

1st October

Higher 5-a-day

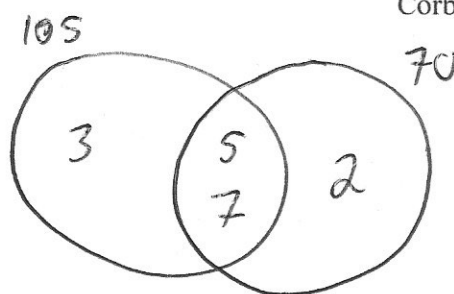


Corbettm@ths

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

70



Give a reason why 0 is an even number.

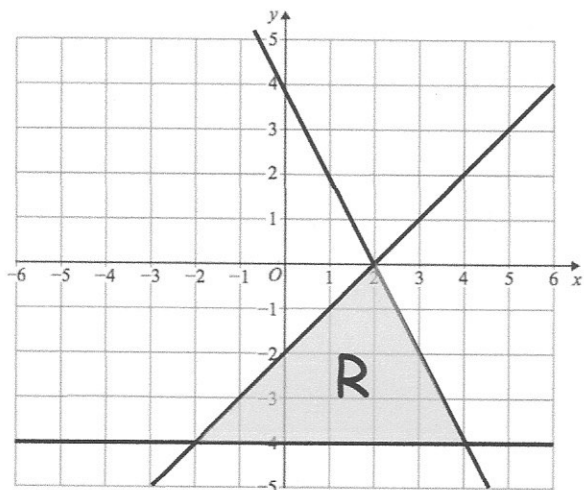
even + even = even

$$8 + 0 = 8$$

$2 \times \text{integer} = \text{even}$

$$2 \times 0 = 0$$

Consecutive integers follow
odd, even pattern.



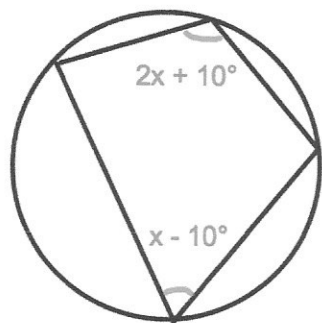
The region labelled R satisfies three inequalities.

State the three inequalities

$$y \geq -4$$

$$y \leq x - 2$$

$$y \leq -2x + 4$$



Find x

$$3x = 180$$

$$x = 60^\circ$$

2nd October

Higher 5-a-day



Corbettmoths

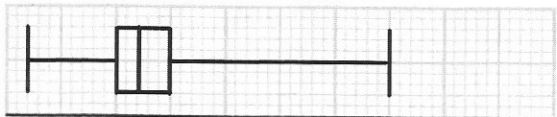
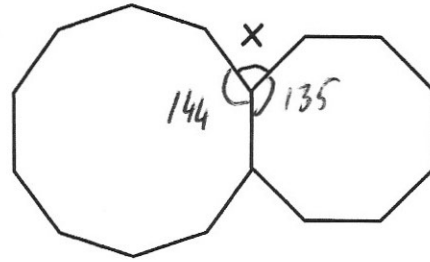
Shown is a regular octagon and a regular decagon.

Find x

$$1440 \div 10 = 144^\circ$$

$$1080 \div 8 = 135^\circ$$

$$360 - 144 - 135 = 81^\circ$$



0 1 2 3 4 5
Distance, km

Find the interquartile range

$$1.5 - 1 = 0.5 \text{ km}$$

5 adult tickets and 14 child tickets cost £99

$$5x + 14y = 99$$

An adult ticket costs £1.75 more than a child ticket.

$$x - y = 1.75$$

Find the cost of an adult ticket and find the cost of a child ticket.

$$£6.50 \text{ and } £4.75$$

$$\begin{array}{r} 5x + 14y = 99 \\ 5x - 5y = 8.75 \\ \hline 19y = 90.25 \\ y = 4.75 \\ x = 6.50 \end{array}$$

Solve by factorising

$$2x^2 - 7x - 9 = 0$$

$$(2x - 9)(x + 1) = 0$$

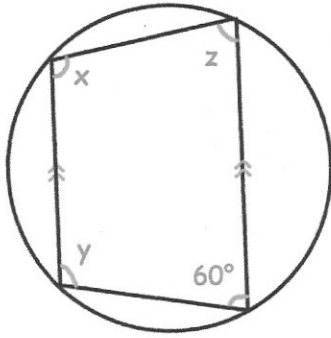
$$x = 4.5 \text{ or } x = -1$$

$$v = u + at$$

Given $u = 2.4$ correct to 2 significant figures, $a = 12$ correct to 2 significant figures and $t = 5$ correct to 1 significant figure.

Calculate the lower bound for v .

$$\begin{array}{r} 2.35 \\ + 11.5 \times 4.5 \\ \hline = 54.1 \end{array}$$



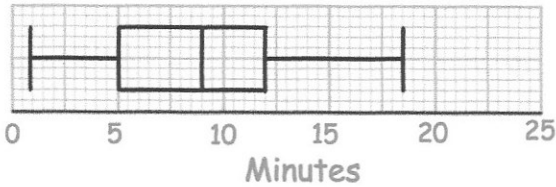
Find x, y and z

$$x = 120^\circ$$

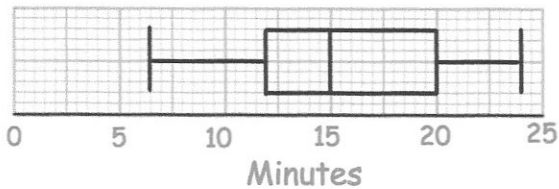
$$y = 120^\circ$$

$$z = 60^\circ$$

Time taken to complete puzzle - Children



Time taken to complete puzzle - Adults



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

Compare the distributions.

① Children were quicker

Medians: Children 9 minutes

Adults 15 minutes

② Similar spread.

IQRs: Children 7 minutes

Adults 8 minutes

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

$$5 / 10 / 4$$

A customer can choose:

- a starter and a main $5 \times 10 = 50$
- a main and a dessert $10 \times 4 = 40$
- a starter, a main and a dessert

$$5 \times 10 \times 4 = 200$$

How many different ways of choosing a meal are there?

$$290$$

Jack flips a biased coin
The probability that he gets a tail is 0.8
He flips the coin three times.

$$P(\text{Head}) \text{ is } 0.2$$

Work out the probability that he gets exactly one tail.

T H H
H T H
H H T

$$0.8 \times 0.2 \times 0.2 = 0.032$$

$$0.2 \times 0.8 \times 0.2 = 0.032$$

$$0.2 \times 0.2 \times 0.8 = 0.032$$

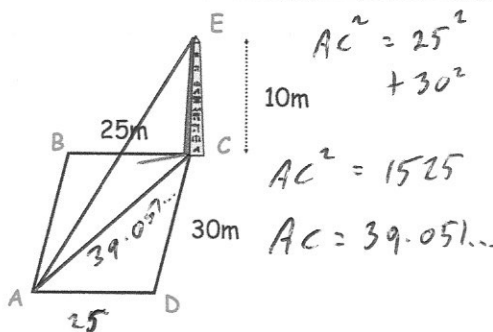
$$\frac{12}{125}$$

Estimate $\sqrt[4]{800}$

$$5 \times 5 \times 5 \times 5 = 625$$

$$6 \times 6 \times 6 \times 6 = 1296$$

5.2 to 5.4



An obelisk is situated in the corner of a rectangular field (drawn from 3D perspective).

Calculate the distance AE.

$$AE^2 = (39.051\dots)^2 + 10^2$$

$$AE = 40.311\text{m}$$

Solve

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

$$4y^2 + 4y - 63 = 0$$

$$(2y - 7)(2y + 9) = 0$$

$$y = \frac{7}{2} \quad \text{or} \quad y = -\frac{9}{2}$$

$$y = 3.5 \quad \text{or} \quad y = -4.5$$

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

$$\sqrt{15} + \sqrt{6}$$

Two solids are mathematically similar.
 The surface area of the smaller solid is $42\pi \text{ cm}^2$
 The surface area of the larger solid is $1512\pi \text{ cm}^2$
 The height of the larger solid is 96cm.

Work out the height of the smaller solid.

$$1512\pi \div 42\pi = 36$$

sides $\times 6$

Areas $\times 36$

$$96 \div 6 = 16\text{cm}$$



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

$$(40 - 2) \times 180$$

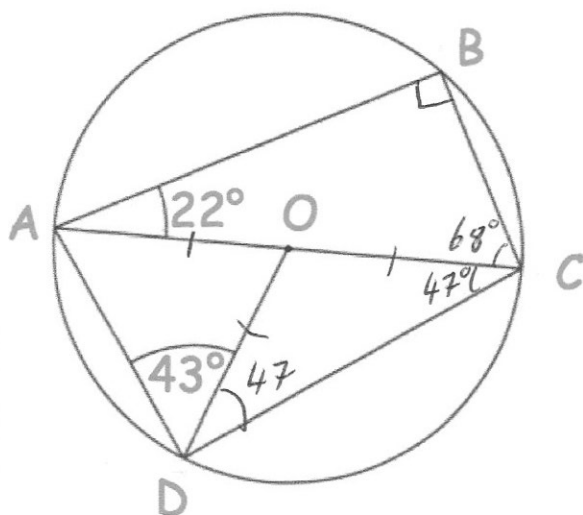
$$6840^\circ$$

Work out $100^{0.5} + 16^{0.25}$

$$10 + 2 = 12$$

$$\sqrt{100} = 10$$

$$\sqrt[4]{16} = 2$$



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

Find angle OAD.

$$43^\circ$$

Find angle BCA

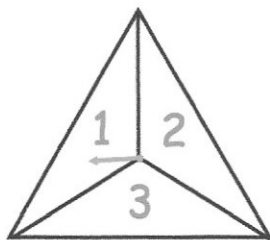
$$90 - 22 = 68^\circ$$

Find angle BCD.

$$68 + 47 = 115^\circ$$

Find angle DCO.

$$47^\circ$$



$$1 \ 2 \ 2$$

$$\frac{1}{3} \times \frac{1}{3} = \frac{1}{9}$$

$$2 \ 2 \ 1$$

$$\frac{1}{3} \times \frac{1}{3} = \frac{1}{9}$$

The spinner is spun twice.

A score is found by adding the two numbers together.

Find the probability of a score of 3

$$\frac{2}{9}$$

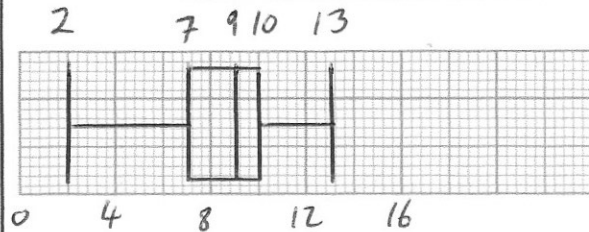


Work out $125^{\frac{2}{3}}$

$$\sqrt[3]{125} = 5$$

$$5^2 = 25$$

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



Draw a box plot to show this information

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

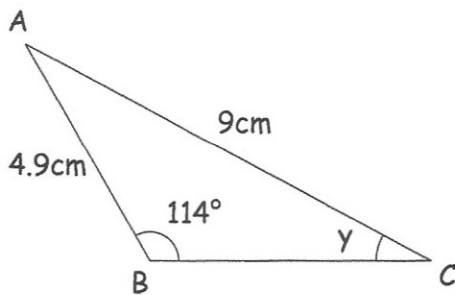
How many years will it take for the investment to exceed £7000.

11

$$5200 \times 1.028^y$$

$$10 \text{ years } \pounds 6853.80$$

$$11 \text{ years } \pounds 7045.70$$

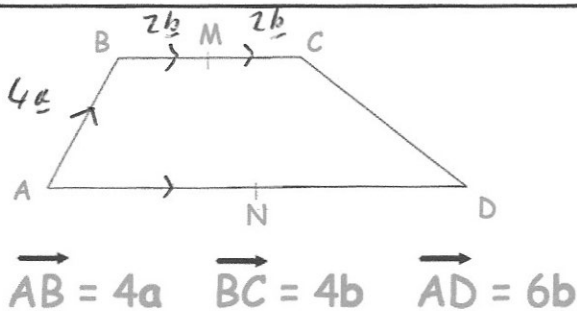


Find y

$$\frac{\sin y}{4.9} = \frac{\sin 114}{9}$$

$$\sin y = 0.4973\dots$$

$$y = 29.826^\circ$$



Find

\vec{CD}

$$\vec{CB} + \vec{BA} + \vec{AD}$$

$$-4b + (-4a) + 6b$$

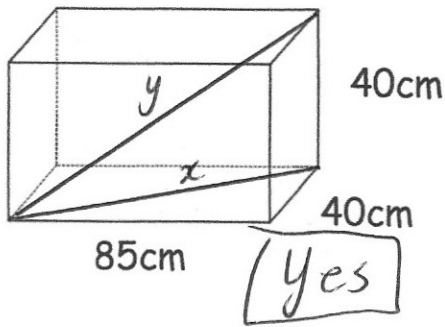
$$2b - 4a$$

7th October

Higher 5-a-day



Corbettm@ths



Can a 1m rod fit inside this box?

$$z^2 = 40^2 + 85^2$$

$$z^2 = 8825 \quad z = 93.941... \text{ cm}$$

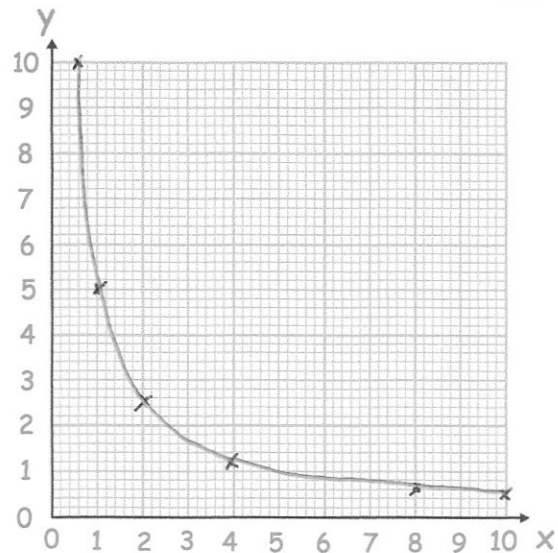
$$y^2 = 40^2 + 93.941...^2$$

$$y^2 = 10425 \quad y = 102.1 \text{ cm}$$

Complete the table of values for

$$y = \frac{5}{x}$$

x	0.5	1	2	4	8	10
y	10	5	2.5	1.25	0.625	0.5



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.

$(0, 5)$

the x axis.

$$0 = 4x + 5$$

$$-5 = 4x$$

$$x = -1.25$$

$(-1.25, 0)$

Solve the simultaneous equations

$$y = 13 - 4x$$

$$3x + 2y = 16$$

$$3x + 2(13 - 4x) = 16$$

$$3x + 26 - 8x = 16$$

$$-5x = -10$$

$$x = 2$$

$$y = 5$$



Find the range of values of x that satisfies both

$$4(x + 5) < 100 \text{ and } 2x + 5 > 17$$

$$\begin{aligned} x + 5 &< 25 & 2x > 12 \\ x &< 20 & x > 6 \end{aligned}$$

$$6 < x < 20$$

A dice is rolled. 2 3 5
A coin is flipped.

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

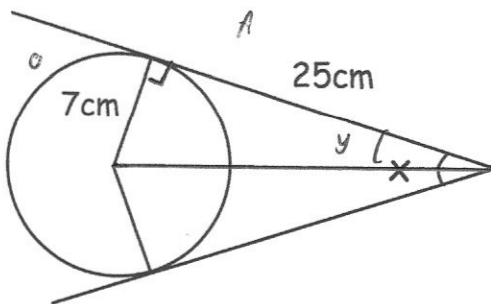
$$P(\text{tail}) = \frac{1}{2}$$

$$P(\text{prime}) = \frac{1}{2}$$

$$\frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$$

Simplify $9\sqrt{35} \div 3\sqrt{5}$

$$3\sqrt{7}$$



Shown is a circle, two tangents and two radii.

Find the size of the angle marked x .

$$\tan y = \frac{7}{25}$$

$$y = 15.64^\circ$$

$$x = 31.28^\circ$$

Work out $100000^{\frac{3}{5}}$

$$\sqrt[5]{100000} = 10$$

$$10^3 = 1000$$



The distance between the Sun and Earth is 150,000,000 km, correct to 2 significant figures.

Write down the lower bound

$$145,000,000 \text{ km}$$

Write down the upper bound

$$155,000,000 \text{ km}$$

What number does not have a reciprocal?

$$0$$

Write down the equation of the line that is perpendicular to $3x - y = 1$ and passes through $(0, 7)$

$$y = 3x - 1$$

$$m = 3$$

$$y = -\frac{1}{3}x + 7$$

Solve using the quadratic formula

$$x^2 + 2x - 10 = 0$$

$$a = 1 \quad b = 2 \quad c = -10$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{-2 \pm \sqrt{4 - (-40)}}{2}$$

$$x = \frac{-2 \pm \sqrt{44}}{2}$$

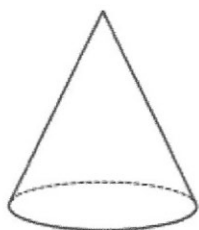
$$x = 2.317 \quad \text{or} \quad x = -4.317$$

Cone A



8cm

Cone B



Cone A and cone B are similar.

The surface area of cone A is 120cm^2

The surface area of cone B is 1080cm^2

The diameter of cone A is 8cm.

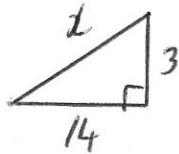
Work out the diameter of cone B.

$$\sqrt{9} = 3$$

$$8 \times 3 = 24 \text{ cm}$$



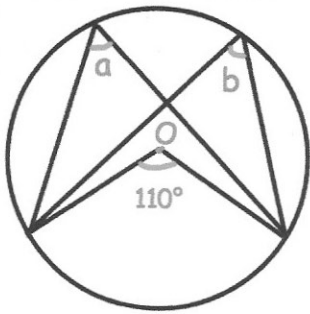
Find the distance between the points $(-5, 4)$ and $(9, 7)$



$$x^2 = 3^2 + 14^2$$

$$x^2 = 205$$

$$x = 14.3178$$



Find a and b

$$a = 55^\circ$$

$$b = 55^\circ$$

Solve, giving your answers to one decimal place.

$$7x = 13 - x^2$$

$$x^2 + 7x - 13 = 0$$

$$a = 1$$

$$b = 7$$

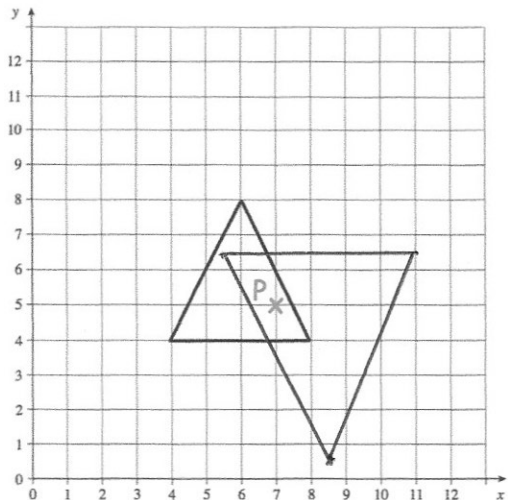
$$c = -13$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{-7 \pm \sqrt{49 - (4 \times 1 \times -13)}}{2}$$

$$x = \frac{-7 \pm \sqrt{101}}{2}$$

$$x = 1.5 \quad \text{or} \quad x = -8.5$$



Enlarge the triangle by scale factor -1.5

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

$$1.5^2 = 2.25$$



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

$$5y = -2x + 3$$

$$y = -\frac{2}{5}x + \frac{3}{5}$$

$$-\frac{2}{5}$$

Find where the line crosses the x-axis.

$$0 = -\frac{2}{5}x + \frac{3}{5}$$

$$-\frac{3}{5} = -\frac{2}{5}x$$

$$-3 = -2x$$

$$x = \frac{-3}{-2} = \frac{3}{2}$$

$$\left(\frac{3}{2}, 0\right)$$

Solve using the quadratic formula

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

$$a = 4$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

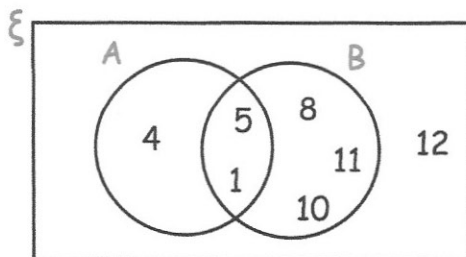
$$b = -12$$

$$c = 9$$

$$x = \frac{12 \pm \sqrt{144 - 144}}{8}$$

$$x = \frac{12}{8} = 1.5$$

$$x = 1.5$$

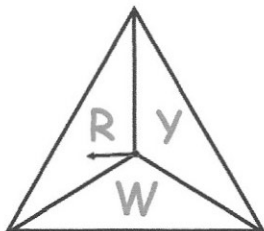


Write down $P(A \cap B)$

$$\frac{2}{7}$$

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

$$\frac{1}{7}$$



$P(\text{no red})$

$$= \frac{2}{3} \times \frac{2}{3} \times \frac{2}{3}$$

$$= \frac{8}{27}$$

The spinner is spun three times.

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

$$1 - \frac{8}{27} = \frac{19}{27}$$

12th October

Higher 5-a-day



Corbettm@ths

The second term of a geometric sequence is 8.
The fourth term of a geometric sequence is 128.

$$8 \xrightarrow{\times 4} 32 \xrightarrow{\times 4} 128$$

$$8 \xrightarrow{\times -4} -32 \xrightarrow{\times -4} 128$$

32 or -32

Find the third term of the geometric sequence.

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?

$$\text{gradient of } CD = \frac{-12 - (-3)}{9 - 6} = \frac{-9}{3} = -3$$

$$y = -3x + 15$$

$$(-17, 66)$$

$$x = -17$$

$$-3 \times -17 = 51$$

$$51 + 15 = 66 \quad \therefore \text{yes}$$

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.

$$x(x+30) = 5000$$

$$x^2 + 30x - 5000 = 0$$

$$a = 1 \quad b = 30 \quad c = -5000$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{-30 \pm \sqrt{900 - (-20000)}}{2}$$

$$x = \frac{-30 \pm \sqrt{20900}}{2}$$

$$x = 57.28 \text{ (width)}, 87.28 \text{ (length)}$$

Donation	Frequency	fd
$0 < d \leq 5$	44	110
$5 < d \leq 10$	35	262.5
$10 < d \leq 20$	16	240
$20 < d \leq 50$	3	105
$50 < d \leq 100$	2	150
	<u>100</u>	<u>867.5</u>

Paul says the average donation is £10

Do you agree?
Explain your answer.

$$867.5 \div 100 = \pounds 8.675$$

$$\pounds 8.68 / \pounds 8.67$$

No the mean is under £10.

Simplify

$$\frac{x}{5} \times \frac{x+8}{3}$$

$$\frac{x^2 + 8x}{15}$$

13th October

Higher 5-a-day



CorbettMths

Write down the value of

$$64^{\frac{2}{3}}$$

$$\sqrt[3]{64} = 4$$

$$4^2 = 16$$

Write down the value of

$$7^{-3}$$

$$\frac{1}{7^3} = \frac{1}{343}$$

Carl is making a drink by mixing orange juice and lemonade in the ratio 3 : 5

O : L

Carl has 57.5 litres of lemonade and 36 litres of orange juice.

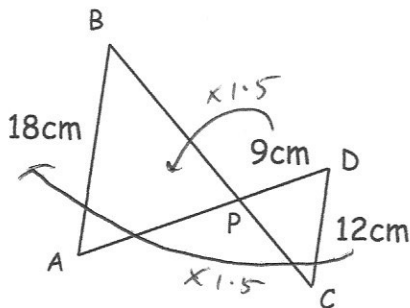
$$57.5 \div 5 = 11.5$$

$$11.5 \times 3 = 34.5$$

What is the maximum amount of the drink that Carl can make?

$$57.5 + 34.5$$

92 Litres



Lines AB and CD are parallel
P is a point of AD, such that PD = 9cm

Find the length of AD.

$$9 \times 1.5 = 13.5$$

$$13.5 + 9 = 22.5 \text{ cm}$$

Find the equation of the straight line through (0, 8) which is perpendicular to the line $y = 4x + 1$

$$y = -\frac{1}{4}x + 8$$

Simplify

$$\frac{x^2 + 4x - 45}{x^2 + 10x + 9}$$

$$\frac{(x+9)(x-5)}{(x+9)(x+1)}$$

$$\frac{x-5}{x+1}$$



Work out $9^{\frac{1}{2}}$

$$9^{\frac{1}{2}} = 3$$

Simplify $6x^0$

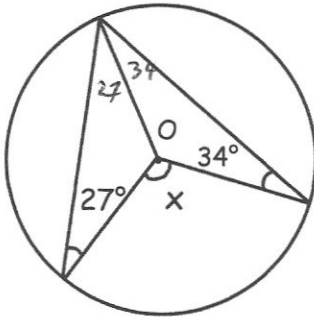
$$6 \times 1 = 6$$

A coin is flipped three times.

What is the probability of getting exactly two tails?

$$\begin{aligned} TTH & \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} = \frac{1}{8} \\ THT & \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} = \frac{1}{8} \\ HTT & \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} = \frac{1}{8} \end{aligned}$$

$$\frac{3}{8}$$



Find x

$$180 - 27 - 27 = 126^\circ$$

$$180 - 34 - 34 = 112^\circ$$

$$360 - 126 - 112 = 122^\circ$$

Tahir has drawn a regular polygon.
He says the exterior angle is 14°

Explain why Tahir is incorrect.

$360^\circ \div 14$ is not an integer.

Solve, to one decimal place,

$$5x^2 + 2x - 1 = 0 \quad \begin{aligned} a &= 5 \\ b &= 2 \\ c &= -1 \end{aligned}$$

$$\frac{-2 \pm \sqrt{4 - (-20)}}{10} \quad c = -1$$

$$x = 0.3$$

or

$$x = -0.7$$

15th October

Higher 5-a-day



Corbettmαths

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

$$1\text{m}^2 = 10000\text{cm}^2$$

Give your answer in newtons/m²

$$P = \frac{F}{A}$$

$$P = \frac{1400}{0.002} = 700000 \text{ N/m}^2$$

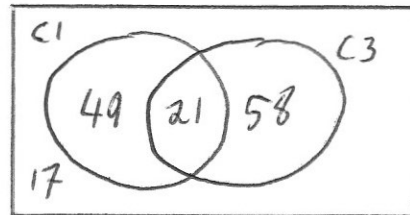
A group of 145 people surveyed about which TV channels they watched on Saturday.

70 watched Channel 1.

79 watched Channel 3.

17 watched neither.

Show this information in a Venn diagram

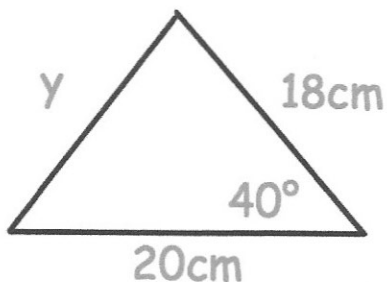


What is the probability that somebody who watched Channel 3 on Saturday, also watched Channel 1?

$$\frac{21}{79}$$

Expand $\sqrt{2}(\sqrt{3} - 4)$

$$\sqrt{6} - 4\sqrt{2}$$



Find y.

$$y^2 = 18^2 + 20^2 - 2 \times 18 \times 20 \times \cos 40$$

$$y^2 = 172.448$$

$$y = 13.13 \text{ cm}$$

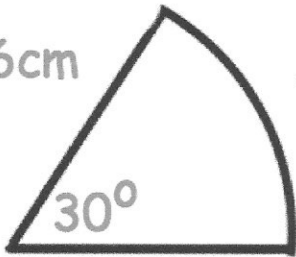
Work out 8^0

1

Work out $81^{\frac{1}{2}}$

9

6cm



$$\begin{aligned} \frac{30}{360} \times \pi \times 6^2 \\ = 3\pi \text{ cm}^2 \\ = 9.425 \text{ cm}^2 \end{aligned}$$

Calculate the area.

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

$$4x - 1 = -x$$

$$5x = 1$$

$$x = 0.2 \quad y = -0.2$$

(0.2, -0.2)

Mr Jones is a personal trainer. He created this table to show information about the ages of his clients. Explain how you know he had made a mistake.

The range should not be greater than the IQR.

Median	42
Interquartile range	50
Range	13

Solve, giving your answers to one decimal place.

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

$$a=1 \quad b=-4$$

$$c=2$$

$$x = \frac{4 \pm \sqrt{16 - 8}}{2}$$

$$x = 3.4 \quad \text{or} \quad x = 0.6$$



Simplify

$$\frac{x^2 - 4x}{4x^3} \quad \frac{x(x-4)}{4x^3}$$

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

Work out

$$64^{\frac{3}{2}}$$

$$\sqrt{64} = 8$$

$$8^3 = 512$$

Work out

$$\left(2\frac{1}{4}\right)^{\frac{1}{2}}$$

$$\left(\frac{9}{4}\right)^{\frac{1}{2}}$$

$$\frac{3}{2}$$

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

Calculate the number of sides the polygon has.

$$(n-2) \times 180 = 7380$$

$$n-2 = 41$$

$$n = 43$$

Expand and simplify

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

$$(2x+1)(x^2+4x+3)$$

$$2x^3 + 8x^2 + 6x + x^2 + 4x + 3$$

$$2x^3 + 9x^2 + 10x + 3$$

In a box, the ratio of green beads to purple beads is 3:5

15 green beads are removed from the box and replaced with 15 purple beads.

The ratio of green beads to purple beads is now 1:2

How many beads are in the box?

$$2(3x-15) = 5x+15$$

$$6x-30 = 5x+15$$

$$x = 45$$

$$8 \times 45 = 360$$

18th October

Higher 5-a-day



CorbettmOths

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

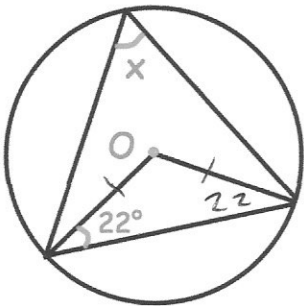
$$220g \div 12 = 18.3g \text{ per biscuit}$$
$$412 \div 100 = 4.12 \text{ cal per g}$$

$$18.3 \times 4.12 =$$
$$75.53 \text{ calories}$$

Simplify fully

$$(\sqrt{3} + 1)(\sqrt{3} - 1)$$

$$3 - \sqrt{3} + \sqrt{3} - 1 = 2$$



$$180 - 44$$
$$= 136$$

$$136 \div 2 = 68^\circ$$

Make y the subject

$$y + 7 = x(y + 4)$$

$$y + 7 = xy + 4x$$

$$y - xy = 4x - 7$$

$$y(1 - x) = 4x - 7$$
$$y = \frac{4x - 7}{1 - x}$$

A fair six sided dice is rolled three times.

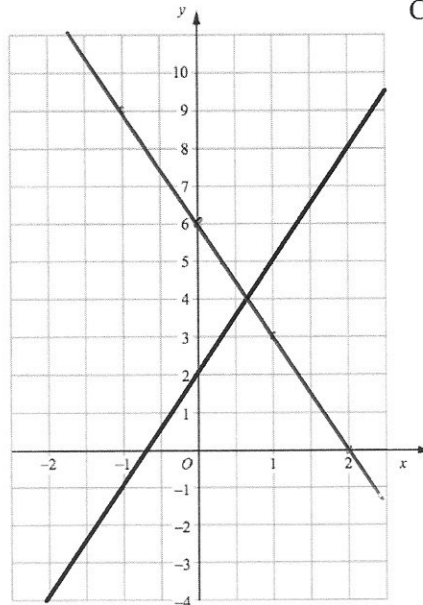
Find the probability of getting no sixes.

$$\frac{5}{6} \times \frac{5}{6} \times \frac{5}{6} = \frac{125}{216}$$



Draw the graph of $3x + y = 6$

$$y = -3x + 6$$



Use your graph to estimate the solutions to simultaneous equations

$$3x + y = 6$$

$$y = 3x + 2$$

$$x = \frac{2}{3}, y = 4$$

Simplify

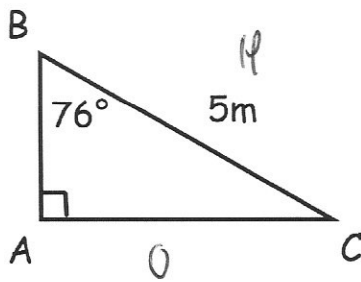
$$(w^5)^{-\frac{2}{3}} \div (w^{-4})^{\frac{7}{3}}$$

$$w^{-\frac{10}{3}} \div w^{-\frac{28}{3}}$$

$$w^6$$

$$-\frac{10}{3} - \left(-\frac{28}{3}\right)$$

$$\frac{-10 + 28}{3} = \frac{18}{3} = 6$$



$$\begin{aligned} 5^{\circ} H \\ \sin(76) \times 5 \\ = 4.8514... \end{aligned}$$

Calculate the perimeter of ABC.

$$AB^2 + 4.8514...^2 = 5^2$$

$$AB^2 = 1.46...$$

$$AB = 1.2096...$$

$$5 + 1.2096 + 4.8514 = 11.061m$$

Make m the subject of

$$y = \frac{m+9}{m+10}$$

$$y(m+10) = m+9$$

$$my + 10y = m + 9$$

$$my - m = 9 - 10y$$

$$m(y-1) = 9 - 10y$$

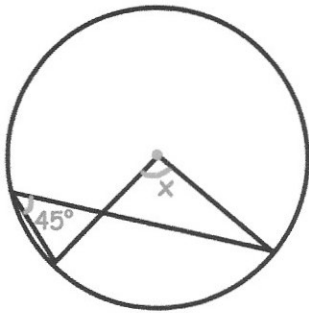
$$m = \frac{9 - 10y}{y - 1}$$

$$\frac{9 - 10y}{y - 1}$$



Work out $\sqrt{30} \times \sqrt{6}$

$$\begin{aligned} & \sqrt{180} \\ & = \sqrt{36} \times \sqrt{5} \\ & = 6\sqrt{5} \end{aligned}$$



Find x

$$90^\circ$$

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

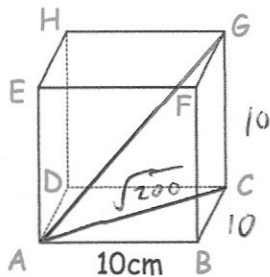
How many pieces of fruit were in the box to begin with?

$$4(2x + 8) = 3(3x + 7)$$

$$8x + 32 = 9x + 21$$

$$x = 11$$

$$55$$



Shown is a cube.
Find the length of AG

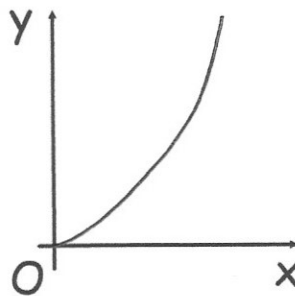
$$10^2 + (\sqrt{200})^2 = AG^2$$

$$300 = AG^2$$

$$AG = 17.32 \text{ cm}$$

y is directly proportional to x squared.

Sketch this graph.





Expand fully.

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

$$y(y^2 - 9y + 18)$$

$$y^3 - 9y^2 + 18y$$

Work out

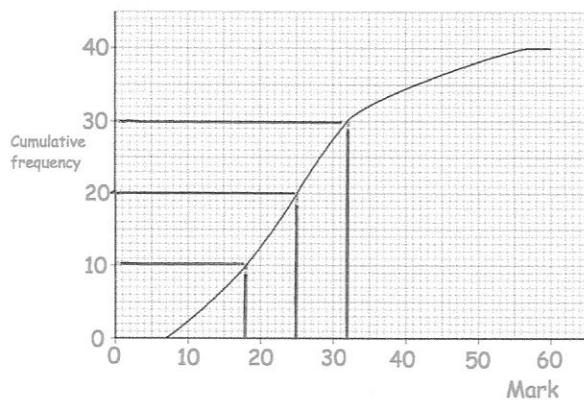
$$25^{0.5} + 3^{-2} \times 0.5^{-3}$$

$2^3 = 8$

$$5 + \frac{1}{9} \times 8$$

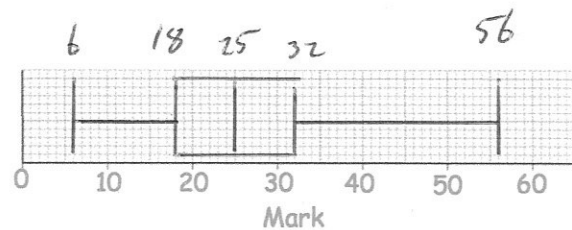
$$5 + \frac{8}{9}$$

$$5\frac{8}{9}$$



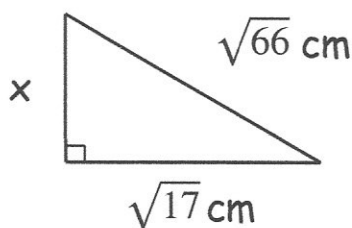
The lowest mark is 8.
The highest mark is 56.

Draw a box plot for this data.



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

25%

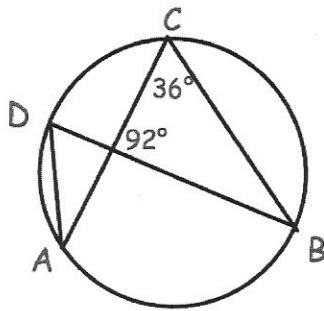
Find x 

$$x^2 + (\sqrt{17})^2 = (\sqrt{66})^2$$

$$x^2 + 17 = 66$$

$$x^2 = 49$$

$$x = 7 \text{ cm}$$



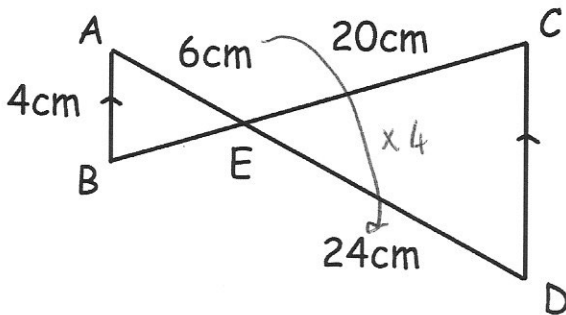
Find the size of angles:

CBD

$$52^\circ$$

ADB

$$36^\circ$$



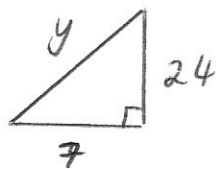
Find CD

$$4 \times 4 = 16 \text{ cm}$$

Find BE.

$$20 \div 4 = 5 \text{ cm}$$

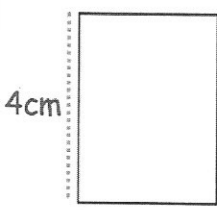
Calculate the distance between (9, 5) and (2, -19)



$$y^2 = 7^2 + 24^2$$

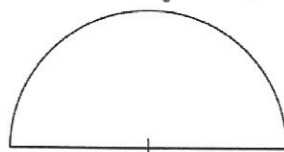
$$y^2 = 625$$

$$y = 25$$



$$8 + 2y$$

$$\frac{1}{2}(\pi \times 2y) + 2y$$



$$\pi y + 2y$$

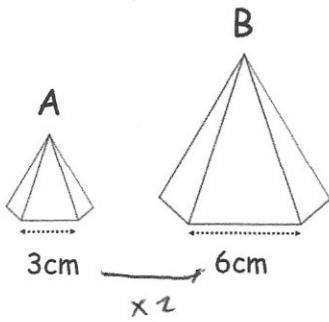
The perimeters are equal.

Find y.

$$8 + 2y = \pi y + 2y$$

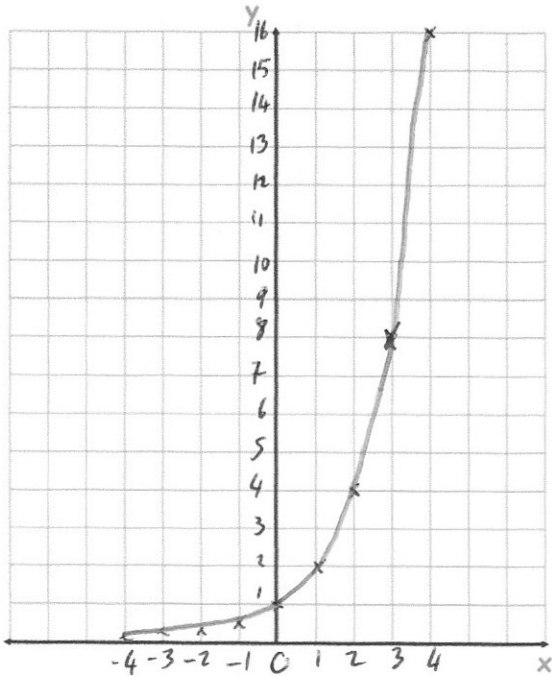
$$8 = \pi y$$

$$y = \frac{8}{\pi}$$



Shown are two similar pyramids.
Pyramid A has a volume of 26cm^3
Work out the volume of Pyramid B.

$$26 \times 2^3 = 208\text{cm}^3$$



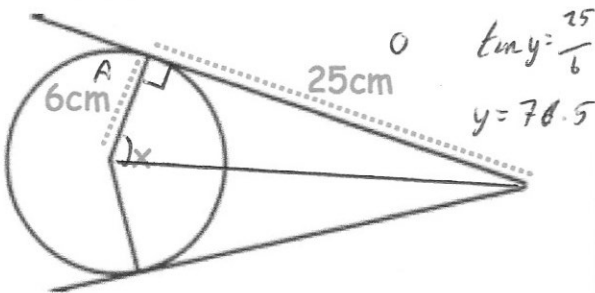
Draw the graph of $y = 2^x$
for values of x from -4 to 4

x	-4	-3	-2	-1	0
y	$\frac{1}{16}$	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{2}$	1

x	1	2	3	4
y	2	4	8	16

Write down the equation of the line that
is perpendicular to $y = \frac{1}{2}x + 7$ and
passes through $(0, -6)$

$$y = -2x - 6$$



Shown is a circle, two tangents and two radii.

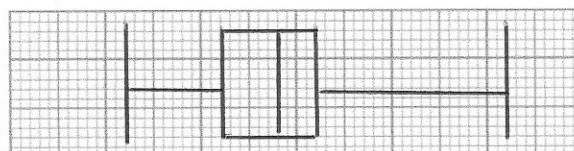
Find the size of the angle marked x .

$$x = 153^\circ$$

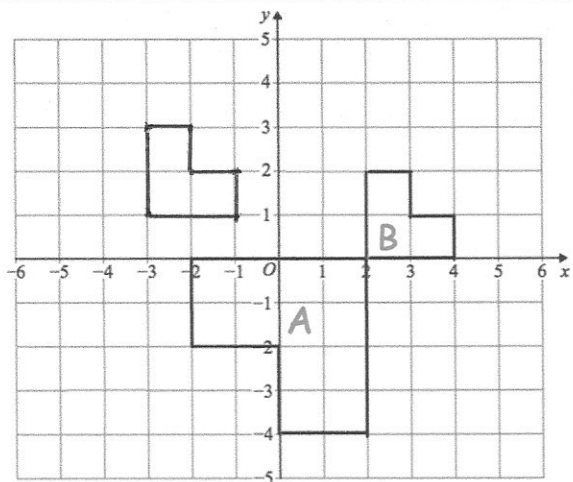


Lowest Value	6
Median	14
Upper Quartile	16
Range	20
Interquartile Range	5

LQ: 11
highest: 26



0 5 10 15 20 25 30
Draw a box plot to show this information



Describe fully the single transformation that takes shape A to shape B.

Enlargement
Scale factor $-\frac{1}{2}$
Centre $(2, 0)$

Translate shape B by the vector

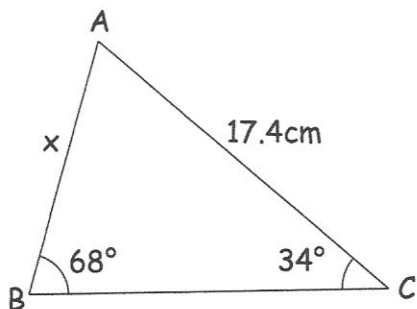
$$\begin{pmatrix} -5 \\ 1 \end{pmatrix}$$

Solve

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

$$(2x + 1)(x + 5) = 0$$

$$x = -\frac{1}{2} \text{ or } x = -5$$



Find the length of AB.

$$\frac{x}{\sin 34} = \frac{17.4}{\sin 68}$$

$$x = 10.49 \text{ cm}$$

Write $0.4\overline{25}$ as a fraction in its simplest form.

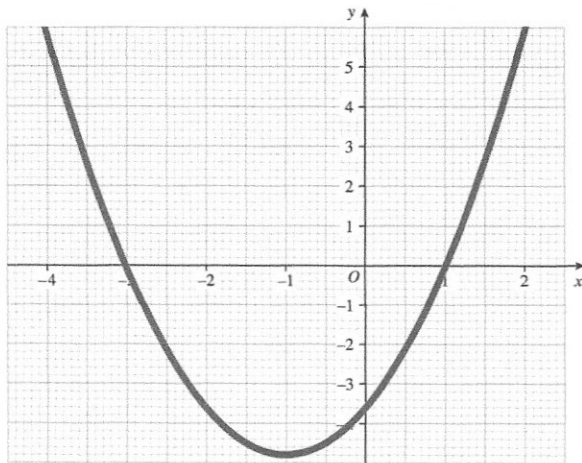
$$x = 0.42525\dots$$

$$10x = 4.2525\dots$$

$$1000x = 425.2525\dots$$

$$990x = 421$$

$$x = \frac{421}{990}$$



Write down an estimate for the coordinates of the turning point of the graph.

$$(-1, -4.8)$$

Write down the equation of the mirror line of the graph.

$$x = -1$$

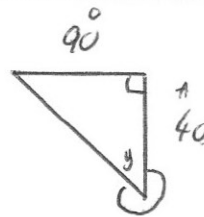
A helicopter flies 90 miles east and 40 miles south and lands. The helicopter flies back on a direct course.

What is its bearing?

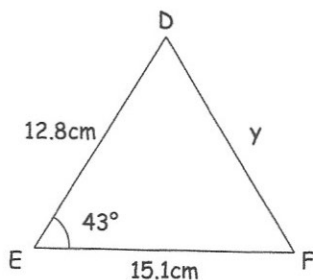
$$\tan y = \frac{90}{40}$$

$$y = 66.0375\dots$$

$$360 - 66.037\dots$$



$$293.96^\circ$$

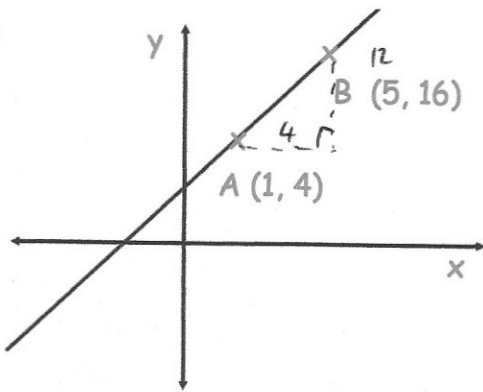


Find y.

$$y^2 = 12.8^2 + 15.1^2 - 2 \times 12.8 \times 15.1 \times \cos 43$$

$$y^2 = 109.13\dots$$

$$y = 10.447 \text{ cm}$$



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

$$\frac{12}{4} = 3$$

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

$$y = 3x + 4$$

Write down the equation of a line perpendicular to AB

$$y = -\frac{1}{3}x + 1$$

Factorise fully $2y^2 - 50$

$$2(y^2 - 25)$$

~~scribble~~

$$2(y-5)(y+5)$$

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.

$LLLO$ OLL 10 options
 $LLLOL$
 $LLLOL$
 $LLOLO$ $0.3 \times 0.3 \times 0.3 \times 0.7 \times 0.7 = 0.01323$
 $LOLOL$
 $LOLOL$ 0.01323×10
 $LOLOL$
 $OLLLO$ $= 0.1323$
 $OLLLO$
 $OLLLO$

Two containers are mathematically similar.

The height of container A is 5cm.
The height of container B is 15cm $\downarrow \times 3$

The volume of A is 120cm^3

What is the volume of B?

$$120 \times 3^3 = 3240\text{cm}^3$$

27th October

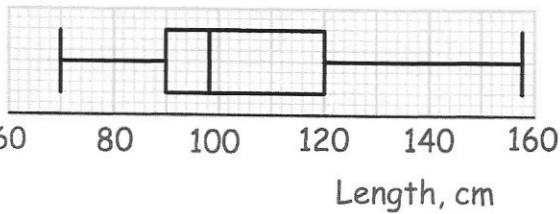
Higher 5-a-day



Corbettm@ths

40 people visited a swimming pool.
 There are 23 adults.
 9 adults wore goggles.
 4 children did not wear goggles.
 How many children wore goggles?

	A	C	Total
Goggles	9	13	22
No Goggles	14	4	18
Total	23	17	40

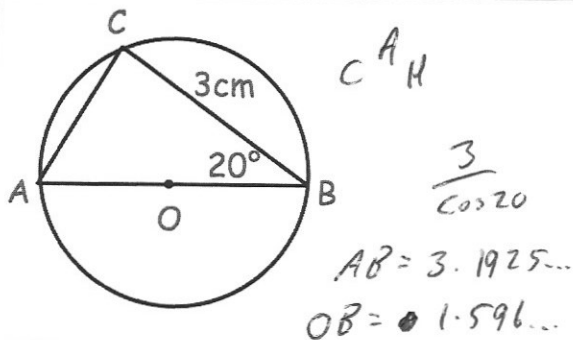


Find the median.

98

Find the interquartile range.

$$120 - 90 = 30$$



Find the area of the circle.

Give your answer to 1 decimal place.

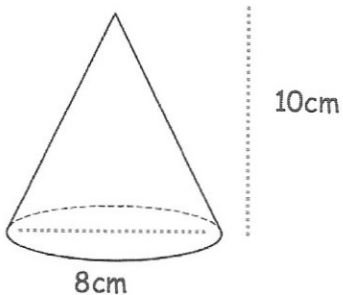
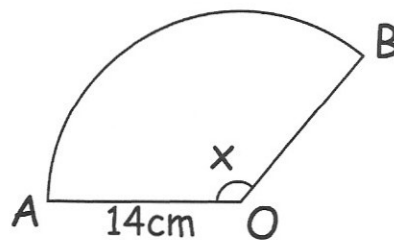
$$\pi \times 1.596...^2$$

$$8 \text{ cm}^2$$

The area of sector OAB is 165 cm^2
 Find x .

$$\frac{x}{360} \times \pi \times 14^2 = 165$$

$$x = 96.47^\circ$$



Calculate the volume of the cone.

$$\frac{1}{3} \times \pi \times 4^2 \times 10$$

$$167.55 \text{ cm}^3$$

28th October

Higher 5-a-day



Corbettmαths

Zayn is checking the quality of pencils made by a machine.

7 out of the 118 pencils that he checked were faulty.

The machine made 6000 pencils.

Use this information to estimate how many of the 6000 pencils were faulty.

$$\approx \frac{7}{118} \text{ of } 6000$$

$$350$$

Simplify

$$\frac{2x^2 + 5x - 3}{x^2 - 9} \quad \frac{(2x-1)(x+3)}{(x-3)(x+3)}$$

$$\frac{2x-1}{x-3}$$

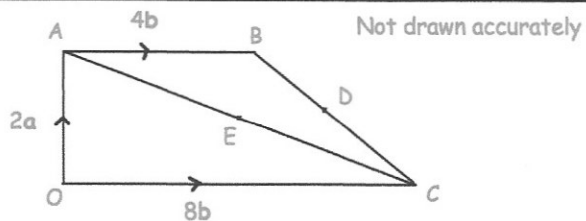
A bag contains 10 counters.
4 of the counters are red
4 of the counters are purple
2 of the counters are white
Sharon chooses a counter at random, records the colour, then replaces it.
Sharon then chooses a second counter at random and records the colour.

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

$$RR \quad \frac{4}{10} \times \frac{4}{10} = \frac{16}{100}$$

$$PP \quad \frac{4}{10} \times \frac{4}{10} = \frac{16}{100} \quad \frac{36}{100} = \frac{9}{25}$$

$$WW \quad \frac{2}{10} \times \frac{2}{10} = \frac{4}{100}$$



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

Write down a vector for \overrightarrow{AC}

$$8b - 2a$$

Write down a vector for \overrightarrow{OB}

$$2a + 4b$$

Write down a vector for \overrightarrow{AE}

$$4b - a$$



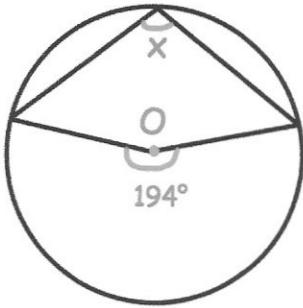
Solve, giving your answers to one decimal place.

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

$a = 3$
 $b = 4$
 $c = -5$

$$x = \frac{-4 \pm \sqrt{16 - (-60)}}{6}$$

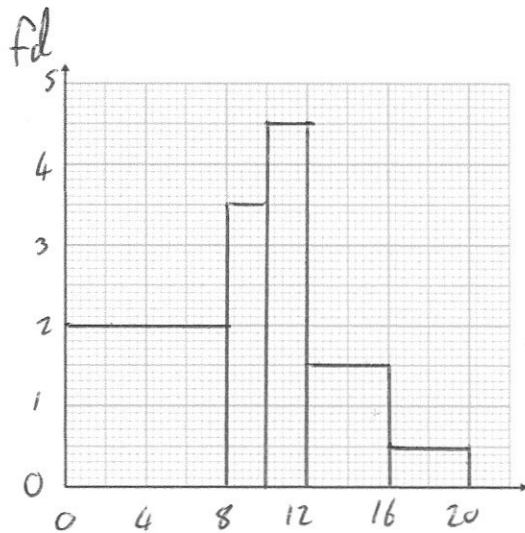
$x = 0.8$ or $x = -2.1$



Find x

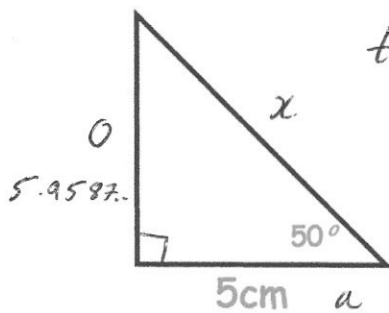
$194 \div 2 = 97^\circ$

length (l cm)	Frequency	fd
$0 < l \leq 8$	16	2
$8 < l \leq 10$	7	3.5
$10 < l \leq 12$	9	4.5
$12 < l \leq 16$	6	1.5
$16 < l \leq 20$	2	0.5



Draw a histogram to show this information.

length (cm)



$t^{\circ} a$
 $\tan(50) \times 5$
 $= 5.95876$

Calculate the perimeter of the right angled triangle.

$$x^2 = 5^2 + 5.9587...^2$$

$$x^2 = 60.5069...$$

$$x = 7.7786...$$

perimeter = 18.737cm

30th October

Higher 5-a-day



Corbettmαths

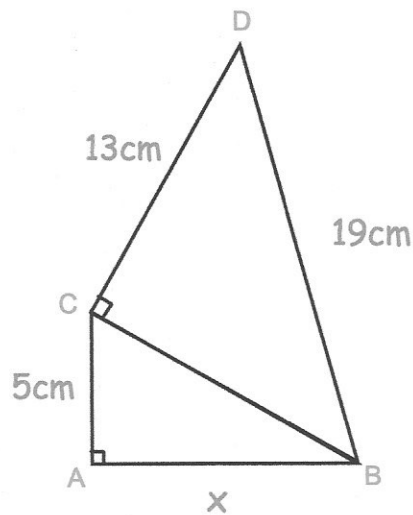
ABC and BCD are right angle triangles.
Find the length of AB

$$BC^2 = 19^2 - 13^2$$

$$BC^2 = 192$$

$$BC = 13.8564$$

$$\boxed{12.92cm}$$



$$AB^2 = 13.8564^2 - 5^2$$

$$AB^2 = 167$$

$$AB = 12.923cm$$

Work out

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

$$0.5 \times 10^9$$

$$5 \times 10^8$$

A circle has an area of $500cm^2$ to the nearest $10cm^2$. $LB = 495cm^2$

Work out the lower bound of the radius

$$\pi \times r^2 = 495$$

$$r^2 = 157.56 \dots$$

$$r = 12.5524cm$$

The value of a caravan is given by

$$v = 26000 \times 0.93^n$$

where v is the value of the caravan in pounds and n is the number of years after it was bought.

How much was the caravan when it was brand new?

$$£26000$$

Nick says the value of the caravan is decreasing by 93% each year. Explain why he is wrong.

It is decreasing
by 7%

How many years will it take the ~~£1500~~ $£1500$ caravan to be worth less than 25% of its original value?

$$n = 19 \quad v = £6548.61$$

$$n = 20 \quad v = £6090.21$$

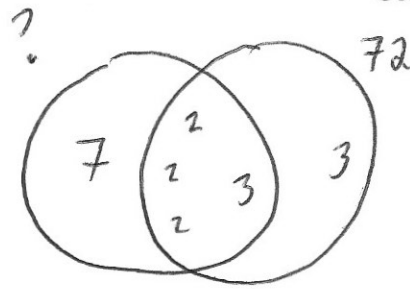
20 years



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

168



Work out

$$(3 \times 10^6)^3 = 27 \times 10^{18}$$

$$= 2.7 \times 10^{19}$$

A is inversely proportional to B cubed.

$$A \propto \frac{1}{B^3}$$

When A = 250, B = 5.

Find A when B = 3.

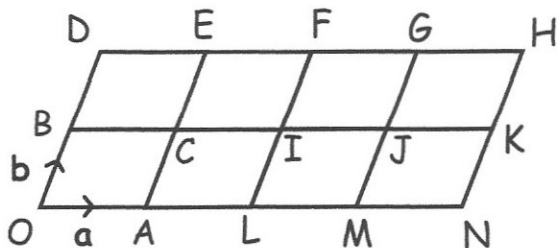
$$A = \frac{k}{B^3}$$

$$250 = \frac{k}{5^3}$$

$$k = 31250$$

$$A = \frac{31250}{8^3}$$

$$A = \frac{31250}{27} = 1157.4074$$



Find in terms of a and b

$$\vec{OK} = 4a + b$$

$$\vec{KO} = -4a - b$$

The perimeter of sector OAB is 59cm.
Find the area of the sector OAB.

$$\frac{x}{360} \times \pi \times 36 = 23$$

$$x = 73.21 \dots$$

$$\frac{73.21 \dots}{360} \times \pi \times 18^2 = 207 \text{ cm}^2$$

