimates he will need 12 litres of paint.
Will this be enough? Justify your answer.

5. The dimensions of a new design of desk is shown here.
The company wants to varnish the desktop.
On average, 100ml of varnish will cover $2m^2$
The company estimates that they will need 150ml of varnish.
Will this be enough? Justify your answer.



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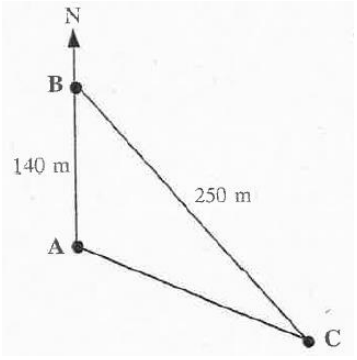
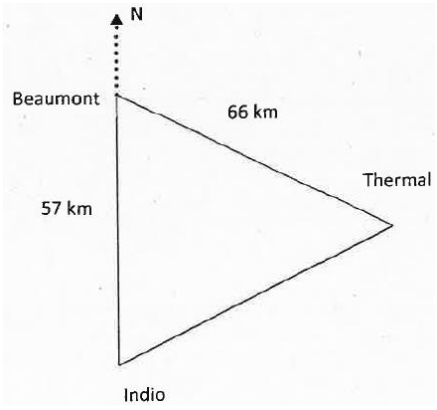


3 CCTV cameras are situated in Clydebank shopping centre.
A is 140m due South of B
B is 250m from C
C is on a bearing of 120°from A
Calculate the bearing of C from B.

7. 3 oil rigs are situated in the North sea.
Beaumont is 57km due North of Indio and 66km from Thermal
Thermal is on a bearing of 070° from Indio.
Calculate the bearing of Thermal from Beaumont
Give your answer to the nearest degree.



8. 3 ships are situated of thew west coast of Scotland.

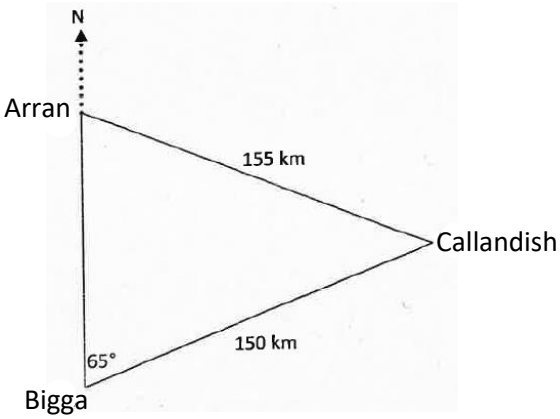
Arran is 155km from the Callandish

The Callandish is on a bearing of 065° from the Bigga.

The Bigga and the Callandish are also 150km from each other.

What is the bearing from the Arran to the Callandish?

Give your answer to the nearest degree.



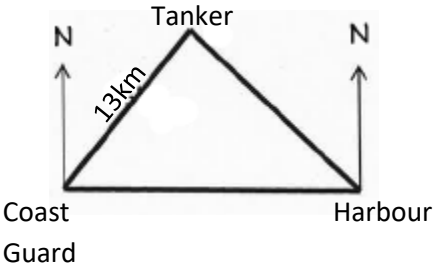
9. A coast Guard ship is patroling due west of the Harbour.

A Tanker is spotted on a bearing of 042° from the Harbour

and on a bearing of 314° from the Coast Guard.

The Tanker is 13km from the Harbour.

How far is the Tanker from the Coast Guard.



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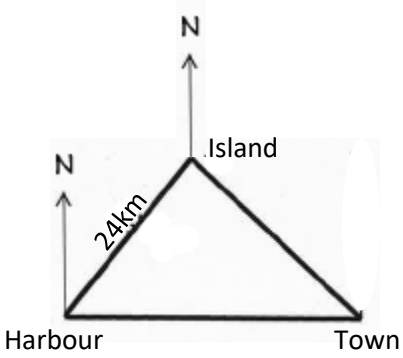


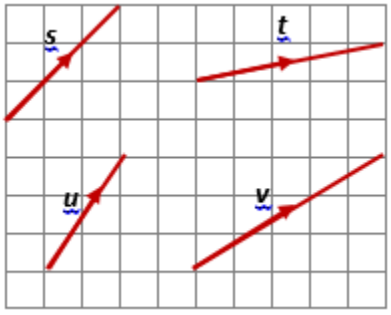
A boat sets sail on a bearing of 035° from a Harbour to an Island 24km away. After dropping anchor for a few hours the boat then heads onwards on a bearing of 120° to a Town further East along the coast from the Harbour. Calculate the distance from the Island to the Town.

11. The diagrams below shows the four vectors $\underline{s}$, $\underline{t}$, $\underline{u}$ and $\underline{v}$.

On squared paper draw the resultant vectors for:

a) $\underline{s} + \underline{t}$ **(b)** $2\underline{t} + \underline{u}$

c) $\underline{v} + 3\underline{s}$ **(d)** $4\underline{u} + 2\underline{v}$



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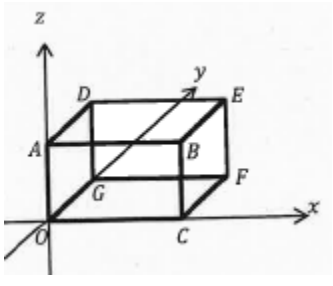
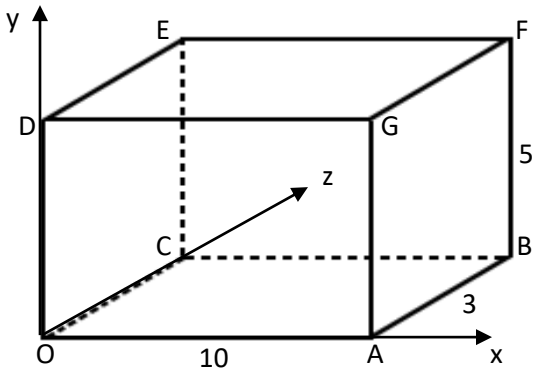


The diagram shows a cuboid

The coordinates of point E are (5 , 3 , 1)

Find the coordinates of each vertex of the cuboid.

13. State the coordinate of each vertex in this cuboid:



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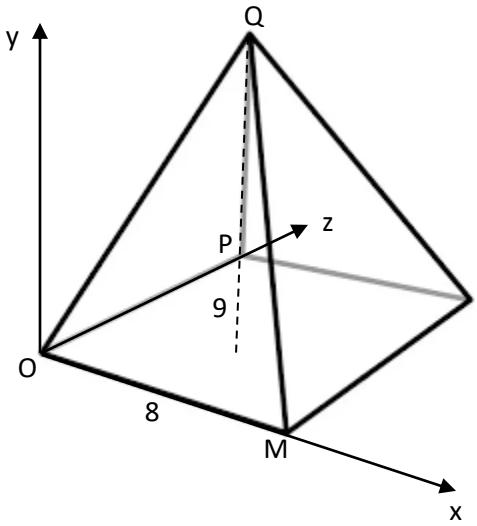


State the coordinate of each vertex in this square-based pyramid with Height 9.

15. For the vectors $a = \binom{6}{8}$, $b = \binom{4}{-2}$, $c = \binom{9}{-10}$ *and* $d = \binom{0.5}{-0.5}$ find:

Calculate (a) $|2a + 3b|$ (b) $|c - 12d|$ (c) $|2a - 4d|$

16. For the vectors $u = \binom{2}{-5}$ *and* $v = \binom{-4}{3}$, find:

a) the resultant vector $\underline{\boldsymbol{u}} + 3\underline{\boldsymbol{v}}$ **(b)** $|u + 3v|$

17. Find the resultant force for each of the vector sets below:

a) $u = \begin{pmatrix} 5 \\ 2 \\ 1 \end{pmatrix}$, $v = \begin{pmatrix} 11 \\ 0 \\ -4 \end{pmatrix}$ *and* $w = \begin{pmatrix} -3.5 \\ 4.5 \\ 6 \end{pmatrix}$

b) $p = \begin{pmatrix} -0.5 \\ 7.5 \\ -2.5 \end{pmatrix}$, $q = \begin{pmatrix} -5.5 \\ -1 \\ -9.5 \end{pmatrix}$ *and* $r = \begin{pmatrix} 7.5 \\ -1.5 \\ 13 \end{pmatrix}$

c) $a = \begin{pmatrix} -6.5 \\ 2 \\ -8 \end{pmatrix}$, $b = \begin{pmatrix} 10 \\ -4.5 \\ 8.5 \end{pmatrix}$ *and* $c = \begin{pmatrix} -3.5 \\ 2.5 \\ 3 \end{pmatrix}$

18. The vector $\underline{\boldsymbol{u}}$ has components $\begin{pmatrix} 3 \\ -2 \\ -1 \end{pmatrix}$ and vector $\underline{\boldsymbol{v}}$ has components $\begin{pmatrix} 2 \\ -4 \\ 1 \end{pmatrix}$.

Calculate: $|4u - 2v|$

19. **a)** A house cost £43000 four years ago has appreciated in value by 1.5% p.a.
Calculate the cost of the house now.

b) A piano cost £3000 three years ago has depreciated in value by 18% p.a.
Calculate the cost of the piano now.

c)

It is estimated that an iceberg weighs 84000 tonnes.
As the iceberg moves through the warmer water,
its weight decreases by 25% each day.
Calculate the weight of the Iceberg after 3 days.

d) Bacteria in a petri dish increase at a rate of 4.6% per hour.
At noon there were 50000 bacteria, how many will there beat 5pm?

e) A food processor has been reduced in price by 20% and costs £120.
What was the full price of the food processor prior to the reduction?

f) The value of a bungalow has appreciated by 6% in the last year and is now worth £180000.
What was the value of the bungalow last year before the increase?
Give your answer correct to the nearest pound.

g)

Ben measured the tree in the local park at 12m tall
He told Bill that this was a 15% increase since last year.
Bill thinks the tree must have been 10.7m tall last year.
Is Bill correct? Explain your answer fully.

20. Evaluate and express in its simplest form:

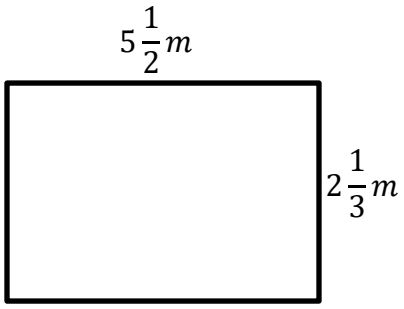
a) $3\frac{1}{6} \div 1\frac{2}{3}$ **(b)** $4\frac{1}{3} - 1\frac{1}{2}$ **(c)** $2\frac{2}{3} - 1\frac{4}{5}$

d) $\frac{2}{3} \div 1\frac{1}{3}$ **(e)** $2\frac{2}{5} + 3\frac{2}{3}$ **(f)** $1\frac{1}{2} \times 2\frac{1}{6}$

g) $5\frac{4}{5} \times 2$ **(h)** $4\frac{4}{5} \div 3$

21. Calculate the area of these shapes expressing your answer in its simplest form:

a)



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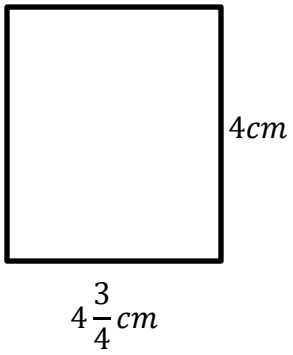

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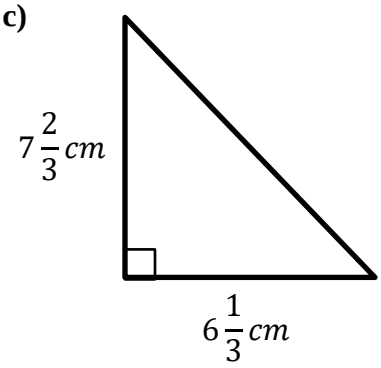

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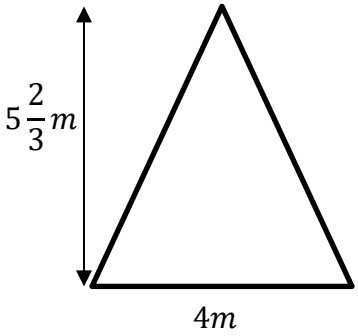


22. A group of students are given a test. Their marks are: 73 47 59 71 48 62

a) Calculate the mean and standard deviation for this group of students.

A second group are given the same test.

The mean for this second group is 60 and the standard deviation is 29.8

b) Write 2 valid statements to compare the two groups of students test marks.

23. A machine is used to put drawing pins into boxes. A sample of 8 boxes was taken and the number of pins in each box was found to be: 102 102 101 98 101 102 103

a) Calculate the mean and standard deviation for this sample of boxes.

A sample of boxes is taken from a second machine.

The mean for this second machine is 103 and the standard deviation is 2.1

b) Write 2 valid statements to compare the two machines.

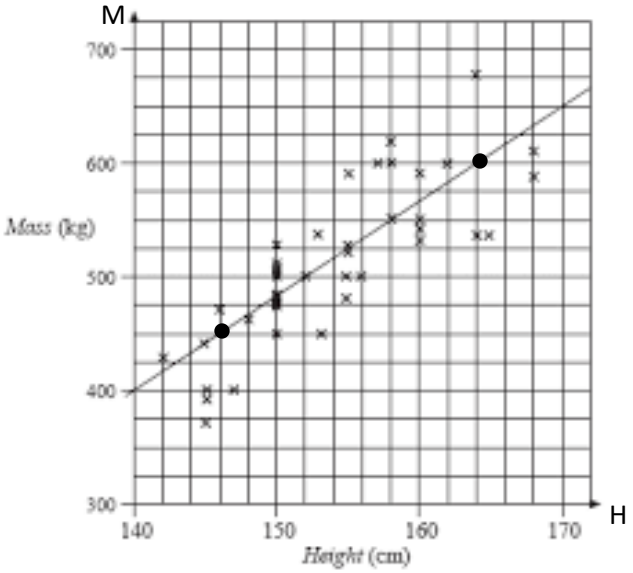
24. The scatter graph shows the heights and masses of a team of horses.

A line of best fit has been drawn.

a) State the gradient and y-intercept of the line. Use the marked points.

b) State the equation of the line of best fit.

c) The height of a horse is 153cm, use your equation to estimate the horses mass.



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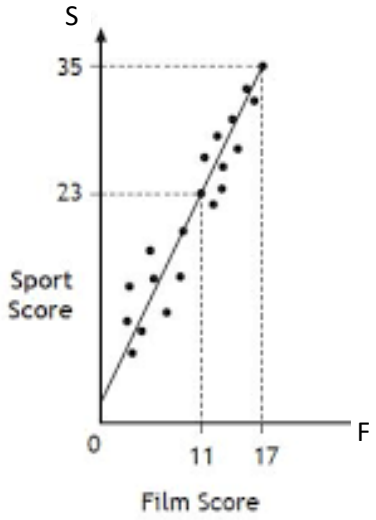


The scatter graph shows the scores from 2 rounds of a pub quiz on sport and films.

A line of best fit has been drawn.

a) State the equation of the line of best fit.

b) A team scored 20 in the film round, use your equation to estimate the team's score in sport.

26. The scatter graph shows the marks of students who sat a Maths and Physics test.

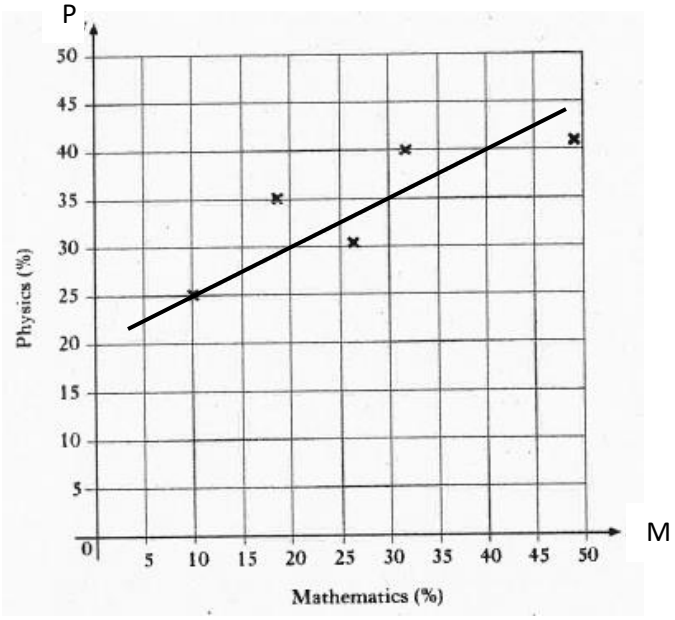
A line of best fit has been drawn.

a) State the gradient and y-intercept of the line.

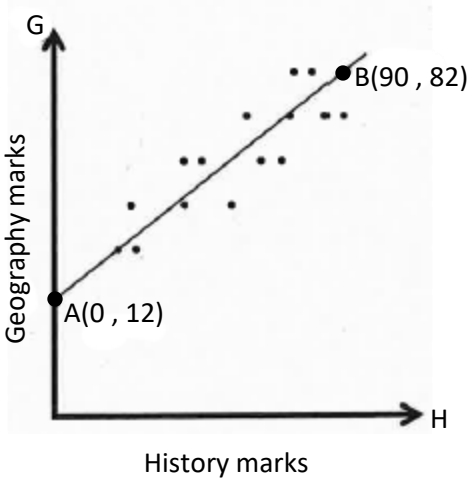
b) State the equation of the line of best fit.

c) Another student sat the test late and scored 64% in the Mathematics test.

Use your equation to estimate her score in the Physics test.



27. The scatter graph shows the marks of students who also sat a History and Geography test.
A line of best fit has been drawn.



Point A represents 0 marks for History and 12 marks for Geography.

Point B represents 90 marks for History and 82 marks for Geography.

a) State the gradient and y-intercept of the line.

b) State the equation of the line of best fit.