165°

O

x

Find x

$165 \div 2 = 82.5°$

7A results

0   10   20   30   40   50

Score

7B results

0   10   20   30   40   50
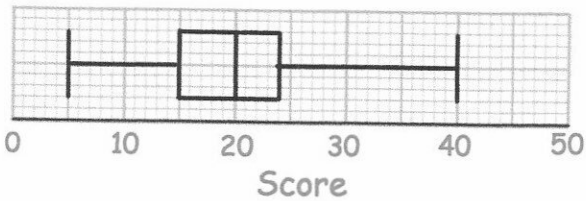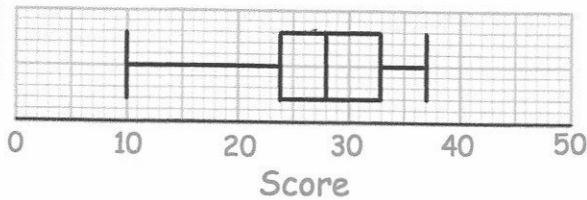
Score

Shown are class 7A's and 7B's test results.

Compare their results

① 7A - Median = 20
     7B - Median = 28
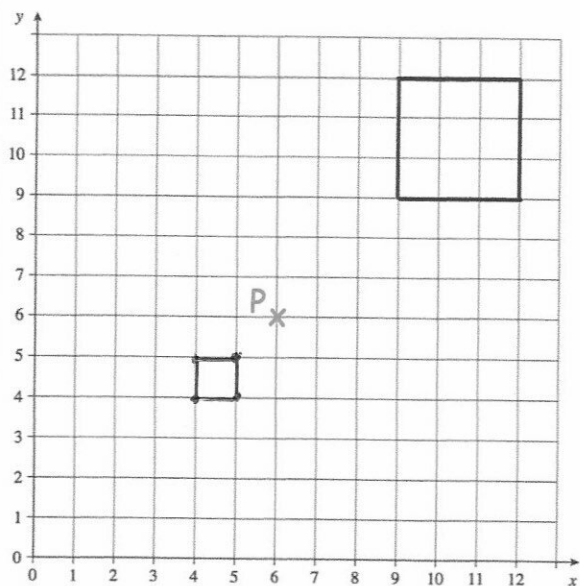   Class 7B performed better.

②
     7A - IQR = 9
     7B - IQR = 9
     Scores in both classes have a similar spread.

Enlarge the square by scale factor $-\dfrac{1}{3}$ using P as the centre of enlargement.
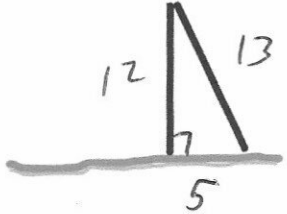

Solve

$2x^2 + 5x - 7 = 0$

$(2x + 7)(x - 1) = 0$

$x = -3.5 \quad \text{or} \quad x = 1$
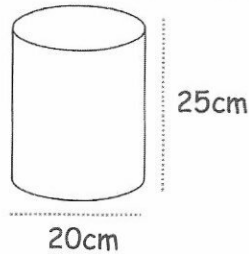
x is $\frac{2}{5}$ of y $x:y = 2:5$

y is $\frac{7}{8}$ of z $y:z = 7:8$

Write down the ratio of x : y : z

$\begin{array}{cc} 2 & 5 \\ & 7 \quad 8 \end{array}$

$\begin{array}{ccc} x & y & z \\ 14 & 35 & 40 \end{array}$

$14:35:40$

Expand and simplify
$$(y^2 + 5y + 4)$$
$(y - 3)(y + 1)(y + 4)$

$(y - 3)(y^2 + 5y + 4)$

$y^3 + 5y^2 + 4y - 3y^2 - 15y - 12$

$y^3 + 2y^2 - 11y - 12$

A wooden flagpole is 25 foot tall.
In a storm, the flagpole is broken and its top touches the ground 5 foot from the base.

Find the lengths of the segments of the flagpole.

$12m$ & $13m$

12 13

5

Simplify $\sqrt{220}$

$\sqrt{4} \times \sqrt{55}$

$2\sqrt{55}$

Simplify

$\frac{2a^4}{3w^3} \times \frac{6w^2}{5a}$

$\frac{12a^4w^2}{15aw^3}$

$\frac{4a^3}{5w}$

3rd November	**Higher 5-a-day**

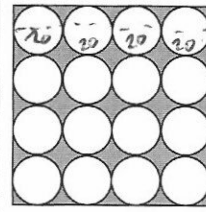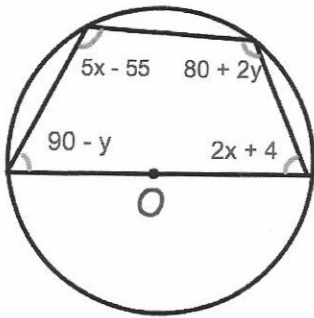|	
Callum is making cylindrical candles. Calculate the volume of the candle. $v = \pi \times 10^2 \times 25$ $= 7853.98 \, cm^3$	25cm 20cm
Callum places 16 of the candles in a box of height 30cm. Cylinder height is 25cm. Here is a plan view of the box. Calculate the percentage of the box that is **not filled** by the candles. $\dfrac{192000 - 40000\pi}{192000} \times 100 =$	Volume of box $= 80 \times 80 \times 30$ $= 192000 \, cm^3$ 16 candles $V = 16 \times 7853.98..$ $= 40000\pi$ $\boxed{34.55\%}$
5x – 55 80 + 2y 90 – y 2x + 4 O	Find x and y $7x - 51 = 180$ $170 + y = 180$ $y = 10°$ & $x = 33°$
Factorise $2x^2 - 7x - 15$ $(2x + 3)(x - 5)$	
Mrs Jenkins is making decorations for a wedding. She needs $18\sqrt{5}$ metres of ribbon in total. Mrs Jenkins has 40 metres of ribbon. Does she have enough ribbon?	$18\sqrt{5} = \sqrt{1620}$ $40 = \sqrt{1600}$ No

Using a ruler and compasses, construct the perpendicular from the line GH to the point I.
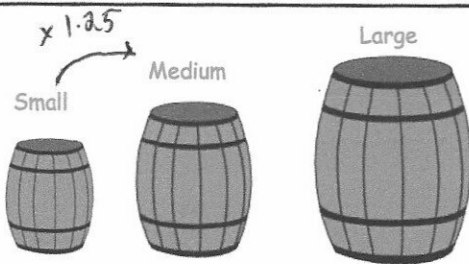
I
×

G ×   × H
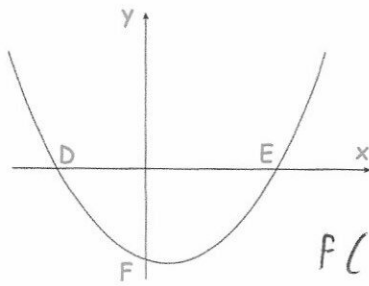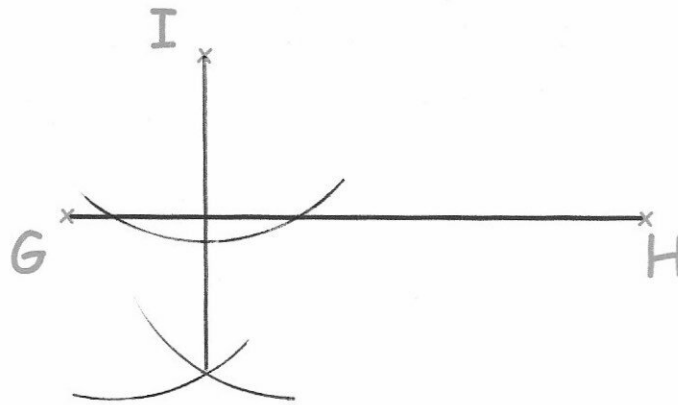
$D\left(-\frac{5}{3}, 0\right)$

$E(5, 0)$

$F(0, -25)$

Shown is the graph $y = 3x^2 - 10x - 25$

Find the coordinates D, E and F

$0 = 3x^2 - 10x - 25$

$0 = (x - 5)(3x + 5)$

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

× 1.25

Small   Medium   Large

$240 \div 100 = 2.4$

$\sqrt[3]{2.4} = 1.338...$

$1.338... \times 24 = 32.1327$

Complete the table. 100×1.25^3

	Height	Capacity
Small	24 inches	100 litres
Medium	30 inches	195.3125 litres
Large	32.1327 inches	240 litres

Simplify

$$\frac{9x^2 - 1}{3x^2 - 13x + 4}$$

$$\frac{(3x - 1)(3x + 1)}{(3x - 1)(x - 4)}$$

$$\frac{3x + 1}{x - 4}$$

$T \quad ^{O} A$

49°   O

X   8cm
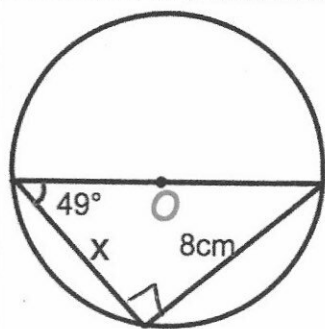
Find x

$\frac{O}{\tan 49} = 6.9543cm$

Solve

$4x^2 + 8x + 3 = 0$

$(2x + 1)(2x + 3) = 0$

$x = -0.5 \quad \text{or} \quad x = -1.5$

The side length of a square table is 105 cm, correct to the nearest centimetre.

$LB = 104.5 cm$

Find the smallest possible perimeter of the table.

104.5×4
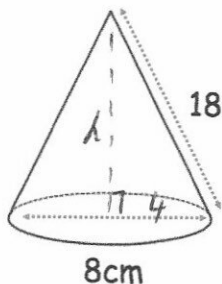
$= 418 cm$

Simplify

$\dfrac{4x - 8}{9 - x^2} \times \dfrac{x^2 + x - 6}{x^2 - 2x}$

$\dfrac{4(x-2)}{x(3-x)}$

$\dfrac{4(x-2)}{(3-x)(3+x)} \times \dfrac{(x+3)(x-2)}{x(x-2)}$

$4^2 + h^2 = 18^2$

18cm $16 + h^2 = 324$

h

$h^2 = 308$

8cm $h = \sqrt{308}$

Calculate the volume of this cone.

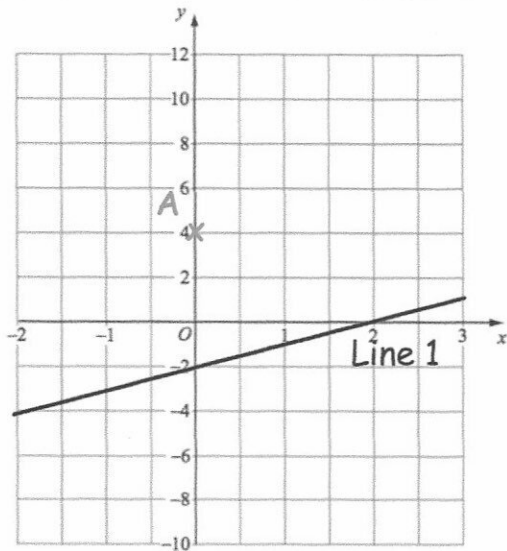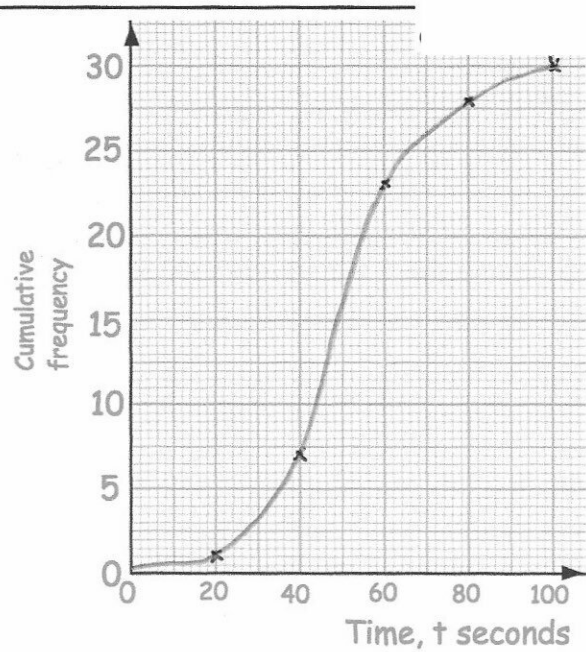$V = \frac{1}{3} \times \pi \times 4^2 \times \sqrt{308}$

$= 294.05 cm^3$

The table below shows the time taken is read an article.

Time (t seconds)	Frequency	cf
0 < t ≤ 20	1	1
20 < t ≤ 40	7	8
40 < t ≤ 60	15	23
60 < t ≤ 80	5	28
80 < t ≤ 100	2	30

Draw a cumulative frequency graph.

Shown is Line 1 and also the point A (0, 4)

Find the equation of Line 1

$$y = x + 2$$

Write down the equation of the line parallel to Line 1 and that passes through the point A

$$y = x + 4$$

Make m the subject of

$$y - mp = np + 2y$$

$$y - np - 2y = mp$$

$$-y - np = mp$$

$$m = \frac{-y - np}{p}$$

The length of a line is 24cm, correct to the nearest centimetre.

Write down the error interval for the length of the line.

$$23.5 \le L < 24.5$$

Given that $x : y = 3 : 5$

and $x + y = 280$

Find the value of $x - y$

$5x = 3y$

$x = \frac{3}{5}y$

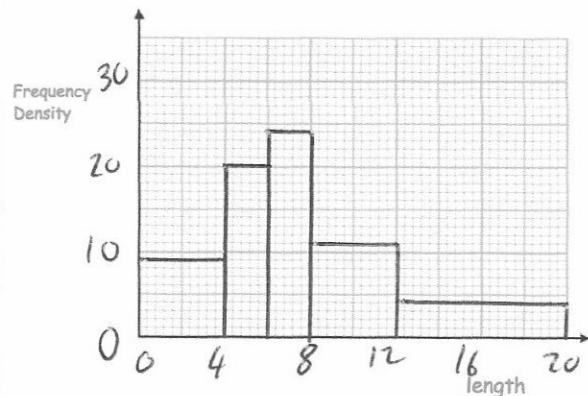$\boxed{-70}$

$0.6y + y = 280$

$1.6y = 280$

$y = 175$

$x = 105$

$x - y = 105 - 175 = -70$

$175 - 105 = 70$

Length, l	Frequency	fd
$0 < l \le 4$	36	9
$4 < l \le 6$	40	20
$6 < l \le 8$	48	24
$8 < l \le 12$	44	11
$12 < l \le 20$	32	4

Draw a histogram for this data.

There are 9 sweets in a bag
6 are green and 3 are red.

Two sweets are taken out of the bag, at random, without replacement.

Find the probability that the two sweets are the same flavour.

$P(GG) = \frac{6}{9} \times \frac{5}{8} = \frac{30}{72}$

$P(RR) = \frac{3}{9} \times \frac{2}{8} = \frac{6}{72}$

$\left.\right\} \frac{36}{72}$

$\frac{1}{2}$

Shape A is translated by vector $\begin{pmatrix} 3 \\ -1 \end{pmatrix}$ to make Shape B.

Shape B is translated by vector $\begin{pmatrix} -5 \\ -2 \end{pmatrix}$ to make Shape C.

Describe the single transformation that maps Shape C to Shape A

$\overrightarrow{AG} = \begin{pmatrix} -2 \\ -3 \end{pmatrix}$ $\overrightarrow{CA} = \begin{pmatrix} 2 \\ 3 \end{pmatrix}$
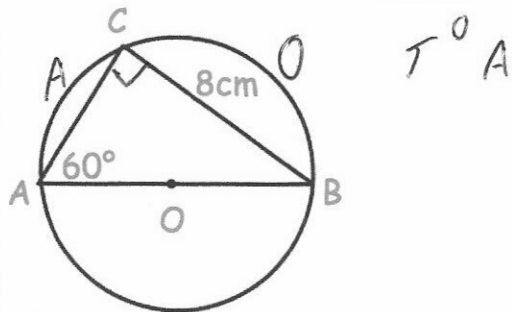
translation by $\begin{pmatrix} 2 \\ 3 \end{pmatrix}$

Work out the value of

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

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

$5^2 = 25$

$T\,^O\,A$

Find AC.

$\dfrac{8}{\tan 60} = 4.6188\ cm$

18cm   124°
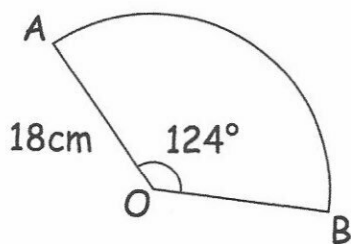
Find the area of the sector.

$\dfrac{124}{360} \times \pi \times 18^2$

$350.6\ cm^2$

Write down the equation of a line perpendicular to $y = 5x + 3$

$y = -\frac{1}{5}x + 8$
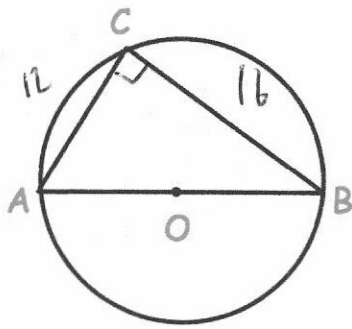
$AB^2 = 12^2 + 16^2$

$AB^2 = 400$

$AB = 20$

BC is 16cm.
AC is 12cm.

Find the area of the circle.
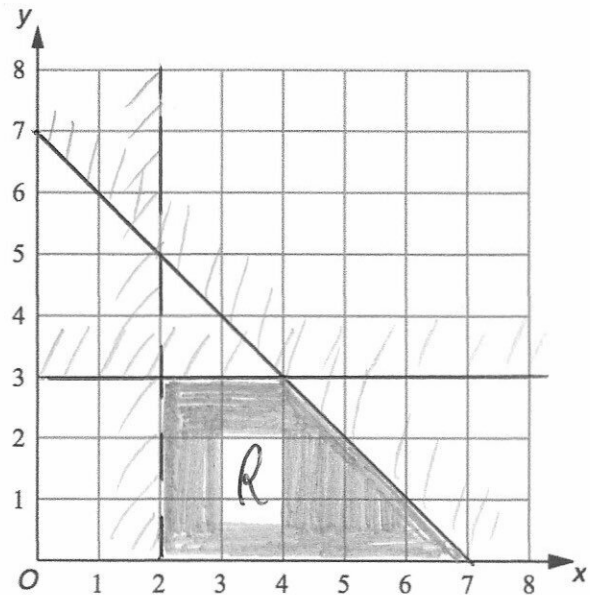
$\pi \times 10^2$

$314 \cdot 16_{cm^2}$

A region R satisfies the inequalities

$x + y \leq 7$

$x > 2$

$y \leq 3$

Show this region on the grid.

Harper rolls an ordinary 6 sided dice three times.

What is the probability she gets exactly one 6?

N N 6
N 6 N
6 N N
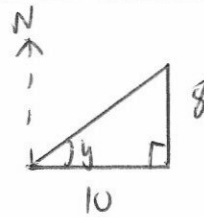
$\frac{5}{6} \times \frac{5}{6} \times \frac{1}{6} = \frac{25}{216}$

$\frac{25}{216} \times 3 = \boxed{\frac{25}{72}}$

A helicopter leaves Bristol and flies due east for 10 miles. Then the helicopter flies 8 miles north before landing.

Calculate the bearing of the helicopter from Bristol.

$\tan y = \frac{8}{10}$

$y = 38 \cdot 66°$

$90 - 38 \cdot 66° = 51 \cdot 34°$

$051 \cdot 3°$

Solve the simultaneous equations

$7x - 15y = 2.5$ × 2

$3x - 2y = 5.5$ × 15

$45x - 30y = 82.5$

$14x - 30y = 5$

$31x = 77.5$

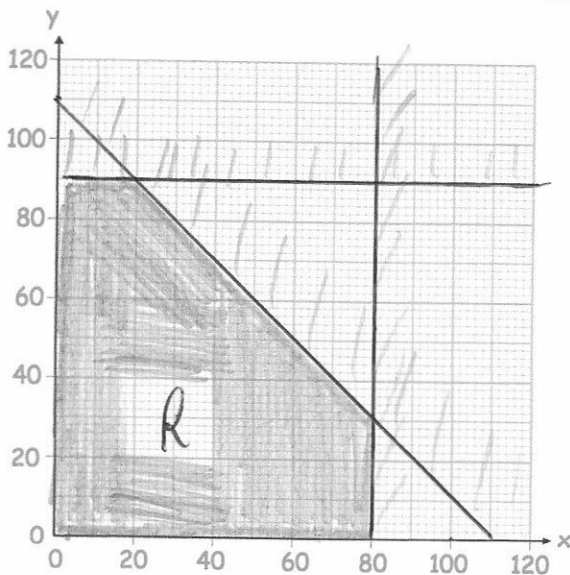$\boxed{x = 2.5}$

$7.5 - 2y = 5.5$

$\boxed{y = 1}$

Simplify fully

$$\frac{x^2 + 8x}{x^2 + 10x + 16}$$

$$\frac{x(x+8)}{(x+8)(x+2)}$$

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

A greengrocer sells bananas and apples.
In one day he sells
up to 80 bananas
up to 90 apples
no more than a total of 110 pieces of fruit
Let x be the number of bananas sold
Let y be the number of apples sold.

Show the region below that satisfies these inequalities

Given that

$a : b = 5 : 2$ and $b : c = 9 : 11$

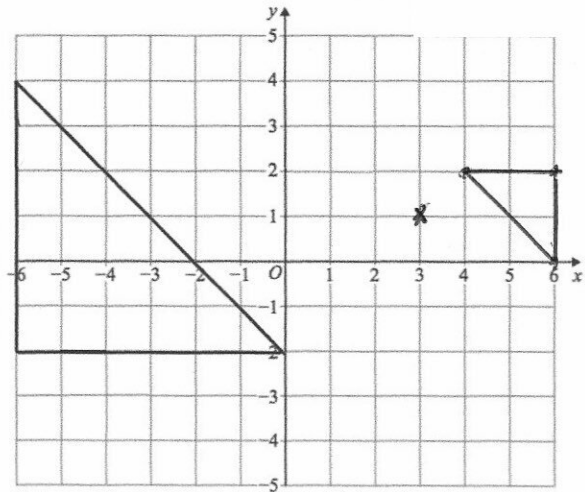Find the ratio $a : c$

Give your answer in its simplest form.

$a : b : c$

$5 : 2$

$\left(\times 9 \quad 9 : 11 \right) \times 2$

$45 : 18 : 22$

$45 : 22$

Enlarge the triangle with scale factor $-\dfrac{1}{3}$ using centre of enlargement (3, 1)

$f(x) = \dfrac{6x - 3}{4}$

Find $f(-5)$

$\dfrac{6\times(-5)-3}{4}$

$\dfrac{-33}{4}$ $\boxed{-8.25}$

Simplify

$\dfrac{x^4}{3yz} \div \dfrac{2x^3}{6z}$

$\dfrac{x^4}{3yz} \times \dfrac{6z}{2x^3}$

$\dfrac{x}{y}$

Mia is creating an 6 digit password.

The first two digits are a multiple of 35.
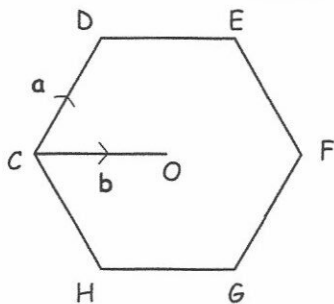The second two digits are an odd number between 10 and 90.
The second last digit is one more than the last digit.

How many possible different possible codes could Mia create?

1st 2nd ; 3rd 4th ; 5th 6th
35, 70 ;   10 54 87
    21 32 65 98
    43 76

$2 \times 40 \times 9$

$= 720$

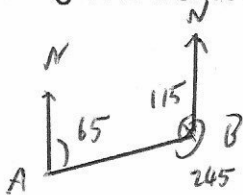Shown is a regular hexagon.

Write down the vector $\overrightarrow{CE}$

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

The bearing of A from B is 245°

Find the bearing of B from A.

$065°$

The sum of the interior angles in a polygon is 14220°

Calculate the number of sides the polygon has.

$(n-2) \times 180 = 14220$

$n-2 = 79$

$n = 81$

Solve the simultaneous equations

$4x - y = 17$

$y = x - 2$

$4x - (x-2) = 17$

$3x + 2 = 17$

$3x = 15$

$x = 5 \qquad y = 3$
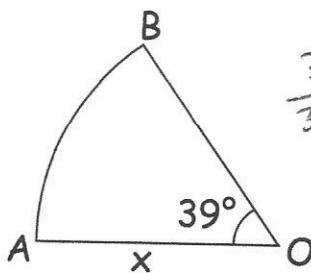
$\dfrac{39}{360} \times \pi \times x^2 = 50$

The area of the sector is 50cm²
Find x.

$x^2 = 146.912...$

$x = 12.12 \, cm$

Show $(2n+9)^2 - (2n+5)^2$ is always a multiple of 4 for all positive integer values of n.

$(2n+9)(2n+9) =$

$4n^2 + 36n + 81$

$(2n+5)(2n+5) =$

$4n^2 + 20n + 25$

$16n + 56$
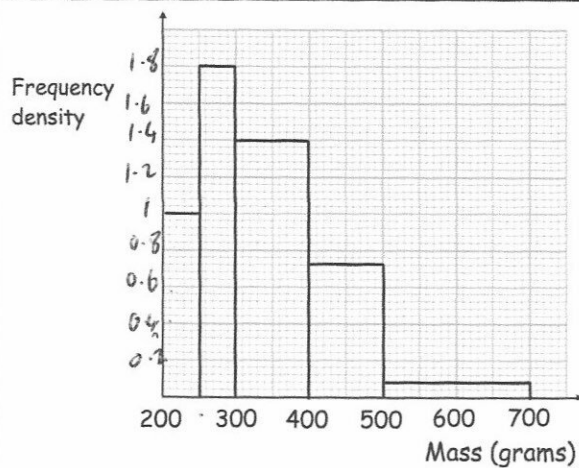
$4(4n + 14)$

$\therefore$ multiple of 4

Work out $9^{0.5}$ $\sqrt{9} = 3$

3

Which of these points is not 10 units from the point (0, 1)?

(10, 1)   (6, 9)   (1, 11)

(0, −9)   (−8, 7)   (−10, 1)

Use the information in the histogram to complete the frequency table.

Mass (grams)	Frequency
200 < m ≤ 250	50
250 < m ≤ 300	90
300 < m ≤ 400	140
400 < m ≤ 500	72
500 < m ≤ 700	16

A restaurant menu has 6 starters, 9 mains and 7 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?

$6 \times 9 = 54$
$9 \times 7 = 63$
$6 \times 9 \times 7 = 378$

495

A recipe for a drink says

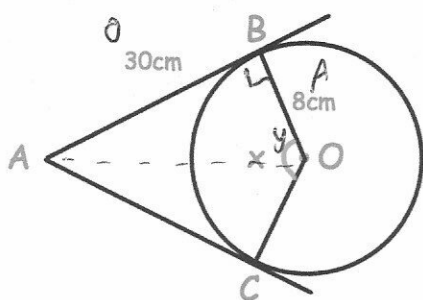"mix 2 parts orange juice with 7 parts lemonade."

$$2:7$$

Victoria has 100ml of orange juice and 300ml of lemonade.

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

300ml lemonade

85.7ml Orange juice

385.714 ml

0
30cm
B
A
8cm
A
x y O
C

Find x $\tan y = \dfrac{30}{8}$

$y = 75.068...$

$x = 150.14°$

Find the coordinates where the line $y = 8x - 15$ and the curve $y = x^2$ meet.

$$x^2 = 8x - 15$$

$$x^2 - 8x + 15 = 0$$

$$(x - 5)(x - 3) = 0$$

$x = 3$ or $x = 5$

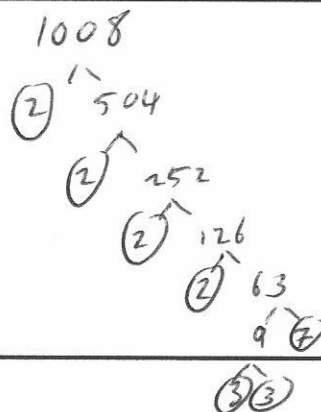$y = 9$ $y = 25$

$(3, 9)$ $(5, 25)$

Write 1008 as a product of prime factors.

Express your answer in index form.

$$2^4 \times 3^2 \times 7$$

1008

② 504

② 252

② 126

② 63

9 ⑦

③③

Hence find the **lowest** whole positive number by which 1008 would need to be multiplied by to give a square number.

$$7$$

$$2^4 \times 3^2 \times 7^2$$
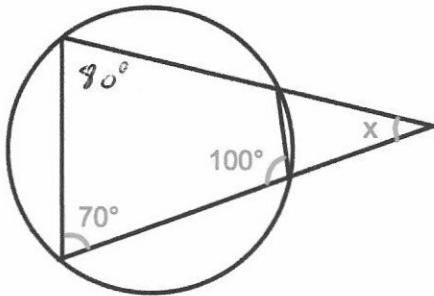
On a plane, the ratio of passengers travelling economy to business to 7:5. The ratio of passengers travelling business to first class is 4:3.

$E : B : 1^{st}$
$7 : 5$
$\quad 4 : 3$
$28 : 20 : 15$

Jack says more than half the passengers are travelling ecomony. Is he correct?

$\dfrac{28}{63} = 44.4...\%$

$\boxed{No}$

Find x

$180 - 80 - 70 = 30^{\circ}$

Simplify fully

$$\dfrac{x^2 - 4x - 12}{x^2 - x - 30}$$

$\dfrac{(x-6)(x+2)}{(x+5)(x-6)}$

$\dfrac{x+2}{x+5}$

Simplify

$$\sqrt{6} \times \sqrt{27} \times \sqrt{2}$$

$\sqrt{324} = 18$

A shop sells two different sizes of rugby ball.

A small rugby ball has a length of 8cm and surface area of 90 cm²
A large rugby ball has a length of 16cm. Calculate the surface area of a large rugby ball.
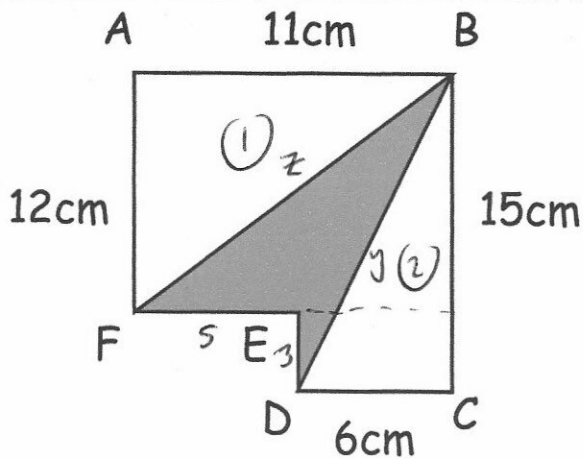
$\downarrow \times 2$

$90 \times 2^2 = 360 cm^2$

Simplify $\sqrt{60}$

$\sqrt{4} \times \sqrt{15}$

$2\sqrt{15}$

A   11cm   B

12cm   15cm

F   5   E₃

D   6cm   C

$z^2 = 11^2 + 12^2$ $y^2 = 6^2 + 15^2$

$z^2 = 265$ $y^2 = 261$

$z = \sqrt{265}$ $y = \sqrt{261}$

Find the area of shape BDEF

total area $= 6 \times 3 + 12 \times 11 = 150\,cm^2$

① $= \frac{1}{2} \times 11 \times 12 = 66cm^2$

② $= \frac{1}{2} \times 6 \times 15 = 45\,cm^2$

$150 - 66 - 45 = 39cm^2$

Find the perimeter of shape BDEF

$40 \cdot 43\,cm$

$5 + 3 + \sqrt{265} + \sqrt{261}$

Jobi plays 3 games of chess.

The probability that he wins game 1 is $\frac{3}{4}$

The probability that he loses game 2 is $\frac{2}{5}$

The probability that he wins game 3 is $\frac{7}{8}$

What is the probability that Jobi wins all 3 games?

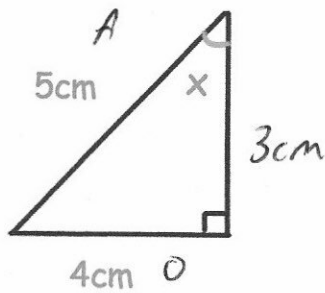$\frac{3}{4} \times \frac{3}{5} \times \frac{7}{8}$

$= \frac{63}{160}$

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

$(2x - 1)(2x + 3) = 0$

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

A

5cm   x

3cm

4cm   O

Write down the value of cos x
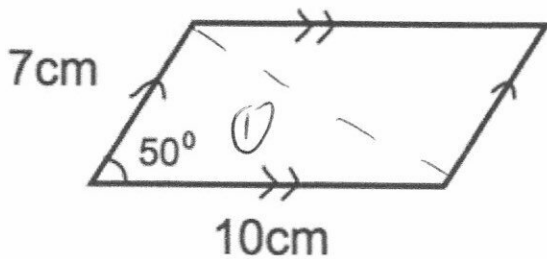Give your answer as fraction.

$Cos\ x = \dfrac{A}{H}$ $\dfrac{3}{5}$

Simplify

$$\dfrac{3}{w} \times \dfrac{x}{4} \times \dfrac{y}{w}$$

$$\dfrac{3xy}{4w^2}$$

Find the area of the parallelogram.

7cm

50°   ①

10cm

Area of ① :

$\dfrac{1}{2} \times 7 \times 10 \times Sin\ 50$

$= 26.811... cm^2$

$53.62\ cm^2$

Complete the table of value for
$$y = \dfrac{4}{x}$$

x	0.5	1	2	4	8	10
y	8	4	2	1	0.5	0.4

On the grid, draw the graph of
$$y = \dfrac{4}{x}$$
for $0.5 \le x \le 10$
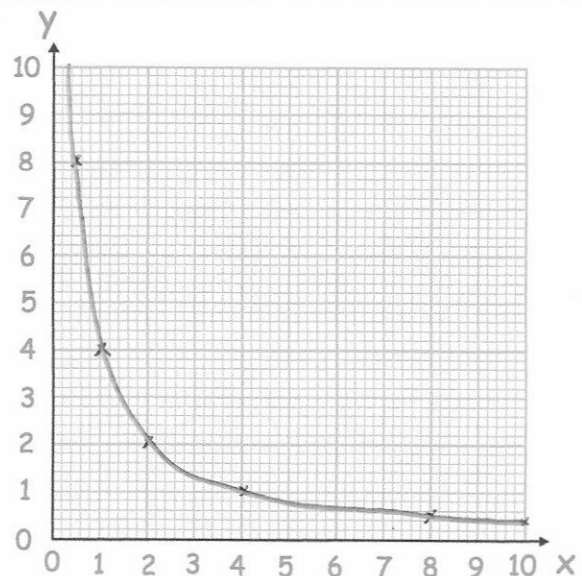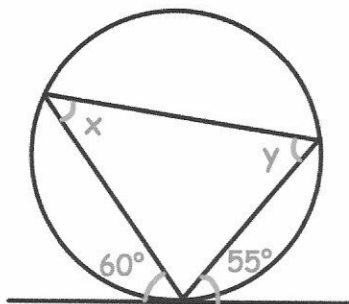
Shape A is translated by vector $\begin{pmatrix} -4 \\ 9 \end{pmatrix}$ to make Shape B.

Shape B is translated by vector $\begin{pmatrix} 8 \\ 0 \end{pmatrix}$ to make Shape C.

Describe the single transformation that maps Shape A to Shape C

$\begin{pmatrix} 4 \\ a \end{pmatrix} \rightarrow$ translation by $\begin{pmatrix} 4 \\ a \end{pmatrix}$

Find x and y

$x = 55°$

$y = 60°$

Simplify fully

$$\frac{25x^2 - 9}{5x^2 - 17x - 12}$$

$\dfrac{(5x-3)(5x+3)}{(5x+3)(x-4)}$

$\dfrac{5x-3}{x-4}$

Write $1.\dot{2}\dot{5}$ as a fraction.

$x = 1.252525\ldots$

$100x = 125.2525\ldots$

$99x = 124$

$x = \dfrac{124}{99}$

Martin invests £500 into a savings account that pays X% compound interest per annum.
After 5 years, he has £750 in the account.

Find X 8.447%

$500 \times y^5 = 750$

$y^5 = 1.5$

$\sqrt[5]{1.5} = 1.08447$

Work out

$$2\frac{1}{2} + 1\frac{3}{4} \div 5\frac{2}{3}$$

$$\frac{5}{2} + \frac{7}{4} \div \frac{17}{3}$$

$$\frac{5}{2} + \frac{7}{4} \times \frac{3}{17}$$

$$\frac{5}{2} + \frac{21}{68}$$

$$\frac{170}{68} + \frac{21}{68} = \frac{191}{68}$$

$$2\frac{55}{68}$$

A coin is flipped three times.

What is the probability of getting three tails?

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

Sahil says 12m/s is faster than 40km/h

Is Sahil right?   ~~No~~ Yes

$$40000 \, m/h$$

$$666\cdot\dot{6} \, m/min$$

$$11\cdot\dot{1} \, m/s$$

On Monday, 75 customers ordered a coffee in a restaurant.

Max surveyed 20 customers at random on Monday and 3 had a coffee.

$$\frac{3}{20} = \frac{75}{N}$$

$$20 \times 75 = 1500$$

$$1500 \div 3 = 500$$

Work out an estimate for the total number of customers that the restaurant had on Monday.
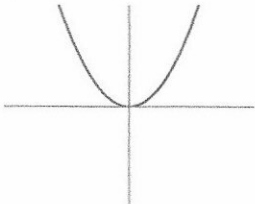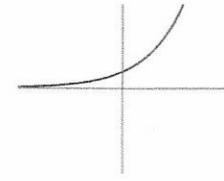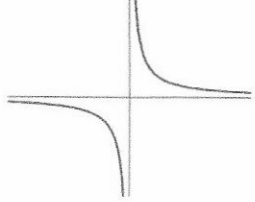
$$500$$

Simplify $\sqrt{80} - \sqrt{45}$
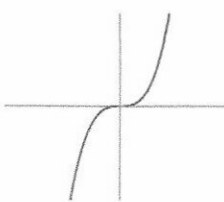
$$\sqrt{16} \times \sqrt{5} - \sqrt{9} \times \sqrt{5}$$

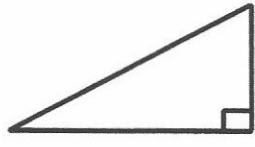$$4\sqrt{5} - 3\sqrt{5}$$

$$= \sqrt{5}$$

Graph A

Graph B

Match each graph to the correct equation

$y = x^2$ is graph **A**

$y = x^3$ is graph .... *D*

$y = 2^x$ is graph .... *B*

$y = \frac{1}{x}$ is graph .... *C*

Graph C

Graph D

(x - 3) cm

(x + 5) cm

The area of the triangle is 32.5cm²

Find x

$\frac{1}{2}(x-3)(x+5) = 32.5$

$(x-3)(x+5) = 65$

$x^2 + 2x - 15 = 65$

$x^2 + 2x - 80 = 0$

$(x+10)(x-8) = 0$ $x = 8$

Simplify fully

$\frac{12x + 16}{3x^2 + 10x + 8}$

$\frac{4(3x+4)}{(3x+4)(x+2)}$

$\frac{4}{x+2}$

Solve, giving your answers to one decimal place.

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

$a = 1$
$b = 2$
$c = -4$

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

$x = \frac{-2 \pm \sqrt{20}}{2}$

$x = 1.2$ or $x = -3.2$

The population of a country is
4.8×10^6

The population of a city is 8×10^5

$$\frac{8 \times 10^5}{4.8 \times 10^6} \times 100 = 16.\dot{6}$$

What percentage of the population of the country live in that city?

$16.\dot{6} \%$

$f(x) = 3x^2 + 7$

Given $f(a) = 55$ find the possible values of a.

$$3a^2 + 7 = 55$$
$$3a^2 = 48$$

$a^2 = 16$

$a = 4$ or $a = -4$

The cumulative frequency graph shows the heights of 400 trees.
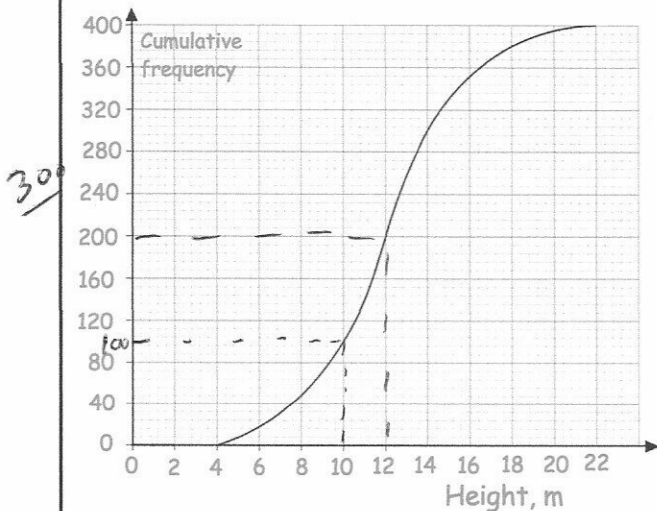
Height, m

Find an estimate of the median height.

$12m$

Find an estimate for what percentage of the trees had a height greater than 10m.

75%

Write down the Sine Rule

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

Write down the Cosine Rule

$$a^2 = b^2 + c^2 - 2bc \cos A$$

30°

y is directly proportional to the square of x.
When y = 32, x = 4.

$y \propto x^2$

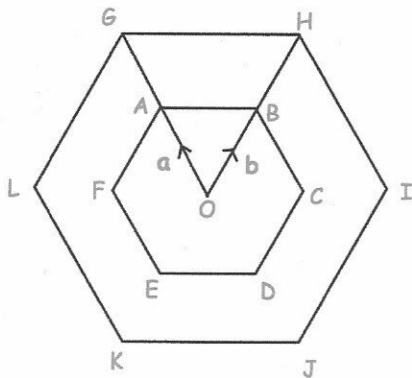Find the value of y when x = 8.

$y = k x^2$

$32 = k \times 4^2 \qquad k = 2$

$y = 2x^2$

$y = 2 \times 8^2 = 128$

ABCDEF and GHIJKL are regular hexagons with centre O.
GHIJKL is an enlargement of ABCDEF, with scale factor 2.

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

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

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

$-2\underline{a} + 2\underline{b}$

Factorise fully $9y^2 - 144$

$(3y - 12)(3y + 12)$

$9(y - 4)(y + 4)$

or

$9(y^2 - 16)$

$9(y - 4)(y + 4)$

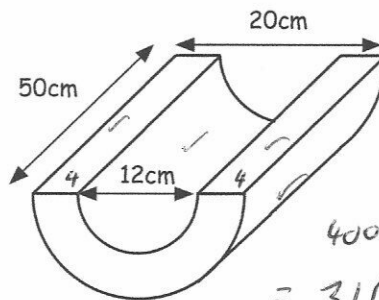Work out the surface area

$\frac{1}{2}(\pi \times 12) \times 50 = 300\pi$

$\frac{1}{2}(\pi \times 20) \times 50 = 500\pi$

$4 \times 50 = 200$

$4 \times 50 = 200$

$\frac{1}{2}(\pi \times 10^2 - \pi \times 6^2) = 32\pi$

$\frac{1}{2}(\pi \times 10^2 - \pi \times 6^2) = 32\pi$

50cm   20cm   12cm   4   4

$400 + 864\pi$

$= 3114.34 \, cm^2$

ξ = 80 students
C = students that have visited Canada
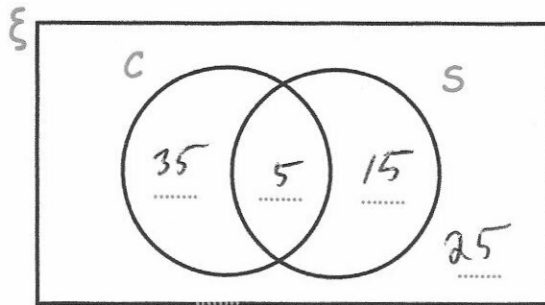S = students that have visited Sweden

50 students have visited only Canada or only Sweden

$\dfrac{3}{10}$ of these 50 students have only visited Sweden

15

The number of students who have visited Canada is double the number of students that have visited Sweden

Complete the Venn Diagram

The nth term of sequence A is
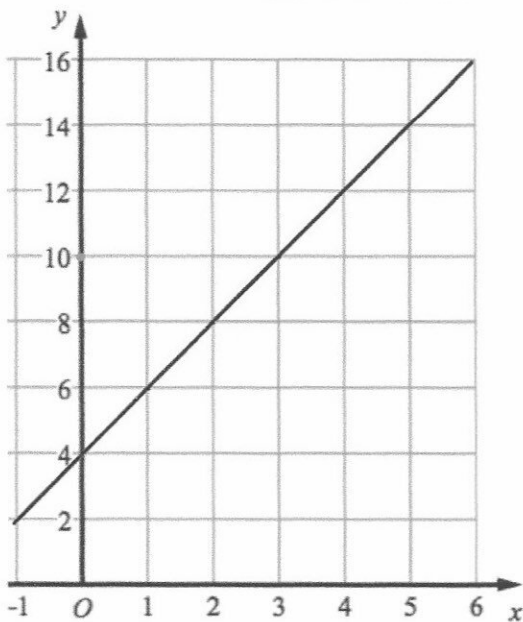$90 - 5n$

95 80 75 70 ~~

The nth term of sequence B is
$n^2 + 5n + 1$

7   15   25 37 51 67 85 106 ~~

How many numbers are in both sequence A and sequence B?

③

Write down the equation of the line shown.

$y = 2x + 4$

A line is perpendicular to the line shown and passes through (0, 10).

Find its equation.

$y = -\frac{1}{2}x + 10$

A group of workers are painting the $10 \times 12 = 120$ classrooms in a school. 10 workers could paint all the classrooms in 12 days.
For the first five days, only two workers paint the classrooms. $5 \times 2 = 10$
For the next six days, only five workers paint the classrooms. $6 \times 5 = 30$
For the rest of the days, all 10 workers paint the classrooms.

worker days
Work out the total number of days taken to paint the classrooms.

$120 - 40 = 80$

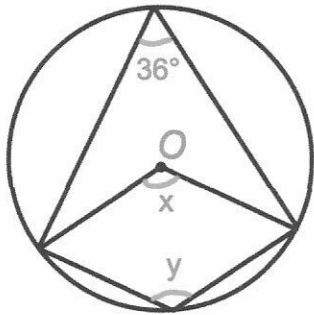$80 \div 10 = 8$

$5 + 6 + 8 = 19 \text{ days}$

Work out

$25^{\frac{1}{2}} + 64^{\frac{2}{3}}$

$\sqrt{25} = 5$

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

$4^2 = 16$

$5 + 16 = 21$

$=$

Find x and y

$x = 72°$

$180 - 36 = 144$

$y = 144°$

Orla put £400 in a savings account for 5 years.

She was paid 2% compound interest per annum for the first 4 years.
She was paid x% compound interest for the final year. $\boxed{9.7\%}$
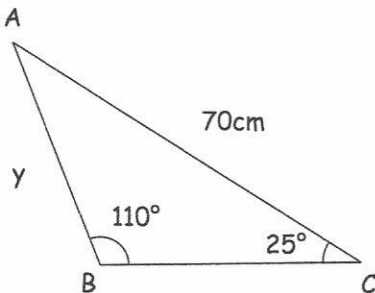
Altogether Orla earned £75 in interest. Find x to 1 decimal place.

$400 \times 1.02^4 = £432.97...$

$432.97... \times y = 475$

$y = 1.097...$

Find y.

$\frac{y}{\sin 25} = \frac{70}{\sin 110}$

$y = 31.48 \text{ cm}$

Work out

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

$\sqrt{9} = 3$

$3^3 = 27$

$=$

Simplify

$\dfrac{x^2 + 11x}{x^2 - 121}$

$\dfrac{x(x+11)}{(x-11)(x+11)}$

$\dfrac{x}{x-11}$

D

T^o_A

15cm

y   E

A   50°

A   B   9.2cm   C

o
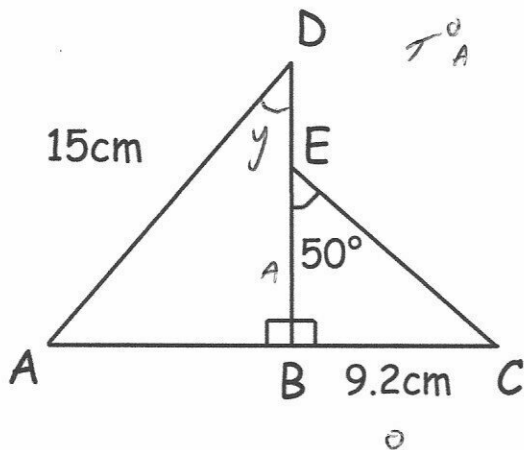
BC = 9.2cm   AD = 15cm
Angle BEC = 50°

E is a point on BD such that BE:ED = 3:2

Find the size of angle ADB

$BE = \dfrac{9.2}{\tan 50} = 7.7197...$

$BD = 12.866...$ cm

$\cos y = \dfrac{12.866...}{15}$

$y = 30.936°$

---

y is inversely proportional to x.

Sketch this graph.

Work out

$$\left(\frac{25}{49}\right)^{\frac{1}{2}} \qquad \frac{5}{7}$$
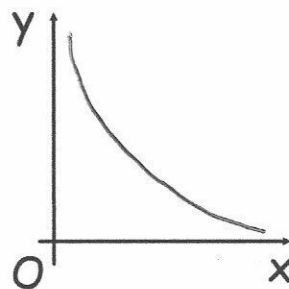

Write down the formula to work out frequency density

$$\text{frequency density} = \frac{\text{frequency}}{\text{class width}}$$

Write down the equation of the line that is perpendicular to x + 2y = 4 and passes through the point (0, 5)

$$2y = -x + 4$$
$$y = -\tfrac{1}{2}x + 2$$

$$y = 2x + 5$$

Factorise

$$3y^2 + 16y + 16$$

$$(3y + 4)(y + 4)$$

Duncan bought a toy that grows when placed in water.
Before placing the toy in water it was 4cm tall.   ⟶   × 2·5
After placing the toy in water it grew to a similarly shaped toy that was 10cm tall.
Is the claim reasonable?
     underestimate

Grows 10 times larger

$$2.5^3 = 15.625$$

Volume is 15.625 larger

58.9×10^3 *fifty thousand* 50000

58900

6000 5.98×10^4

59800

Which of these has the greatest value?

5.98×10^4

A full swimming pool is 12m in width and 25m in length.

The width is to the nearest metre.
The length is to the nearest metre.

Find the minimum surface area of the water.

$11.5 \times 24.5 = 281.75 \, m^2$

Shape A is translated by vector $\begin{pmatrix} -3 \\ 1 \end{pmatrix}$ to make Shape B.

Shape B is translated by vector $\begin{pmatrix} -5 \\ -2 \end{pmatrix}$ to make Shape C.

Describe the single transformation that maps Shape C to Shape A

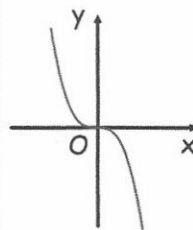$\vec{AC} = \begin{pmatrix} -8 \\ -1 \end{pmatrix}$ $\vec{CA} = \begin{pmatrix} 8 \\ 1 \end{pmatrix}$

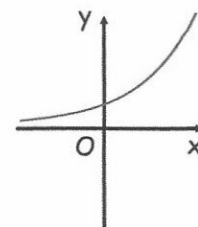translation by $\begin{pmatrix} 8 \\ 1 \end{pmatrix}$

$y = 2^x$ is graph $\underline{2}$

$y = x^3$ is graph $\underline{3}$
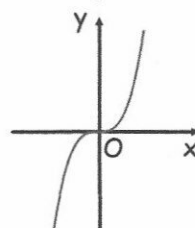
$y = -x^3$ is graph $\underline{1}$

Graph 1   Graph 2

Graph 3

Write down the value of 100^0

1

112°
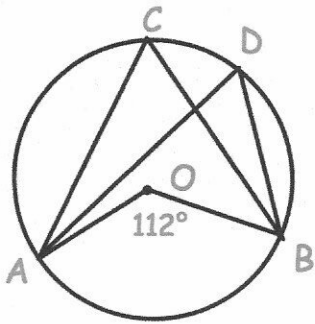
Find the size of angle ADB.

$56°$

A rectangular field has:

125

length 120m, to the nearest 10m.
width 86m, to the nearest metre.

86·5

Calculate the upper bound for the perimeter of the field.

$125 + 125 + 86·5 + 86·5$

$423m$

Darius has a biased 6 sided dice.

The probability of a 6 is 0.8 and the other five numbers have an equal probability.

Darius rolls the dice three times.

What is the probability that Darius rolls three sixes?

$0·8 \times 0·8 \times 0·8$

$= 0·512$

A ball is dropped from h metres.
After each bounce the ball reaches 80% of its previous height.
After its third bounce it reaches a height of 3.072m.

Find h

$h \times 0·8^3 = 3.072$

$3.072 \div 0·8^3 = 6m$

Given that

a : b = 9 : 4   and   b : c = 7 : 3

Find the ratio   a : c

Give your answer in its simplest form.

$$a \quad b \quad c$$
$$9 \quad 4$$
$$\quad 7 \quad 3$$
$$63 \quad 28 \quad 12$$

$63 : 12$

$21 : 4$

Factorise

$(2x - y)^2 - 5(2x - y)$

$(2x - y)\left[(2x - y) - 5\right]$

$(2x - y)(2x - y - 5)$

---

n is an integer. From the expressions

$4n \quad 6n - 1 \quad 2n^2 \quad n^2 + 1$

Which expression(s) will always give an even number?

$4n \quad , \quad 2n^2$

Which expression(s) will always give an odd number?

$6n - 1$

Which expression(s) could give an even or odd number?

$n^2 + 1$

Expand and simplify

$(2x - 5)(x + 1)(x - 3)$

$(2x^2 + 2x - 5x - 5)(x - 3)$

$(2x^2 - 3x - 5)(x - 3)$

$2x^3 - 6x^2 - 3x^2 + 9x - 5x + 15$

$2x^3 - 9x^2 + 4x + 15$

C is directly proportional to w^3

When C = 9000, W = 10.

Find C when W = 5.

$C \propto w^3$

$C = kw^3$

$9000 = k \times 1000$

$k = 9$

$C = 9w^3$

9×5^3

$C = 1125$

Simplify

$\dfrac{2x^2 + 3x - 2}{2x^2 - 15x + 7}$

$\dfrac{(2x - 1)(x + 2)}{(2x - 1)(x - 7)}$

$\dfrac{x + 2}{x - 7}$

A box contains apples and oranges in the ratio 2:5.　$2x$　　$5x$
8 apples and 5 oranges are added to the box and the ratio of apples to oranges is now 4:7

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

$$7(2x+8) = 4(5x+5)$$
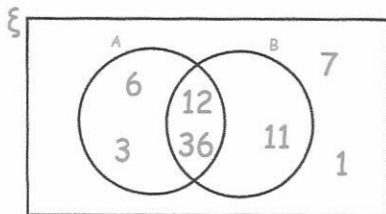$$14x + 56 = 20x + 20$$
$$36 = 6x$$
$$x = 6$$
$$7 \times 6 = 42$$

Solve

$$\frac{10 + 8x}{3x} = -4$$

$$10 + 8x = -12x$$
$$20x = -10$$
$$x = -0.5$$

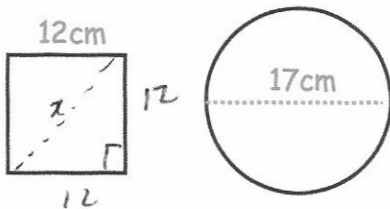Write down the numbers that are in set

$A \cap B'$　　$6 \, \& \, 3$

Michael bought a hat and a coat.
The hat cost £10.
He sold both items for a total of £90.

Michael made
200% profit on the hat
80% profit on the total cost.

$\boxed{50\%}$

Work out his percentage profit on the cost of the coat.

	bought	sold	profit	% profit
coat	40	60	20	50%
hat	10	30	20	200%
total	50	90	40	80%

12cm

17cm

$x^2 = 12^2 + 12^2$
$x^2 = 288$　　$x = 16.97 \text{cm}$

Can the square fit inside the circle without touching the circle?

Yes