

1st August

Foundation Plus 5-a-day



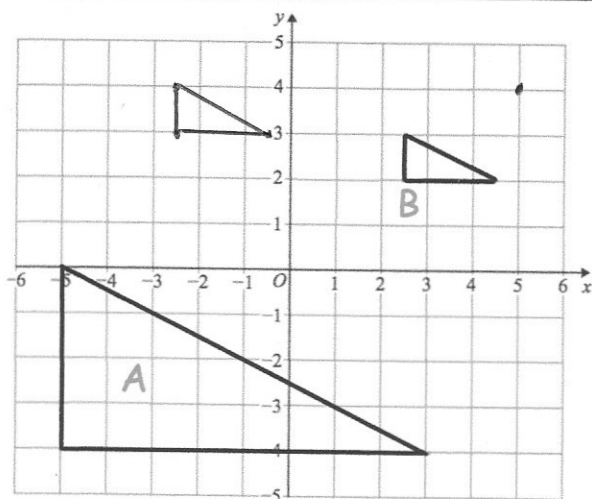
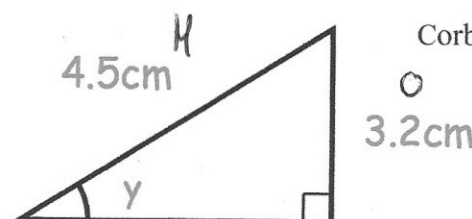
Corbettmaths

Calculate angle y

5011

$$\sin y = \frac{3.2}{4.5}$$

$$y = 45.3254^\circ$$



Describe fully the single transformation that maps triangle A onto triangle B.

Enlargement by scale factor $\frac{1}{4}$, centre $(5, 4)$

Translate triangle B by $\begin{pmatrix} -5 \\ 1 \end{pmatrix}$ 5 left, 1 up

There are three colours of beads in a bag.

The ratio of red to yellow beads is 8:3

The ratio of green to yellow beads is 9:2.

What fraction of the beads are green?

$$\begin{array}{l} R : Y : G \\ 8 : 3 \\ \times 2 \quad \quad \times 3 \\ 16 : 6 : 27 \end{array} \quad \boxed{\frac{27}{49}}$$

Work out the reciprocal of 20.
Give your answer as a decimal

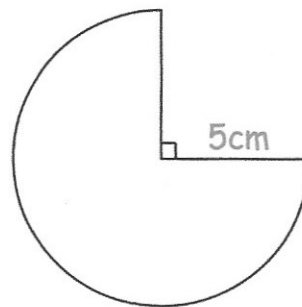
$$\frac{1}{20} = 0.05$$



Calculate the area of this sector.

$$\frac{3}{4} \times \pi \times 5^2$$

$$58.9 \text{ cm}^2$$



The number of days, D , to complete research is inversely proportional to the number of researchers, R .

$$D = \frac{240}{R}$$

Work out how long it would take to complete the research if there were 8 researchers.

$$\frac{240}{8} = 30 \text{ days}$$

How many researchers would be needed to complete the research in 15 days?

$$15 = \frac{240}{R}$$

$$240 \div 15 = 16$$

The density of Nitrogen is $1.25 \times 10^{-6} \text{ kg/cm}^3$

$d^m v$

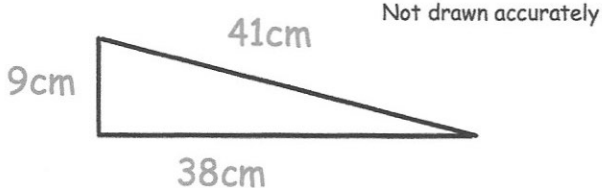
Calculate the mass of one cubic metre of Nitrogen.

$$1 \text{ m}^3 = 1,000,000 \text{ cm}^3$$

$$m = d \times v$$

$$1.25 \times 10^{-6} \times 1,000,000$$

$$1.25 \text{ kg}$$



Is this triangle a right angled triangle?

$$a^2 + b^2 = c^2 ?$$

$$(9)^2 + (38)^2 = 1525$$

$$(41)^2 = 1681$$

No

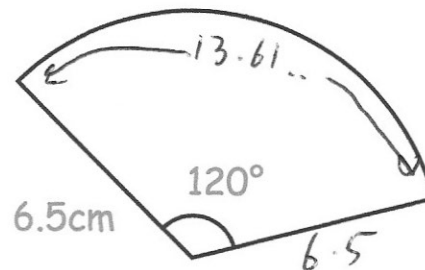
Solve $(x + 1)(x + 12) = 0$

$$x = -1 \text{ or } x = -12$$

Calculate the perimeter of the sector.

$$\frac{120}{360} \times \pi \times 13 + 6.5 + 6.5$$

$$26.61 \text{ cm}$$



150 students in Years 10 and 11 visit a school canteen.

Some students have packed lunches.
Some students have a cooked lunch.

56 out of the 89 students who have packed lunch are in Year 10.
There are 72 Year 11 students.

Work out how many Year 10 students have a cooked lunch.

$$22$$

	Packed	cooked	total
yr 10	56	39 22	78
yr 11	33	39	72
Total	89	61	150

In a sale, a shop reduces all its prices by 30%.

On the last day of the sale, the shop reduces the sale prices by 10%.

On the last day of the sale, a mobile phone costs £516.60

How much was the mobile phone before the sale?

$$63\% \text{ of } y = 516.60$$

$$1\% \text{ of } y = 8.2$$

$$100\% \text{ of } y = £820$$



Solve

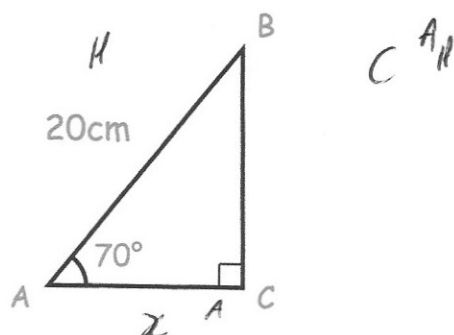
$$\frac{4(x-2)}{3} = 5 - 2x$$

$$4x - 8 = 15 - 6x$$

$$10x = 23$$

$$10x = 23$$

$$x = 2.3$$



Find the length of side AC.

$$\cos(70) \times 20$$

$$6.84 \text{ cm}$$

Solve the simultaneous equations

$$2x - 5y = 1 \quad \times 3 \quad 6x - 15y = 3$$

$$8x + 3y = 73 \quad \times 5 \quad 40x + 15y = 365$$

$$46x = 368$$

$$x = 8$$

$$16 - 5y = 1$$

$$y = 3$$

Find the volume of a piece of wood that has a mass of 600g and density of 0.75 g/cm^3

$\text{g} \text{ m}^3$

$$\frac{600}{0.75} = 800 \text{ cm}^3$$

A number, c , has been rounded to two decimal places.

The answer is 0.74

Write down the error interval for c .

$$0.735 \leq c < 0.745$$



Write in standard form

$$1800 \times 10^9$$

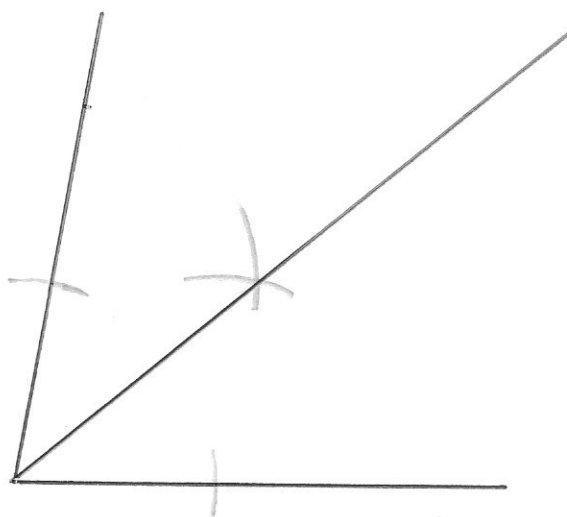
$$1.8 \times 10^{12}$$

Write in standard form

$$0.00000000000034$$

$$3.4 \times 10^{-12}$$

In the space below, draw a 80° angle.
Construct the angle bisector.



The circumference of a circle is 60cm.
Work out the area of the circle.

$$C = \pi \times d$$

$$60 = \pi \times d$$

$$d = 19.098...$$

$$r = 9.54...$$

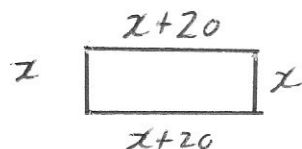
$$A = \pi r^2$$

$$= \pi \times 9.54...^2$$

$$= 286.479 \text{ cm}^2$$

A rectangular field is 20 metres longer than wide.

The perimeter of the field is 280m.



Find the area of the field.

$$4x + 60 = 280$$

$$4x = 240$$

$$x = 60$$

$$60 \times 80 = 4800 \text{ m}^2$$



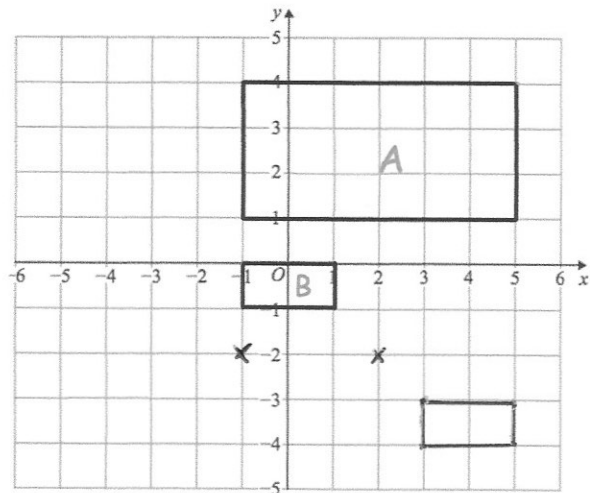
Solve $x^2 - 5x - 84 = 0$

$$(x + 7)(x - 12) = 0$$

$$x = -7 \text{ or } x = 12$$

Describe fully the single transformation that maps shape A onto shape B.

Enlargement, scale factor $\frac{1}{3}$,
Centre $(-1, -2)$



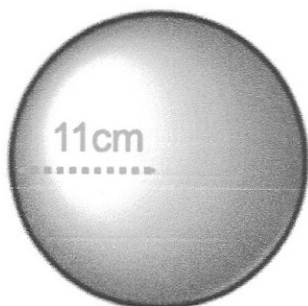
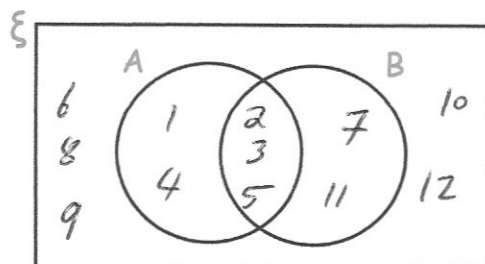
Rotate shape B 180° about the point $(2, -2)$.

$\xi = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12\}$

$A = \{\text{numbers less than 6}\}$ 1 2 3 4 5

$B = \{\text{prime numbers}\}$ 2 3 5 7 11

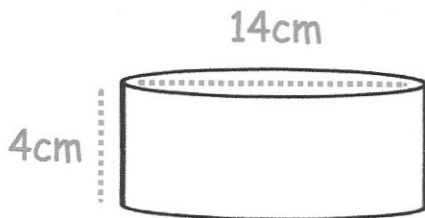
Draw a Venn diagram for this information.



A sphere has a radius of 11cm.
Calculate the volume of the sphere.
Give your answer to 1 decimal place.

$$\frac{4}{3} \times \pi \times 11^3$$

$$5575.3 \text{ cm}^3$$



Calculate the volume.
Give your answer in terms of π

$$\pi \times 7^2 \times 4$$

$$= 196\pi \text{ cm}^3$$

Expand and simplify $6(w + 3) - 2(w - 5)$

$$6w + 18 - 2w - 10$$

$$= 4w + 8$$

Can you spot any mistakes?

$$-2 \times -5 = +10$$

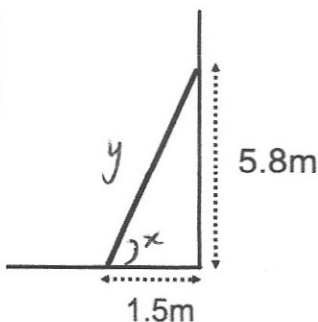
not -10

Final answer $4w + 28$

Calculate the density of a piece of wood with a mass of 80g and a volume of 90cm³

$$d = \frac{m}{v}$$

$$\frac{80}{90} = 0.8 \text{ g/cm}^3$$



$$\tan x = \frac{5.8}{1.5}$$

$$75.4998^\circ$$

A ladder is placed against a wall.
To be safe, it must be inclined at between 70° and 80° to the ground.

Is the ladder safe?

Yes

Calculate the length of the ladder.

$$y^2 = 1.5^2 + 5.8^2$$

$$y^2 = 35.89$$

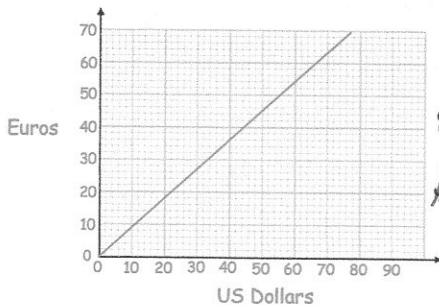
$$y = 5.99 \text{ m}$$

Factorise $y^2 + 4y - 45$

$$(y+9)(y-5)$$

Factorise $1 - x^2$

$$(1-x)(1+x)$$



$$\begin{aligned} \$50 &= €45 \\ \$1 &= €0.90 \\ \$290 &= €261 \end{aligned}$$

Rachel has £160 and \$50.

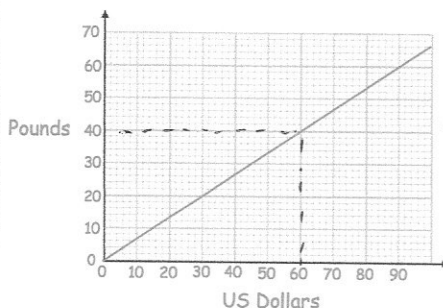
$$\$240$$

$$\$290$$

Her hotel bill is €950.

How much more money does Rachel need to pay the hotel bill?

$$950 - 261 = €689$$



$$\begin{aligned} £40 &= \$60 \\ £160 &= \$240 \end{aligned}$$

A cube with side length 8cm is placed on the ground. The pressure exerted on the ground is 4N/cm^2 . $8 \times 8 = 64\text{cm}^2$

What force does the cube exert on the ground?

$$P \quad F \quad A$$

$$F = P \times A$$

$$= 4 \times 64$$

$$= 256 \text{ N}$$

Five chairs and a table cost £240

Eight chairs and two tables cost £416

Find the cost of buying three tables and three chairs.

$$£336$$

$$5x + y = 240$$

$$8x + 2y = 416$$

$$\begin{aligned} 160 + y &= 240 \\ y &= 80 \end{aligned}$$

$$10x + 2y = 480$$

$$8x + 2y = 416$$

$$2x = 64$$

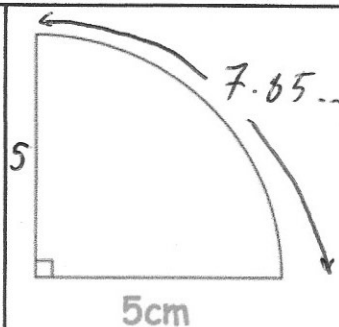
$$x = 32$$



Calculate the perimeter of this quarter circle

$$\frac{1}{4} \times \pi \times 10 = 7.85\dots$$

$$7.85\dots + 5 + 5 = 17.854\text{cm}$$



The mean of four numbers is 10.
Three of the numbers are 9, 11 and 7.

Work out the fourth number.

$$4 \times 10 = 40$$

$$40 - 9 - 11 - 7 = 13$$

Input $\rightarrow$ $\boxed{\times \frac{3}{4}}$ $\rightarrow$ $\boxed{\div \frac{2}{3}}$ $\rightarrow$ Output

Find the output if the input is 5

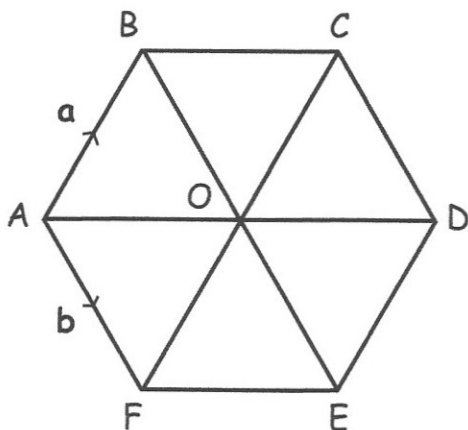
$$5 \times \frac{3}{4} = \frac{15}{4}$$

$$\frac{15}{4} \div \frac{2}{3}$$

$$\frac{15}{4} \times \frac{3}{2} = \frac{45}{8}$$

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

ABCDEF is a regular hexagon, with centre O.



$$\vec{AB} = \underline{a}$$

$$\vec{AF} = \underline{b}$$

Express in terms of **a** and **b** the vector

$\vec{FC}$

$$2\underline{a}$$

Express in terms of **a** and **b** the vector

$\vec{AO}$

$$\underline{a} + \underline{b}$$



Simplify

$$2a^3c^3 \times 3a^2c$$

$$6a^5c^4$$

Shoe Size	Frequency
5	2 ✓
6	11 ✓
7	5 ✓
8	4
9	1

23

A student is picked at random.

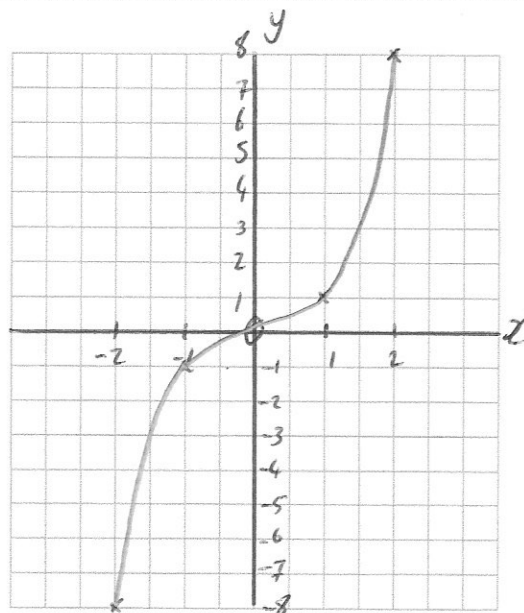
Work out the probability that the student has a shoe size of 7 or smaller.

$$\frac{18}{23}$$

$$y = x^3$$

Complete the table of values and draw a graph

x	-2	-1	0	1	2
y	-8	-1	0	1	8



Solve the simultaneous equations

$$2x - 3y = 18$$

$$3x + y = 5 \times 3$$

$$2x - 3y = 18$$

$$9x + 3y = 15$$

$$11x = 33$$

$$x = 3$$

$$y = -4$$

$$6 - 3y = 18$$

$$-3y = 12$$

$$y = -4$$

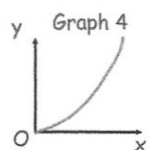
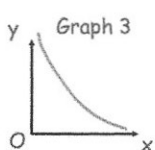
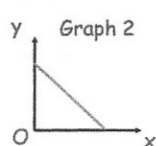
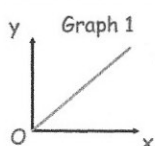
Make x the subject of

$$\sqrt[3]{\frac{2x}{y}} = w$$

$$\frac{2x}{y} = w^3$$

$$2x = w^3 y$$

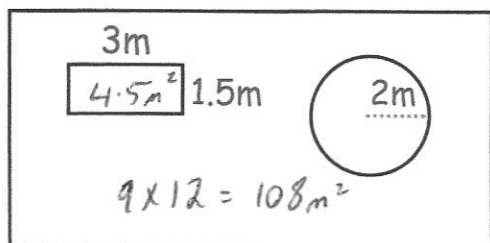
$$x = \frac{w^3 y}{2}$$

One of the graphs shows that y is inversely proportional to x .

Which graph?

3

12m



There is a circular pond that has radius 2 metres.

The remainder of the garden is grass. Each bag of grass seed costs £4.60 and covers 10m².

Work out the total cost to re-seed the garden.

Belle wants to re-seed the grass in her garden.

The garden is 12 metres long and 9 metres wide.

There is a vegetable patch that is 3 metres long and 1.5 metres long.

$$\pi \times 2^2 = 12.566... \text{ m}^2$$

$$108 - 12.566... - 4.5 = 90.93... \text{ m}^2$$

10 bags needed

£46.00

The sum of Nita's age and Hannah's age is 102 years.

The difference between their ages is 52 years.

Hannah is younger than Nita.

Find the age of each woman.

Nita is 77 Hannah is 25

$$x + y = 102$$

$$x - y = 52$$

$$2x = 154$$

$$x = 77$$



A company collected data about the number of internet enabled devices in each of 50 households.

The table shows the results.

Number of devices	Number of households	
0	1	0
1	1	1
2	2	4
3	4	12
4	9	36
5	13	65
6	10	60
7	7	49
8	3	24

Work out the total number of internet enabled devices in these 50 households

251

Calculate the mean number of internet enabled devices per household.

$$251 \div 50 = 5.02$$

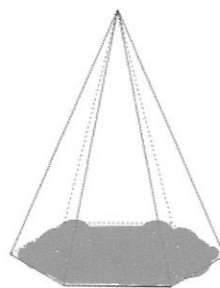
A hexagon-based pyramid has a height of 54cm.

The volume of the pyramid is 1080cm³.

Calculate the area of the base of the pyramid.

$$V = \frac{1}{3} A h$$

$$1080 = \frac{1}{3} \times A \times 54$$



54cm

$$1080 \div 18 = 60 \text{ cm}^2$$

The number, c, has been truncated to one decimal place.

The answer is 5.8

Write down the error interval for c.

$$5.85 \leq c < 5.9$$

A line has gradient 7 and passes through the point (1, 5)

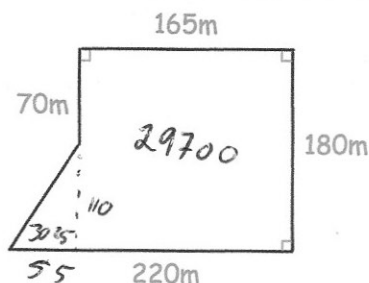
Find the equation of the line.

$$y = 7x - 2$$



Write 708% as a simplified fraction

$$\frac{708}{100} = \frac{177}{25}$$



Farmer Richards owns this field.
The crop he plants earns him £7 for each square metre.
How much money does he earn in total?

$$29700 \times 7$$

$$£207900$$

Solve $x^2 + 10x - 39 = 0$

$$(x + 13)(x - 3) = 0$$

$$x = -13 \text{ or } x = 3$$

$$(a + c)^3 = t$$

make c the subject

$$a + c = \sqrt[3]{t}$$

$$c = \sqrt[3]{t} - a$$

Charlie and Ruma share some money in ratio 2 : 5

Ruma gets £216 more than Charlie.

How much does each person receive?

$$5 - 2 = 3$$

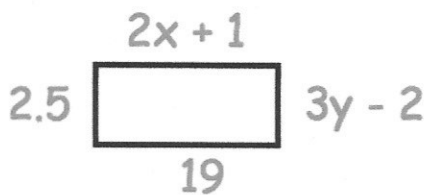
$$216 \div 3 = 72$$

$$72 \times 2 = £144 \text{ Charlie}$$

$$72 \times 5 = £360 \text{ Ruma}$$



Shown below is a rectangle.
The measurements are in centimetres.

Find x

$$\begin{aligned} 2x + 1 &= 19 \\ 2x &= 18 \\ x &= 9 \end{aligned}$$

Find y

$$\begin{aligned} 3y - 2 &= 2.5 \\ 3y &= 4.5 \\ y &= 1.5 \end{aligned}$$

Find the perimeter of the rectangle.

$$\begin{aligned} 19 + 19 + 2.5 + 2.5 \\ = 43 \text{ cm} \end{aligned}$$

Expand and simplify

$$(3w - 5)(2w + 9)$$

$$\begin{aligned} 6w^2 + 27w - 10w - 45 \\ 6w^2 + 17w - 45 \end{aligned}$$

A car travels at an average speed of 28.7mph ≈ 30 mph

Work out an estimate for how long it will take the car to travel 10 miles.

Is your answer an underestimate or an overestimate

$$\frac{10}{30} = \frac{1}{3} \text{ hour}$$

20 minutes

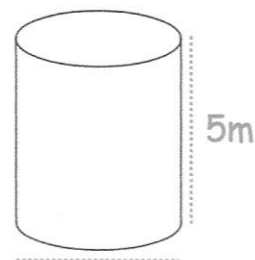
underestimate

Calculate the surface area of the cylinder.

$$\pi \times 1.5^2 = 7.068... \text{ m}^2$$

$$\pi \times 3 \times 5 = 47.123... \text{ m}^2$$

$$47.12... + 7.068... + 7.068... = 61.26 \text{ m}^2$$



3m



The cost, C pounds, of hiring a plumber is $C = 40h + 15$, where h is the number of hours.

Rearrange the formula to make h the subject.

$$C = 40h + 15$$

$$C - 15 = 40h$$

$$h = \frac{C - 15}{40}$$

Use your formula to find how many hours a plumber was hired for if the final cost is £315

$$\frac{315 - 15}{40} = 7.5 \text{ hours}$$

Expand

$$(9 - 2x)(8 - x)$$

$$72 - 9x - 16x + 2x^2$$

$$2x^2 - 25x + 72$$

When a ball is dropped, it bounces and then rises.

The ball rises to 90% of the height from which it is dropped.

The ball is dropped from a height of 5m.



15 bounces →

Calculate the height of the rise after the first bounce.

$$90\% \text{ of } 5 = 4.5 \text{ m}$$

The ball carries on bouncing, each time rising to 90% of the last rise.

For how many bounces does it rise to a height greater than 1m?

$$5 \times 0.9^{15} = 1.029... \text{ m}$$

$$5 \times 0.9^{16} = 0.9265...$$



A farmer says he has 2,500 sheep, to the nearest 100.

What is the greatest possible number of sheep he has?

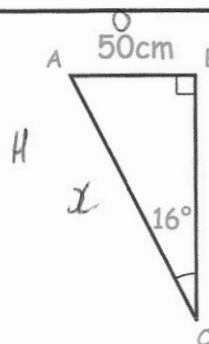
2549

ABC is a right angled triangle

AB = 50cm and $\angle ACB = 16^\circ$ *5 H*

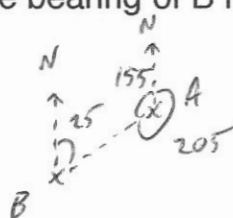
Find AC

$$\frac{50}{\sin 16} = 181.4 \text{ cm}$$



The bearing of A from B is 025°

Find the bearing of B from A.



205°

A car decreases in value 15% a year.

If it was bought for £5000, how much will it be worth after 2 years?

$$5000 \times 0.85^2$$

$$£3612.50$$

The interior angle of a regular polygon is 14 times larger than the exterior angle.

$$14x = 180 - x$$

How many sides does the polygon have?

$$180 \div 15 = 12$$

$$360 \div 12 = 30 \text{ sides}$$

17th August

Foundation Plus 5-a-day



Corbettmaths

$$\frac{8}{101}, \frac{9}{91}, \frac{10}{81}, \frac{11}{71} \dots$$

 $-10n$

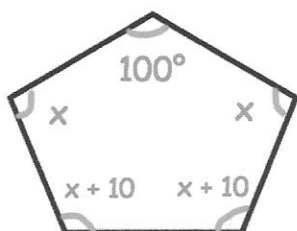
$$101 \quad 91 \quad 81 \quad \dots$$

$$-10 \quad -20 \quad -30 \quad \dots -10n + 111$$

Find the nth term

$$n \quad \begin{matrix} 8 & 9 & 10 & 11 \\ 1 & 2 & 3 & 4 \end{matrix} \quad n+7$$

$$\frac{n+7}{111-10n}$$



Find x

$$4x + 120 = 540$$

$$4x = 420$$

$$x = 105^\circ$$

Shown is a rectangular metal frame with two diagonal supports.

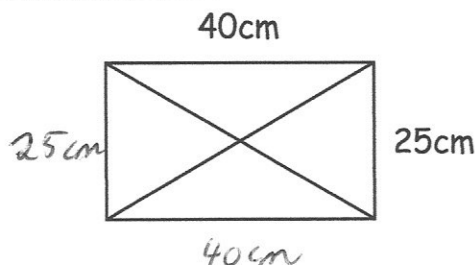
What length of metal is used?

$$25^2 + 40^2 = d^2$$

$$d = 47.1699 \text{ cm}$$

$$40 + 40 + 25 + 25 + 47.1699 =$$

$$47.1699 = 224.34 \text{ cm}$$

The mass of Earth is 5.97×10^{24} kgThe mass of Jupiter is 1.898×10^{27} kg

$$\frac{1.898 \times 10^{27}}{5.97 \times 10^{24}} = 317.9$$

Work out how many times heavier Jupiter is than Earth.

Give your answer to one decimal place.

A line has equation $y = -4x$

Write down the gradient of the line

$$-4$$

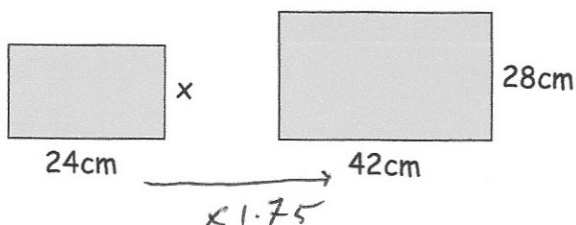
Write down the coordinates of the y-intercept of the line

$$(0, 0)$$

Solve the inequality $2x - 1 < 9$

$$2x < 10$$

$$x < 5$$



The diagram shows two similar rectangles

Find x

$$28 \div 1.75 = 16\text{cm}$$

Find the area of the smaller rectangle

$$24 \times 16 = 384\text{cm}^2$$

Bank of Maths

Double your money in 15 years.

The average annual growth for your investment is 4.5%

Tahir has some money to invest and sees this advert.

Will Tahir double his money in 15 years by investing his money with "Bank of Maths?"

$$100 \times 1.045^{15} = 193.528..$$

No, 93.5% increase.

There are 6000 people at an ice hockey match.

The announcer says this is exactly 40% more people than the previous match.

y

Explain why the announcer is incorrect.

$$140\% \text{ of } y = 6000$$

$$1\% \text{ of } y = 42.857..$$

$$y = 4285.714...$$

that would mean 4285.714.. people attended - not possible

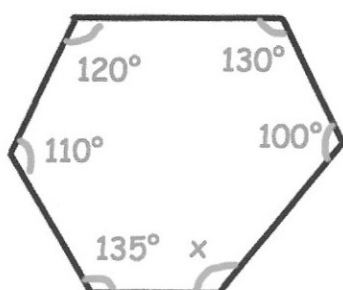


Ian truncates a number, y , to one decimal place.

The result is 8.1

Write down the error interval for y

$$8.1 \leq y < 8.2$$



$$720$$

Find x

$$120 + 130 + 100 + 135 + 110 = 595^\circ$$

$$720 - 595 = 125^\circ$$

Solve the inequality $9x + 4 < 5x - 22$

$$4x < -26$$

$$x < -6.5$$

A rectangle has one side 4cm longer than the other. Write an expression for the area.

$$\begin{array}{c} x+4 \\ x \end{array}$$

$$x(x+4) = x^2 + 4x$$

Write down the equation of the line that is parallel to $y = 5x + 2$ and passes through $(0, 7)$

$$y = 5x + 7$$



Use approximations to estimate the value of

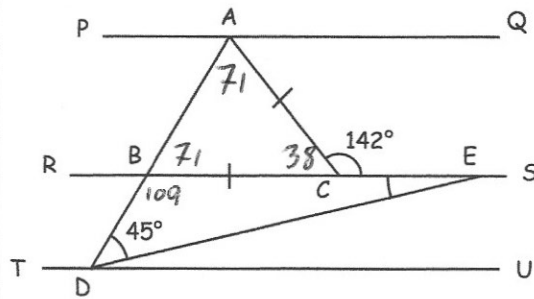
$$\frac{4.12 \times 1.89}{0.21} \approx$$

$$\frac{4 \times 2}{0.2} = \frac{8}{0.2} = 40$$

Lines PQ, RS & TU are parallel.

Find angle BED

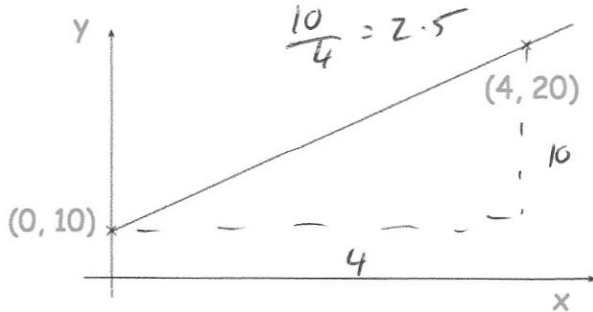
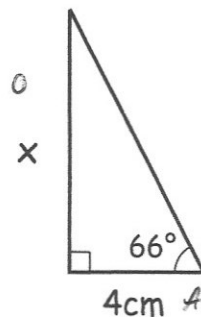
$$180 - 45 - 109 = 26^\circ$$



Find x

$$\tan(66) \times 4$$

$$8.984 \text{ cm}$$



Find the equation of this line

$$y = 2.5x + 10$$

There are only red, green and blue pens in a box.

There are twice as many green pens as red pens. $2x$

There are five times as many blue pens as red pens. $5x$

Work out the probability of a green pen being picked at random from the box.

$$\begin{array}{ccc} R & G & B \\ 1 & 2 & 5 \end{array}$$

$$\frac{2}{8} = \frac{1}{4}$$



A fair coin is flipped twice.

Write down the probability of getting two tails.

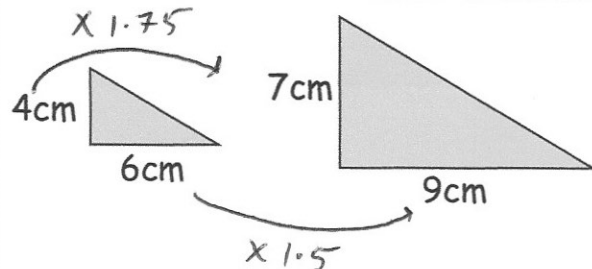
HH HT
TH TT

$$\frac{1}{4}$$

Norman says "the two triangles are similar because 3cm has been added to both the height and base of the smaller triangle."

Explain why Norman is incorrect.

The scale factor needs to be consistent



Here are the equations of four lines.

Line 1 $y = 4x + 1$

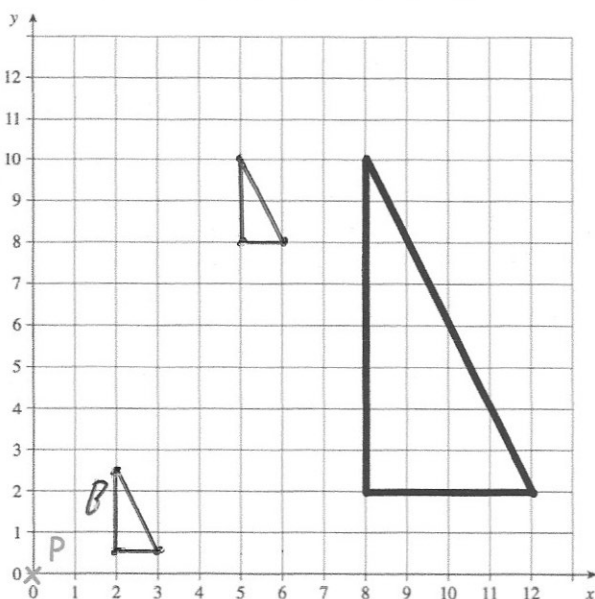
Line 2 $4x - y - 9 = 0$ $y = 4x - 9$

Line 3 $2y = 10 - 8x$ $y = 5 - 4x$

Line 4 $\frac{1}{2}y = 2x + 7$ $y = 4x + 14$

Which line is not parallel to the other three?

3



Enlarge the triangle by scale factor $\frac{1}{4}$ using P as the centre of enlargement. Label this triangle B.

Translate triangle B by $\begin{pmatrix} 3 \\ 7.5 \end{pmatrix}$ right up



Solve the simultaneous equations

$$4x + 2y = 14$$

$$x + 2y = 8 \quad \text{sub}$$

$$3x = 6 \quad x = 2$$

$$\begin{aligned} 8 + 2y &= 14 \\ 2y &= 6 \\ y &= 3 \end{aligned}$$

$$x = 2, y = 3$$

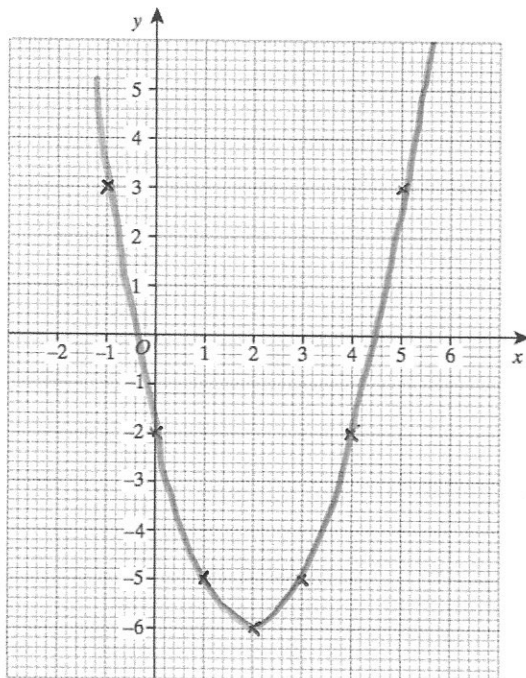
There are 90 cards in a pack.
Each card is red or yellow.
The ratio of the number of red cards to yellow cards is 1:2 $1+2=3$
10 more yellow cards are added to the pack.

$$90 \div 3 = 30$$

30 red 60 yellow $\rightarrow$ 70 yellow

Find the ratio of red cards to yellow cards that are now in the pack.
Give your answer in its simplest form.

$$3:7$$



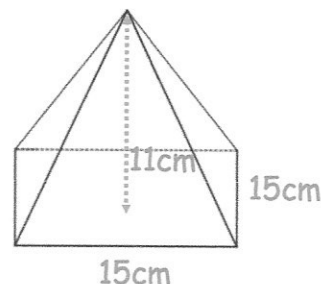
On the grid, draw the graph of $y = x^2 - 4x - 2$

x	-1	0	1	2	3	4	5
y	3	-2	-5	-6	-5	-2	3

Calculate the volume of the square based pyramid.

$$\frac{1}{3} \times 15^2 \times 11$$

$$825 \text{ cm}^3$$





Martin says 'There is a 30% chance of rain today.'

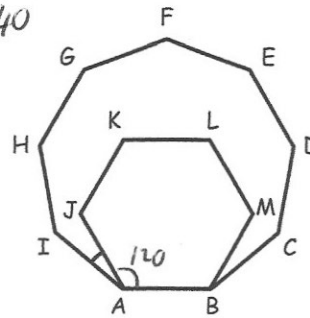
Tim says 'That means there is a 70% chance of it being sunny today.'
Explain why Tim is not correct.

It may not rain but it
may not be sunny

ABCDEFGHJI is a regular nonagon $1260 \div 9 = 140$
ABMLKJ is a regular hexagon. $720 \div 6 = 120$

Find angle IAJ

$$140 - 120 = 20^\circ$$



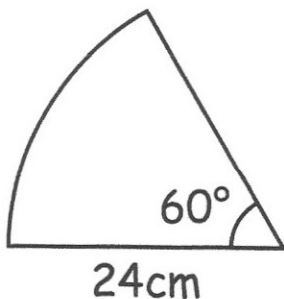
Work out

$$\frac{1}{6} \div 1\frac{5}{8}$$

$$\frac{1}{6} \div \frac{13}{8}$$

$$\frac{1}{6} \times \frac{8}{13} = \frac{8}{78}$$

$$\frac{4}{39}$$



Calculate the area of this sector.

$$\frac{60}{360} \times \pi \times 24^2$$

$$301.593 \text{ cm}^2$$

Nancy returns from holiday and changes her remaining euros into pounds at the Post Office.

The exchange rate is £1 = €1.09

The Post Office deduct commission of 3% and give Nancy £388

How many euros did Nancy return from holiday with?

$$97\% \text{ of } m = 388$$

$$1\% \text{ of } m = 4$$

$$m = £400$$

$$400 \times 1.09 = €436$$

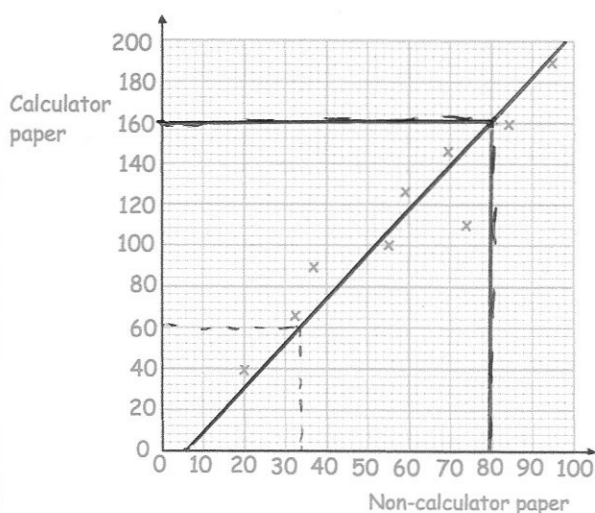


Solve $x^2 - 8x - 33 = 0$

$$(x - 11)(x + 3) = 0$$

$$x = 11 \text{ or } x = -3$$

The students in a class sit a non-calculator and a calculator maths paper.



Lucy was absent for the calculator paper, but she scored 80 in the non-calculator paper.

Use a line of best fit to predict her calculator paper score.

160

may vary
due to line
of best fit

Zofia was absent for the non-calculator paper, but she scored 60 in the calculator paper.

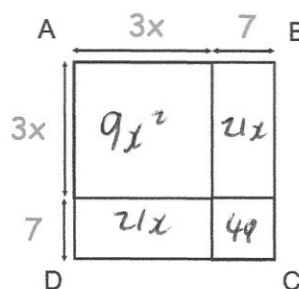
Use a line of best fit to predict her non-calculator paper score.

34

may vary
due to line
of best fit

Find an expression for the area of square ABCD.

$$9x^2 + 42x + 49$$



Solve the simultaneous equations

$$3x + 8y = 31 \quad \times 3 \quad 9x + 24y = 93$$

$$5x + 3y = 31 \quad \times 8 \quad 40x + 24y = 248$$

$$31x = 155$$

$$x = 5$$

$$25 + 3y = 31$$

$$3y = 6$$

$$y = 2$$



Expand and simplify

$$(3y - 2)(2y + 3)$$

$$6y^2 + 9y - 4y - 6$$

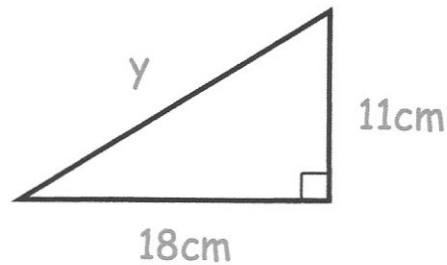
$$6y^2 + 5y - 6$$

Find y

$$y^2 = 11^2 + 18^2$$

$$y^2 = 445$$

$$y = 21.095 \text{ cm}$$



Jenson drove 45 miles from Ipswich to Norwich.

1 hour 20 mins

He left at 17:35 and arrived at 18:55

$1\frac{1}{3}$ hours

Work out his average speed

$$45 \div 1\frac{1}{3} = 33.75 \text{ mph}$$

Simplify

$$\frac{\pi}{12} \div \frac{\pi}{3}$$

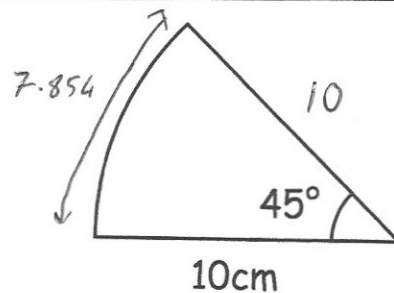
$$\frac{\pi}{12} \times \frac{3}{\pi}$$

$$\frac{1}{4}$$

Find the perimeter of the sector.

$$\frac{45}{360} \times \pi \times 20 = 7.85398$$

$$27.85 \text{ cm}$$



Factorise $x^2 + 9x + 20$

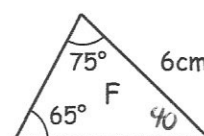
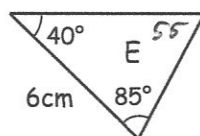
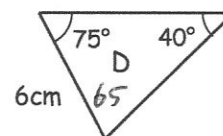
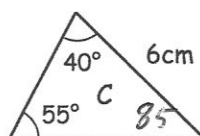
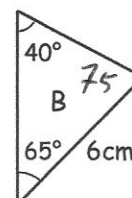
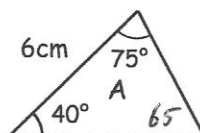
$$(x+5)(x+4)$$

Write down the three pairs of congruent triangles.

A & F ✓

B & D ✓

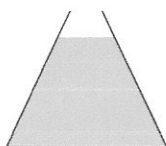
C & E ✓

Work out $6.912 \div 0.12 = 57.6$

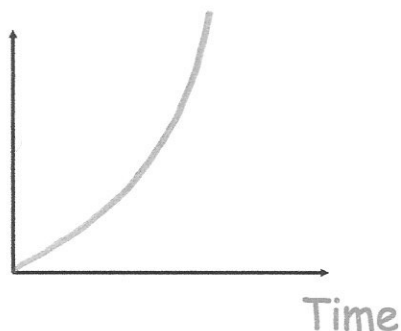
$$691.2 \div 12$$

$$\begin{array}{r} 0.57.6 \\ 12 \overline{) 691.2} \end{array}$$

Water pours steadily into the container below. The container is empty before the water is poured in. Sketch the graph to show the depth of water over time.



Depth



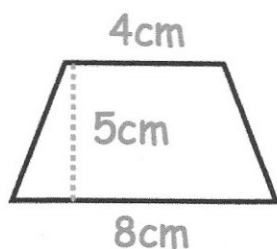
Which is smaller?

$$(x+3)^2 \text{ or } x^2 + 6x + 7$$

$$(x+3)(x+3)$$

$$x^2 + 6x + 9$$

$$\underline{x^2 + 6x + 7}$$



$$\frac{1}{2}(4+8) \times 5$$

$$6 \times 5 = 30$$

Calculate the area of the trapezium

$$30 \text{ cm}^2$$

Expand and simplify

$$(5y - 2)(2y + 3)$$

$$10y^2 + 15y - 4y - 6$$

$$10y^2 + 11y - 6$$

$$x = 10y + 14$$

Rearrange the formula to make y the subject

$$x - 14 = 10y$$

$$y = \frac{x - 14}{10}$$

A coin is flipped and a dice is rolled.

What is the probability of a tail and a 3

$T1$ $T2$ $(T3)$ $T4$ $T5$ $T6$
 $H1$ $H2$ $H3$ $H4$ $H5$ $H6$

$$\frac{1}{12}$$

$$a = \begin{pmatrix} 5 \\ -4 \end{pmatrix} \quad b = \begin{pmatrix} -1 \\ -2 \end{pmatrix}$$

$$4a = \begin{pmatrix} 20 \\ -16 \end{pmatrix} \quad 2b = \begin{pmatrix} -2 \\ -4 \end{pmatrix}$$

Work out $4a + 2b$

$$\begin{pmatrix} 18 \\ -20 \end{pmatrix}$$



There was 50 club members in June and 72 club members in October.

What was the percentage increase?

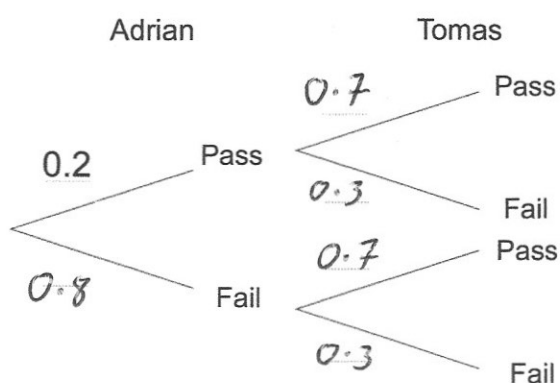
$$\frac{22}{50} \times 100 = 44\%$$

Adrian and Tomas sit their music exams.

The probability that Adrian passes is 0.2

The probability that Tomas fails is 0.3

Complete the tree diagram.



Find the probability that both boys pass.

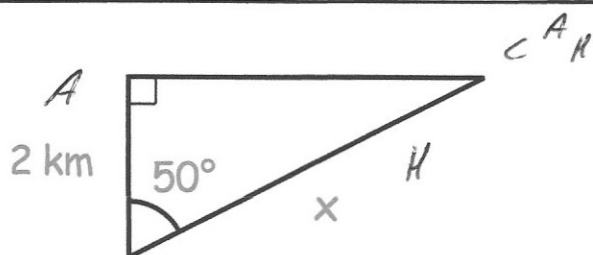
$$0.2 \times 0.7 = 0.14$$

The n th term of a sequence is $(n+1)(n+2)$ 6, 12, 20, 30, 42,
56, 72, 90

The n th term of another sequence is $2n^2 + 4$ 6, 12, 22, 36, 54,
76,

Find any number, less than 100, that is in both sequences

6 & 12



Find x

$$\frac{2}{\cos 50}$$

3.11 km



Write 4cm^3 in mm^3

~~4000~~

$$4 \times 10 \times 10 \times 10$$

$$4000 \text{ mm}^3$$

The population of Wigan in 2001 was 301,500.

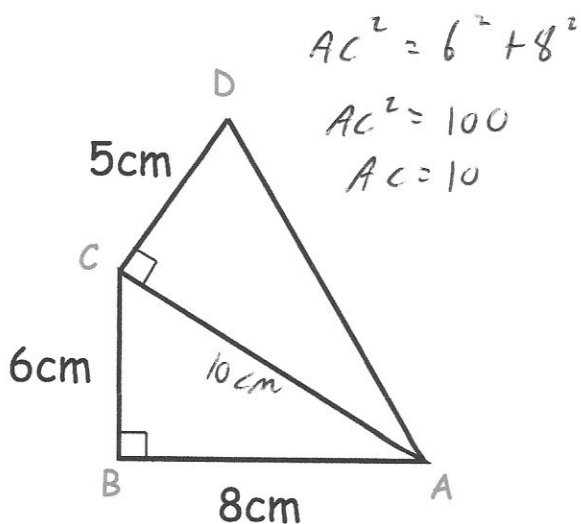
In 2018, the population was 326,100.
Calculate the percentage increase.

Give your answer correct to one decimal place.

$$326100 - 301500 = 24600$$

$$\frac{24600}{301500} \times 100$$

$$8.2\% \text{ to 1dp}$$



Find the length of AD

$$AD^2 = 5^2 + 10^2$$

$$AD^2 = 125$$

$$AD = 11.18 \text{ cm}$$

Work out the area of quadrilateral ABCD.

$$\frac{1}{2} (8 \times 6) + \frac{1}{2} (10 \times 5)$$

$$49 \text{ cm}^2$$

Box A and Box B have an equal ratio of red and yellow counters.

In Box A, there are 16 red and 36 yellow counters.

$$R:Y = 4:9$$

In Box B, there are 455 counters altogether

How many red counters are there altogether in Box A and Box B?

$$4 + 9 = 13$$

$$455 \div 13 = 35$$

$$4 \times 35 = 140 \text{ red in B}$$

$$140 + 16 = 156 \text{ red}$$



Work out

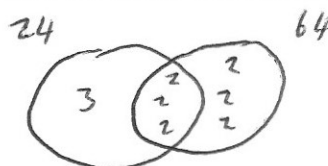
$$\frac{7}{9} \div 3$$

$$\frac{7}{9} \times \frac{1}{3} = \frac{7}{27}$$

Work out the Lowest Common Multiple of 24 and 64.

$$24 = 2 \times 2 \times 2 \times 3$$

$$64 = 2 \times 2 \times 2 \times 2 \times 2 \times 2$$



$$\begin{aligned} \text{LCM} &= 3 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \\ &= 192 \end{aligned}$$

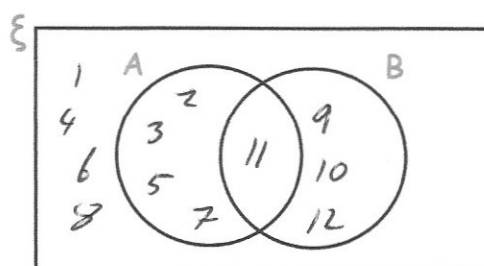
Calculate the pressure if the area is 10cm^2 and the force is 420N

$$p = \frac{F}{A} \quad p = \frac{420}{10}$$

$$42 \text{ N/cm}^2$$

 $\xi = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12\}$ $A = \{\text{prime numbers}\} \quad 2 \quad 3 \quad 5 \quad 7 \quad 11$ $B = \{\text{numbers greater than 8}\} \quad 9 \quad 10 \quad 11 \quad 12$

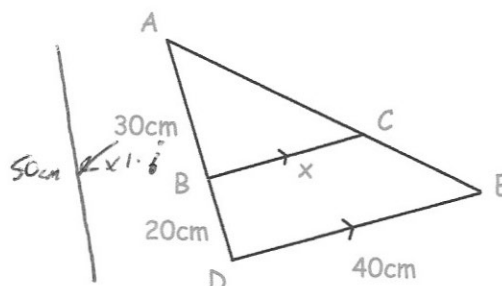
Draw a Venn diagram for this information.

Triangles ABC and ADE are similar.
Lines BC and DE are parallel.

Find x

$$40 \div 1.6$$

$$24 \text{ cm}$$





Estimate

$$\frac{(49.98)^2}{0.401} \approx \frac{50^2}{0.4}$$

$$\frac{2500}{0.4}$$

~~1999.6~~
6250

Solve

$$3(x - 4) - 2(x - 1) = 3x - 20$$

$$3x - 12 - 2x + 2 = 3x - 20$$

$$x - 10 = 3x - 20$$

$$10 = 2x$$

$$x = 5$$

Write 50 as a product of primes.
Give your answer in index form.

$$50 = 2 \times 5 \times 5$$

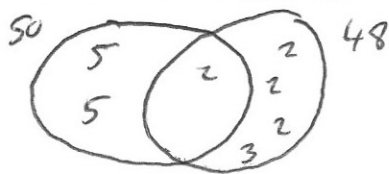
$$50 = 2 \times 5^2$$

Write 48 as a product of primes.
Give your answer in index form.

$$48 = 2 \times 2 \times 2 \times 2 \times 3$$

$$48 = 2^4 \times 3$$

Find the HCF of 50 and 48.



$$\text{HCF} = 2$$

Find the LCM of 50 and 48.

$$5 \times 5 \times 2 \times 2 \times 2 \times 2 \times 3$$

$$1200$$

A bag contains good and bad apples.
 n of the apples are good.
The other 5 apples are bad.

Write down an expression, in terms of n ,
for the probability that a bad apple is
picked at random from the bag.

$$\text{total } n+5$$

$$\frac{5}{n+5}$$