Name: _____

HEROES TUITION

October Homework
Maths
Higher

Please return this booklet to you Maths teacher by the end of the month. All answers will be sent to your parents or guardians, so please ensure it is marked before handing it in.
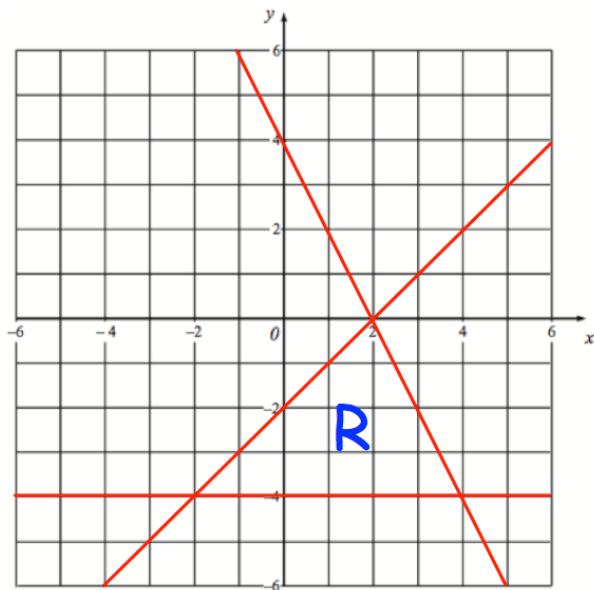
Heroes Tuition Centre - Homework

Name: _____

The HCF of two numbers is 35.
The LCM of the two numbers is 210.
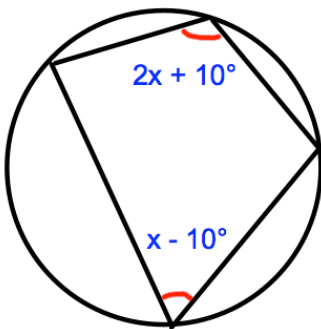One of the numbers is 105.

Find the other number

Give a reason why 0 is an even number.

The region labelled R satisfies three inequalities.
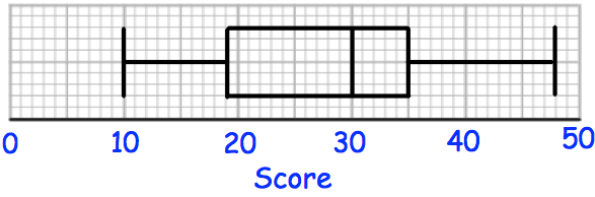
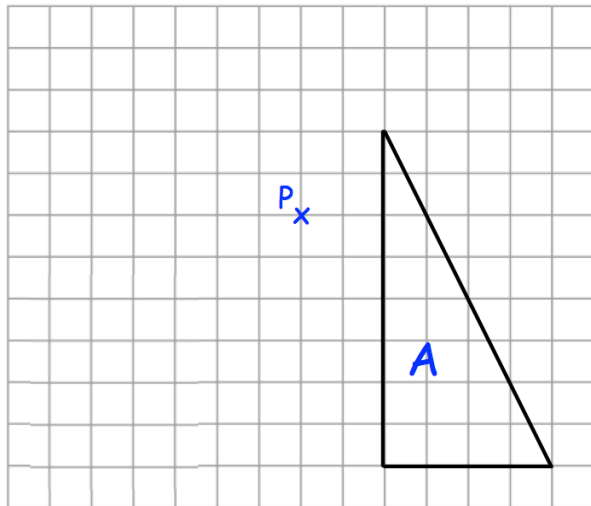State the three inequalities

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2x + 10°

x - 10°

Find x

Heroes Tuition Centre - Homework

Name: _____
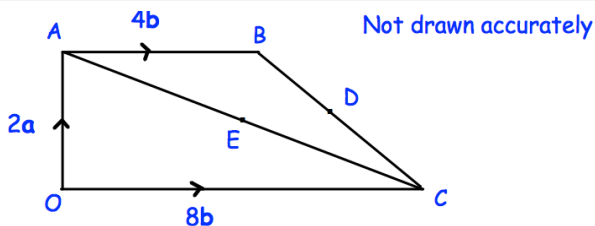
Write down the median score

Enlarge shape A by scale factor –½, using the point P as centre of enlargement.

Point D is the midpoint of BC.
Point E is the midpoint of AC.

Write down a vector for $\overrightarrow{AC}$

The final velocity of a traveling object is given by the formula

$$v = u + at$$

where v is the final velocity
       u is the initial velocity
       a is the acceleration
       and t is the time

Given   u = 2.4 m/s correct to 2 significant figures,
a = 12 m/s² correct to 2 significant figures,
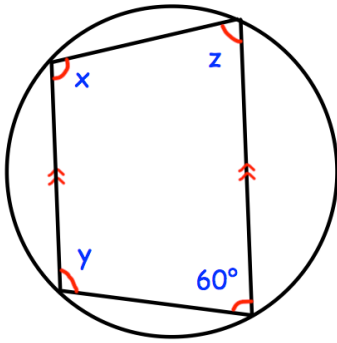and t = 5 seconds correct to 1 significant figure.

Calculate the lower bound for v.
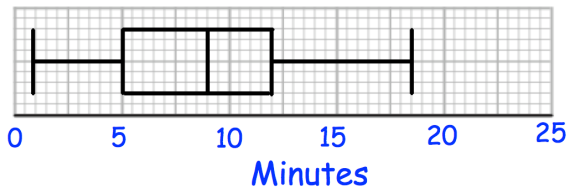
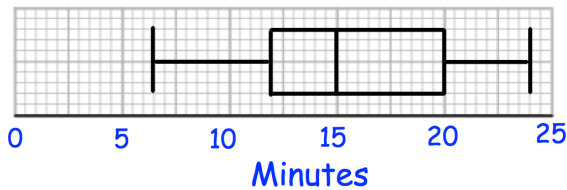# Heroes Tuition Centre - Homework

Name: _____

3rd October

Find x, y and z

Time taken to complete puzzle - Children

0   5   10   15   20   25

Minutes

Time taken to complete puzzle - Adults

0   5   10   15   20   25

Minutes

Shown are the times taken to complete a puzzle by a group of children and a group of adults.

Compare the distributions.

A restaurant menu has 5 starters, 10 mains and 4 desserts.

A customer can choose:

- a starter and a main
- a main and a dessert
- a starter, a main and a dessert

How many different ways of choosing a meal are there?

Jack is taking penalties.
The probability that he scores is 0.8

He takes two penalties.
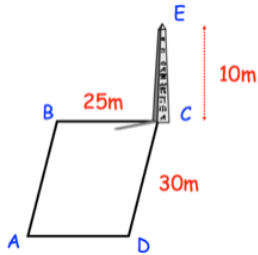Work out the probability that he scores exactly once.

Heroes Tuition Centre - Homework

Name: _____

Estimate $\sqrt[4]{800}$

Calculate the length of AE

Solve $5y^2 + 8y - 100 = y^2 + 4y - 37$

Expand $\sqrt{3}(\sqrt{5} + \sqrt{2})$

Two solids are mathematically similar.
The surface area of the smaller solid is
42π cm²
The surface area of the larger solid is
1512π cm²
The height of the larger solid is 96cm.

Work out the height of the smaller solid.
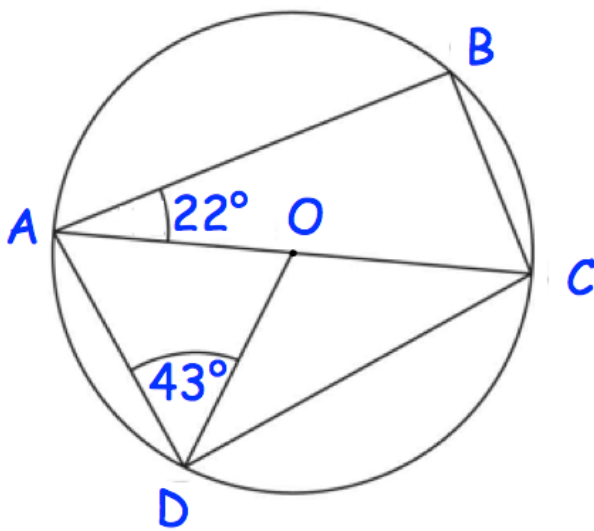
Heroes Tuition Centre - Homework

Name: _____

Work out the sum of the interior angles for a 40 sided polygon.
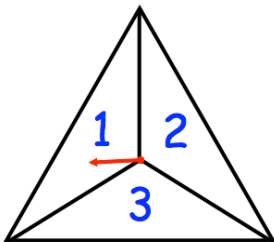
Work out

$$16^{0.5}$$

O is the centre of the circle.
AC is the diameter.

Find angle OAD.

Find angle BCA

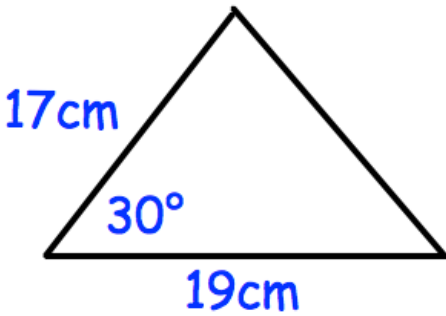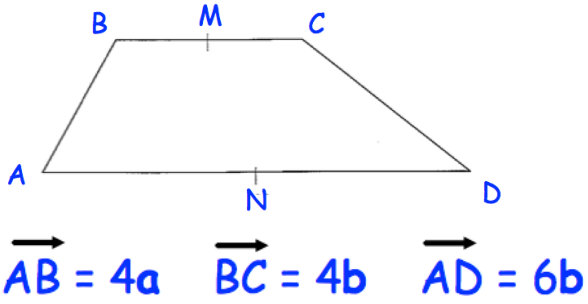Find angle BCD.

Find angle OCD.

The spinner is spun twice.
A score is found by adding the two numbers together.
Find the probability of a score of 3
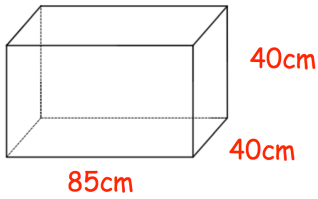
Heroes Tuition Centre - Homework

Name: _____

Evaluate

$$27^{2/3}$$

Lowest Value	2
Lower Quartile	7
Median	9
Upper Quartile	10
Highest Value	13

Draw a box plot for the data given

£5200 is invested at 2.8% compound interest per annum.

How many years will it take for the investment to exceed £7000.

17cm
30°
19cm

Find the area of the triangle.

$\overrightarrow{AB} = 4a$ $\overrightarrow{BC} = 4b$ $\overrightarrow{AD} = 6b$

Find

$$\overrightarrow{CD}$$

Heroes Tuition Centre - Homework

Name: _____

40cm
40cm
85cm

Can a 1m rod fit inside this box?

Complete the table of values for
$$y = \frac{5}{x}$$

x	0.5	1	2	4	8	10
y						
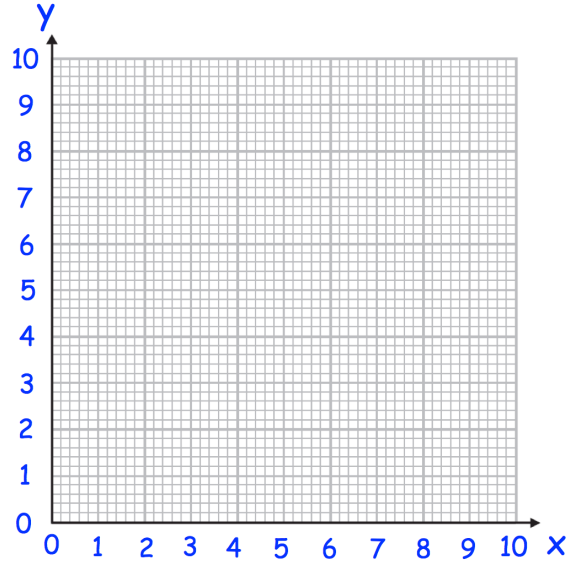
On the grid, draw the graph of
$$y = \frac{5}{x}$$
for $0.5 \leq x \leq 10$

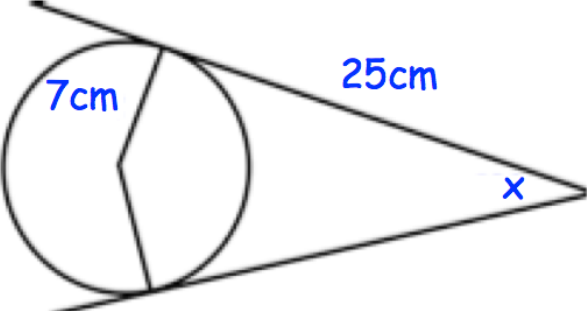---

Find where y = 4x + 5 meets:

the y axis.

the x axis.

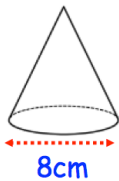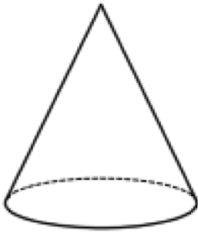
Solve the simultaneous equations

y = 13 − 4x
3x + 2y = 16

Heroes Tuition Centre - Homework

Name: _____

Find the range of values of x that satisfies **both**

$$3(x + 2) \leq 30 \quad and \quad 4x + 3 > 21$$

A dice is rolled.
A coin is flipped.

What is the probability of getting a tail and a prime number?

Simplify

9√35 ÷ 3√5

7cm   25cm   x

Shown is a circle, two tangents and two radii.
Find the size of the angle marked x.
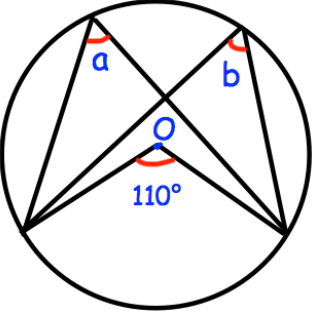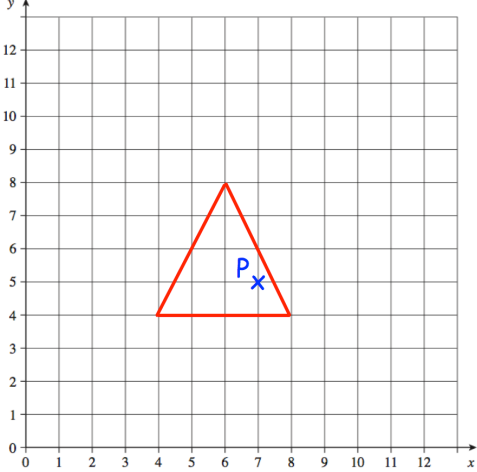

Evaluate

$$125^{\frac{2}{3}}$$

Heroes Tuition Centre - Homework

Name: _____

The distance between the Sun and Earth is 150,000,000 km, correct to 2 significant figures. Write down the lower bound	Write down the upper bound
What number does not have a reciprocal?	
Write down the equation of the line that is perpendicular to $3x - y = 1$ and passes through $(0, 7)$	
Solve using the quadratic formula $x^2 + 2x - 10 = 0$	

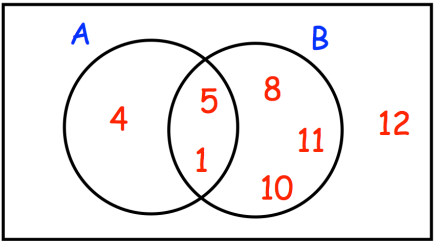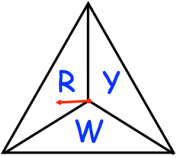|	
Cone B Cone A 8cm	Cone A and cone B are mathematically similar. The total surface area of cone A is 120cm² The total surface area of cone B is 1080cm² The diameter of cone A is 8cm. Work out the diameter of cone B.

Heroes Tuition Centre - Homework

Name: _____

Find the distance between the points (–5, 4) and (9, 7)

Find a and b

Solve, giving your answers to one decimal place.

$7x = 13 - x^2$

Enlarge by scale factor -2

Enlarge the red triangle by scale factor -2

How many times larger is the area of the enlarged triangle than the red triangle?

Heroes Tuition Centre - Homework

Name: _____

Find the gradient of the line with equation $2x + 5y = 3$

Find where the line crosses the x-axis.

Solve using the quadratic formula

$4x^2 - 12x + 9 = 0$

Write down $P(A \cap B)$

Write down $P(A' \cap B')$

The spinner is spun three times.

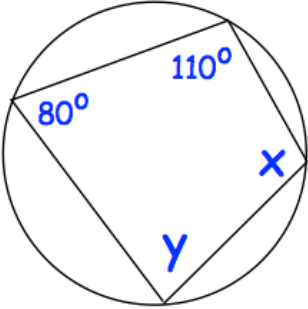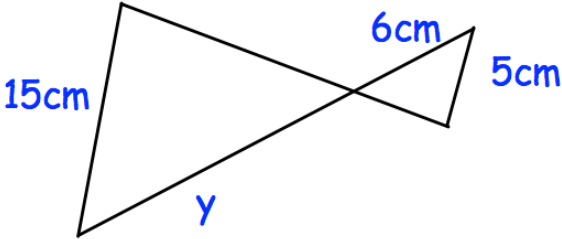Find the probability that the spinner lands on red (R) at least once.

Heroes Tuition Centre - Homework

Name: _____

Which of these is a geometric progression?

4, 6, 8, 10, 12

4, 8, 16, 32, 64

4, 6, 10, 16, 24

4, 7, 12, 19, 28

C is the point (6, –3)
D is the point (9, –12)

Does the point E(–17, 66) lie on the straight line passing through CD?

A rectangular field is 30m longer than it is wide.
The area of the field is 5000m²
Calculate the width and length of the field.

Donation	Frequency
0 < d ≤ 5	44
5 < d ≤ 10	35
10 < d ≤ 20	16
20 < d ≤ 50	3
50 < d ≤ 100	2

Paul says the average donation is £10

Do you agree?
Explain your answer.

Simplify

$$\frac{x}{4} \times \frac{x-3}{2}$$
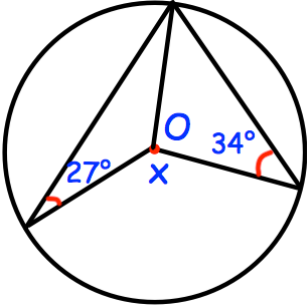
Heroes Tuition Centre - Homework

Name: _____

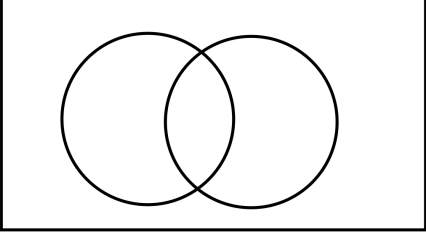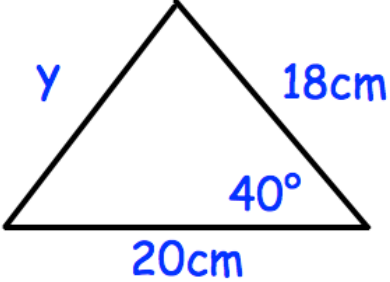|	
Write down the value of: $27^{2/3}$	Write down the value of: 8^{-2}
	$x =$ $y =$
	Find y
Find the equation of the straight line through (0, 8) which is perpendicular to the line $y = 4x + 1$	
Simplify $\dfrac{x^2 + 4x - 45}{x^2 + 10x + 9}$	

Heroes Tuition Centre - Homework

Name: _____

14th October	Higher

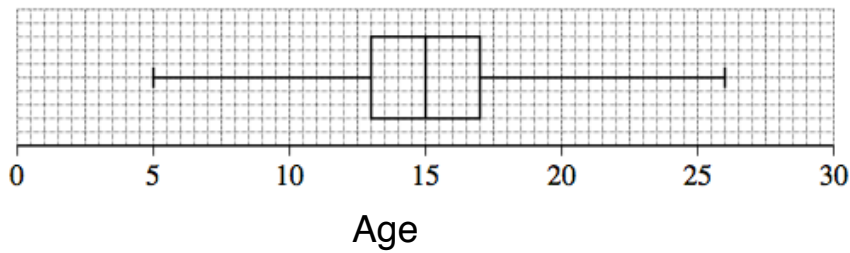|	
Work out 16^0	Work out $16^{½}$
A coin is flipped three times. What is the probability of getting exactly two tails?	
	Find x
Martin has drawn a regular polygon. He says the exterior angle is $14°$ Explain why Martin is incorrect.	
Solve, to one decimal place, $5x^2 + 2x - 1 = 0$	

Heroes Tuition Centre - Homework

Name: _____

Find the pressure exerted by a force of 1400 newtons on an area of 20cm².

Give your answer in newtons/m²

The students in a school sit two tests, a French test (F) and German test (G). Everyone passed at least one test. 79% passed the French test and 66% passed the German test.

Show this information in the Venn diagram

What is the probability that a student passed their French test, given they passed their German test?

Expand　$\sqrt{2}(\sqrt{3} + 5)$

Find y.

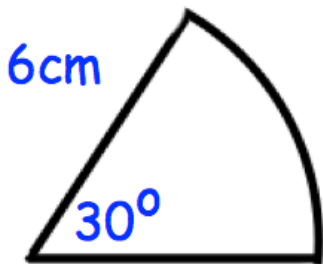# Heroes Tuition Centre - Homework

Name: _____

Age

What is the range?   What is the median?

Find the coordinates of a the point where $y = 4x - 1$ and $y = -x$ intersect.

Work out 36^0 | Work out $49^{½}$

6cm

30^0

Calculate the area.

Solve, giving your answers to one decimal place.

$x^2 - 4x + 2 = 0$
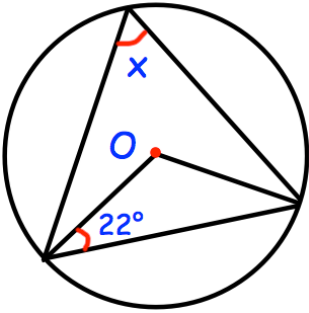
Heroes Tuition Centre - Homework

Name: _____

Simplify

$$\frac{x^2 + 3x}{3x^2}$$

Work out

$$16^{\frac{3}{2}}$$

Evaluate

$$\left(\frac{16}{25}\right)^{\frac{1}{2}}$$

The sum of the interior angles in a polygon is 7380°.

Calculate the number of sides the polygon has.

Expand and simplify

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

Matthew is playing darts.
The probability he hits a bullseye is 0.4

Matthew throws two darts.

Find the probability Matthew does not hit the bullseye with either dart

Heroes Tuition Centre - Homework

Name: _____

12 biscuits weigh 220g.
There are 412 calories in 100g of biscuits.
How many calories are in one biscuit?

Simplify fully

$\sqrt{2}\ (\sqrt{2} - \sqrt{8})$

Make y the subject
$y + 3 = x(y + 2)$

A fair six sided dice is rolled three times.

Find the probability of getting no sixes.
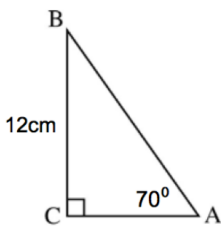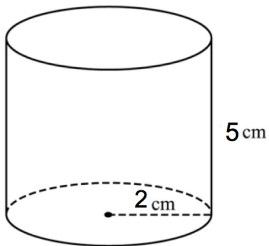
Heroes Tuition Centre - Homework
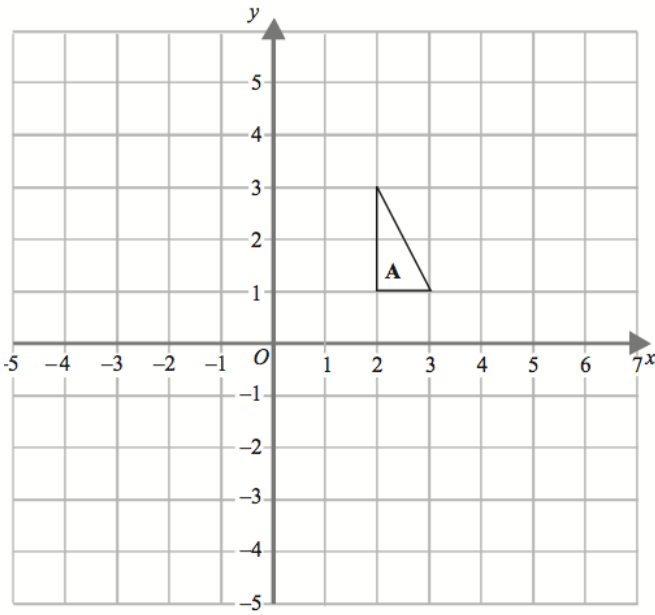
Name: _____

Enlarge A by scale factor –½, centre O.

Calculate the surface area
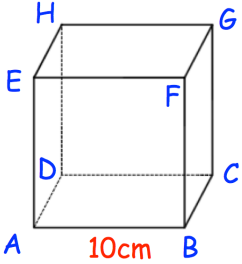

5 cm

2 cm

B

12cm

70⁰

C   A
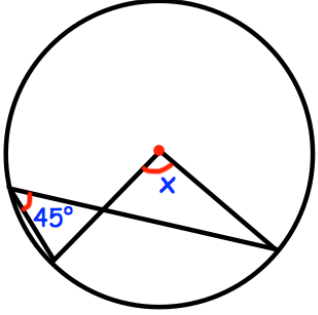
Calculate the perimeter of ABC.
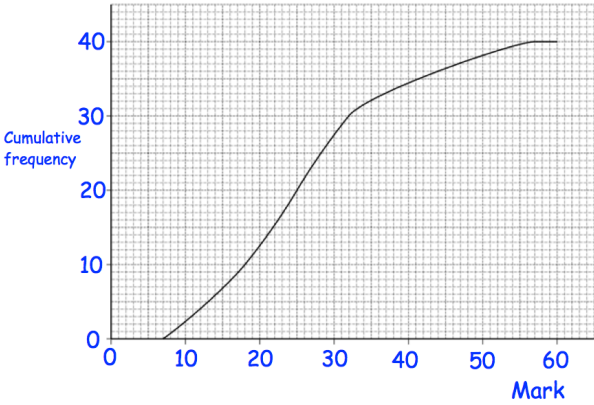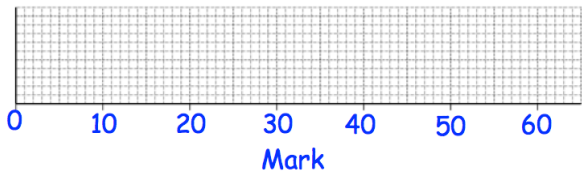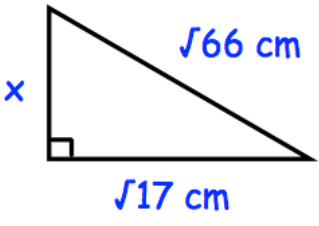

Make m the subject of

$$y = \frac{m + 4}{m + 5}$$

Heroes Tuition Centre - Homework

Name: _____

Work out   √30 ⨉ √6

Find x

A box contains apples and oranges in the ratio 2:3.
8 apples and 7 oranges are added to the box and the ratio of apples to oranges is now 3:4

How many pieces of fruit were in the box to begin with?

Shown is a cube.
Find the length of AG

D is directly proportional to P squared.

Sketch this graph.
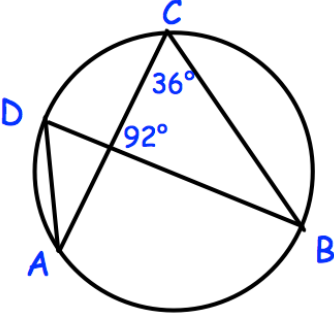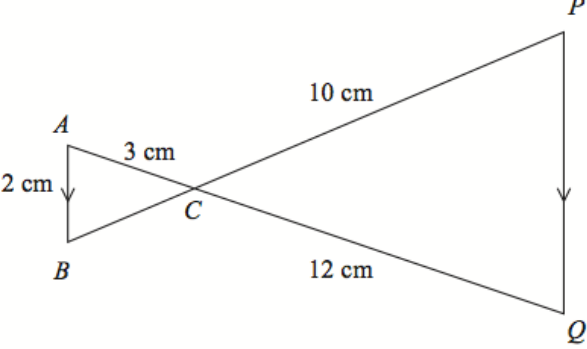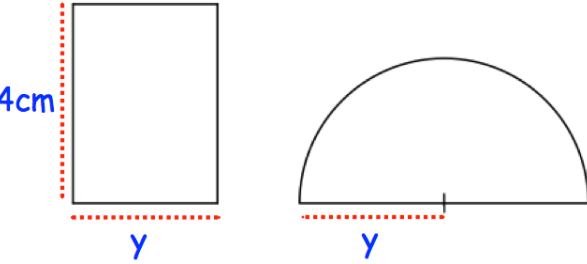
Heroes Tuition Centre - Homework

Name: _____

Expand fully.

$y(y - 3)(y - 6)$

Work out

$$16^{1.5} \times 2^{-4}$$

The lowest mark is 8.
The highest mark is 56.

Draw a box plot for this data.

What percentage of students scored more than the upper quartile mark?

Find x

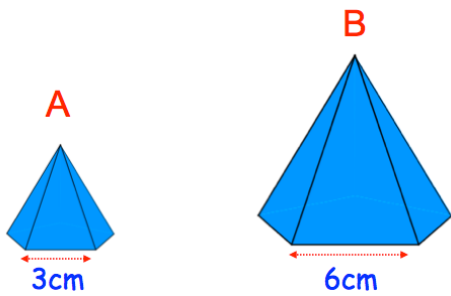# Heroes Tuition Centre - Homework

Name: _____

Find the size of angles:
CBD

ADB

Find PQ

Find BC.

Calculate the distance between (9, 5) and (2, −19)

4cm

y   y

The perimeters are equal.

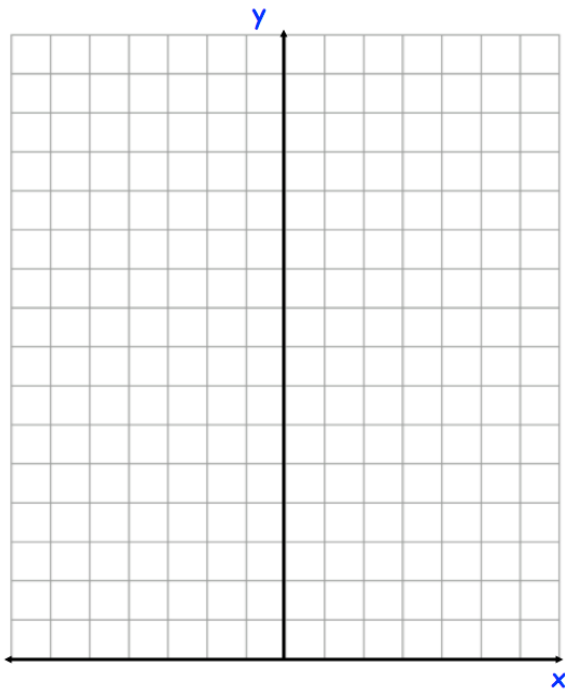Find y.

Heroes Tuition Centre - Homework

Name: _____

B

A

3cm   6cm

Shown are two similar pyramids.
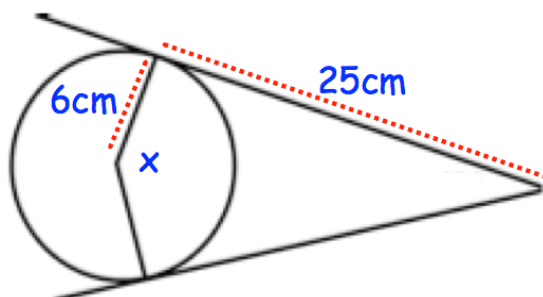Pyramid A has a volume of 26cm³
Work out the volume of Pyramid B.

Draw the graph of

$y = 2^x$

for values of x from −4 to 4

Write down the equation of the line that is perpendicular to y = ½x + 3 and passes through (0, −4)

6cm   25cm
x

Shown is a circle, two tangents and two radii.

Find the size of the angle marked x.
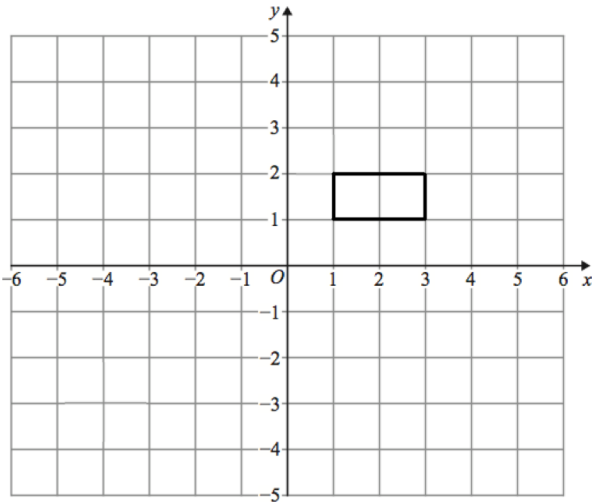
Heroes Tuition Centre - Homework

Name: _____

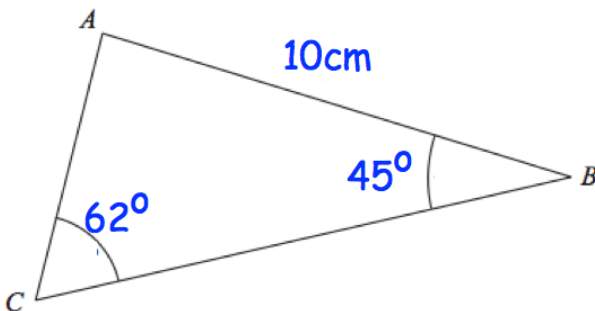| Lowest Value	6
Median	14
Upper Quartile	16
Range	20
Interquartile Range	5

Draw a box plot for the information given

Enlarge the rectangle by scale factor –2, using (0, 1) as centre of enlargement.
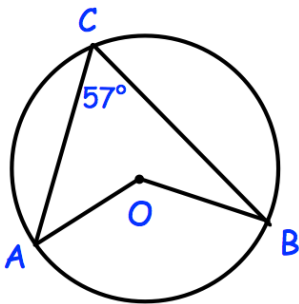
Solve

$$2x^2 + 11x + 5 = 0$$

Find the length of AC.

Heroes Tuition Centre - Homework
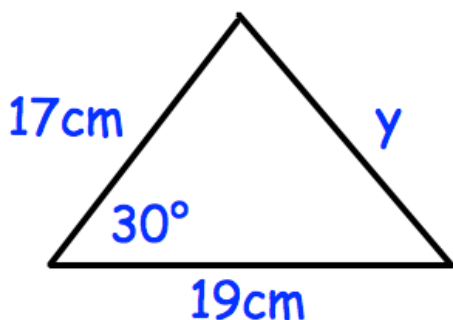
Name: _____

O is the centre of the circle.

Find the size of angle AOB.

Find the size of each interior angle of a regular 40-sided polygon.

A helicopter flies 90 miles East and 40 miles South and lands. The helicopter flies back on a direct course. What is its bearing?

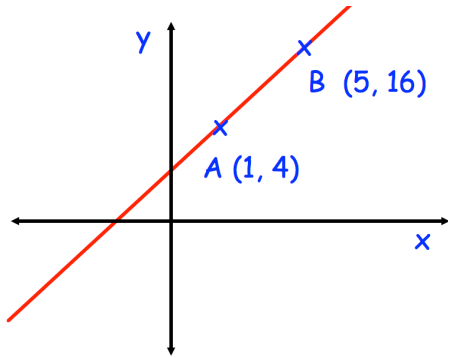Find the equation of the line perpendicular to $y = \frac{1}{2}x - 3$ that passes through (0, 4)

Find y.

Heroes Tuition Centre - Homework

Name: _____

A straight line passes through the points A(1, 4) and B(5, 16).

Find the equation of the line parallel to AB that passes through (1, 7)

Write down the equation of a line perpendicular to AB

Factorise fully $2y^2 - 50$

Harry gets the train to work in the morning.
He works Monday to Friday.
The probability the train is late is 0.3

Find the probability the train is late exactly three times.
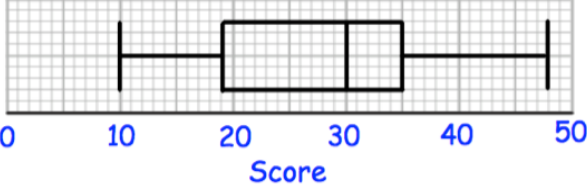
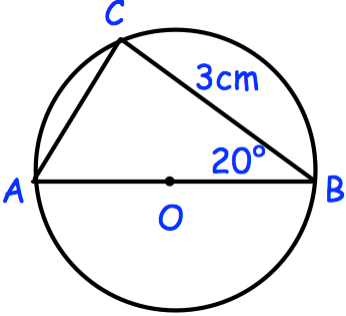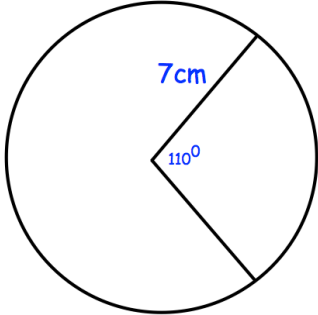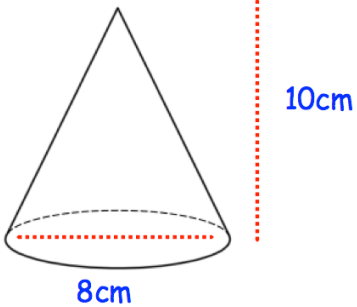Two containers are mathematically similar.

The height of container A is 5cm.
The height of container B is 15cm

The volume of A is 120cm³

What is the volume of B?
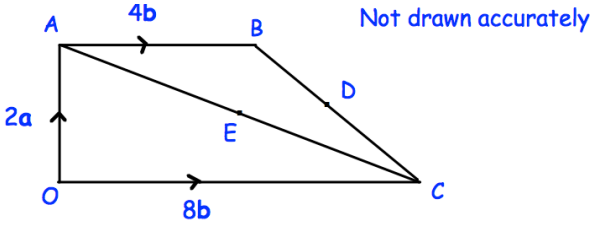
Heroes Tuition Centre - Homework

Name: _____

There are 40 children at a youth club.
There are 23 girls.
9 girls play rounders.
4 boys do not play rounders.
How many boys play rounders at the youth club?

Find the range.

Write down the median.

Find the size of the diameter, AB.

Calculate the area of the major sector. The minor sector has angle 110 degrees.

Calculate the volume of the cone.

Heroes Tuition Centre - Homework

Name: _____

James is a student of a class of 32 students, 6 of which wear glasses.

1402 students attend the school.

Use this information to estimate how many students in the school wear glasses.

£5200 is invested at 2.8% compound interest per annum.

How many years will it take for the investment to exceed £7000.

Simplify

$$\frac{2x^2 + 5x - 3}{x^2 - 9}$$

A bag contains 10 counters.
5 of the counters are red
3 of the counters are purple
2 of the counters are white
Sharon chooses a counter at random, records the colour, then replaces it.
Sharon then chooses a second counter at random and records the colour.

What is the probability that both counters are the same colour?

Point D is the midpoint of BC.
Point E is the midpoint of AC.

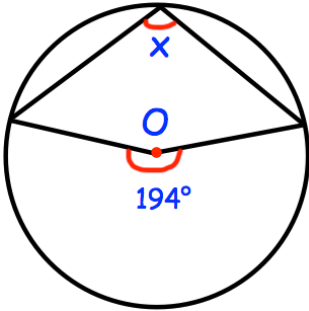Write down a vector for $\overrightarrow{AE}$

Heroes Tuition Centre - Homework

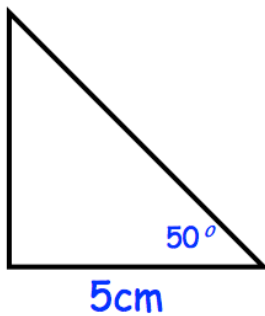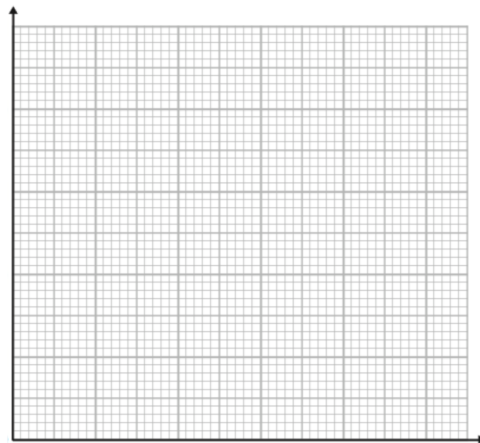Name: _____

Solve, giving your answers to one decimal place.

$3x^2 + 4x - 5 = 0$

194°

Find x

---

length (l cm)	Frequency
$0 < l \leq 8$	16
$8 < l \leq 10$	7
$10 < l \leq 12$	9
$12 < l \leq 16$	6
$16 < l \leq 20$	2

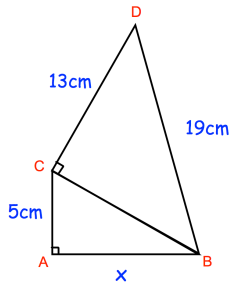Draw a histogram to show this information.

50°

5cm

Calculate the perimeter of the right angled triangle.

Heroes Tuition Centre - Homework
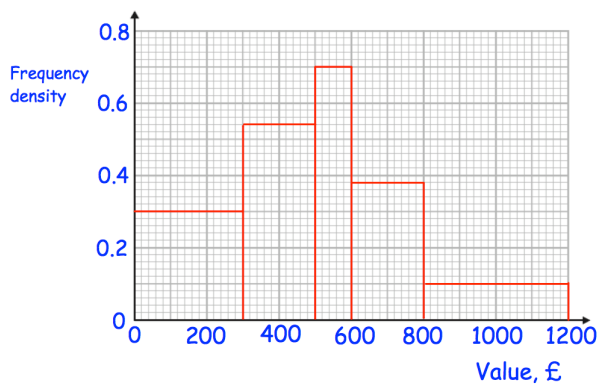
Name: _____

13cm
19cm
C
5cm
A
x
B
D

ABC and BCD are right angle triangles.

Find the length of AB

$$(2.5 \times 10^5) \div (5 \times 10^{-4})$$

A circle has an area of 500cm² to the nearest 10cm².
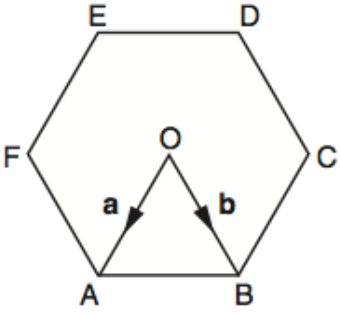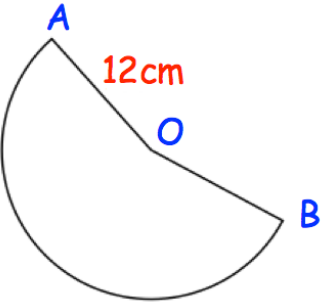
Work out the lower bound of the radius

Frequency density

0.8
0.6
0.4
0.2
0

0   200   400   600   800   1000   1200

Value, £

Use the histogram to complete the frequency table.

Values, v	Frequency
0 < v ≤ 300	
300 < v ≤ 500	
500 < v ≤ 600	
600 < v ≤ 800	
800 < v ≤ 1200	

Heroes Tuition Centre - Homework

Name: _____

The HCF of two numbers is 24.
The LCM of the two numbers is 504.
One of the numbers is 72.

Find the other number

$(3 \times 10^6)^3$

A is inversely proportional to B cubed.

When A = 250, B = 5.

Find A when B = 3.

Find in terms of **a** and **b**

OC

FC

Angle AOB is 160°.
Calculate the perimeter of the sector shown.