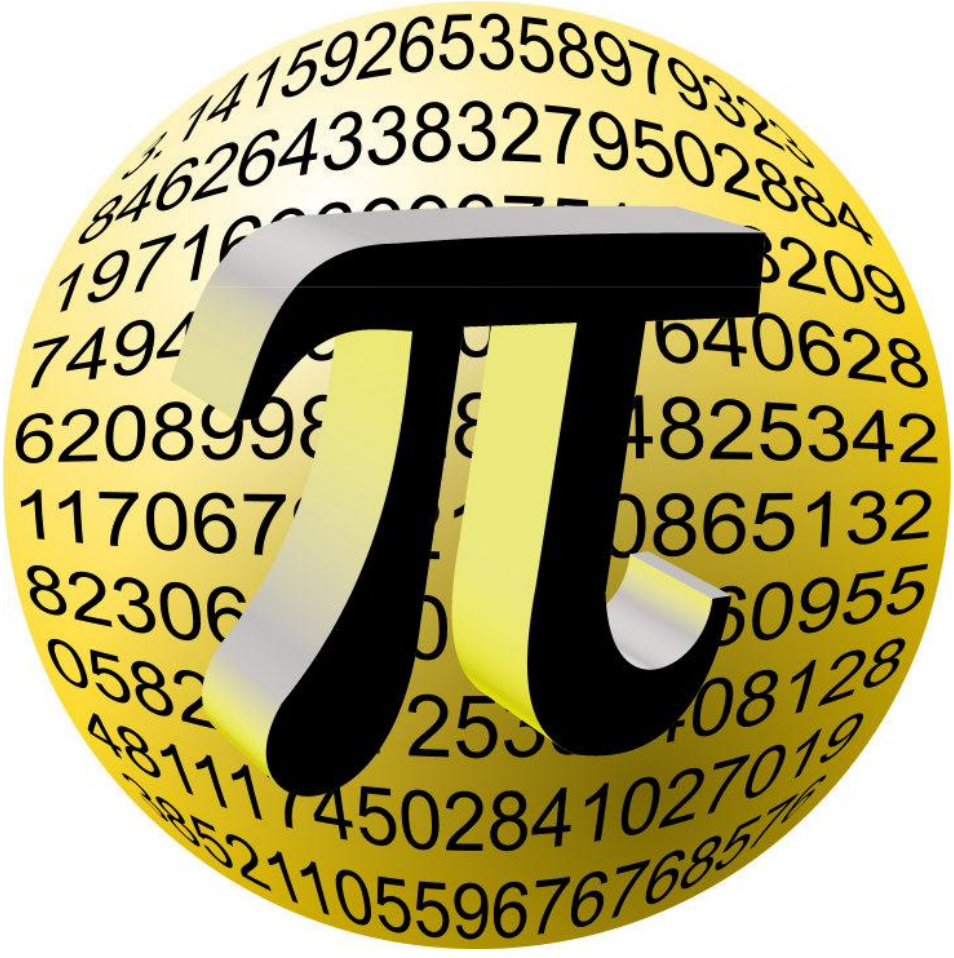


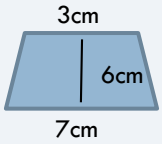
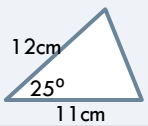
SELF ASSESSMENT SHEETS

Self assessment sheet for common topics

Topic List

Topic	Secure?
Angles	
Area	
Calculations	
Circles	
Expanding, Simplifying and Factorising	
HCF,LCM and Prime factors	
Index Laws	
Inequalities	
Linear Graphs	
Percentages	
Probability	
Pythagoras	
Quadratic Graphs	
Similar Shapes	
Simultaneous Equations	
Standard form	
Transformations	
Tree Diagrams	
Venn Diagrams	
Volume	

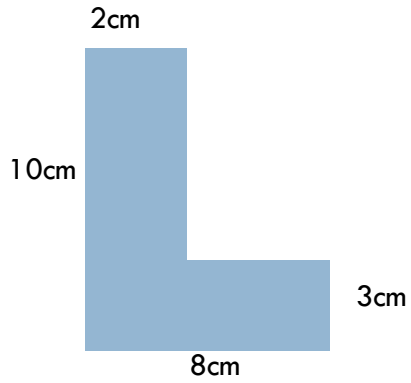
Area*

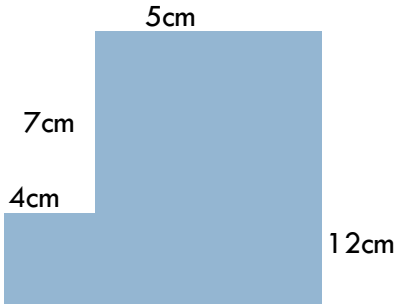
Here's what you need to be able to do:	Example	Secure?
Find the area of triangles and rectangles	What is the area of a triangle with height 4cm and base 6cm? $4x6 \div 2 = 24cm^2$	
Find the area of trapeziums	Find the area of the following shape  3+7=10 $10 \div 2 = 5$ $5x6 = 30cm^2$	
Find the area of compound shapes made from rectangles, triangles and trapeziums	Shapes need to be split up so that you can find individual areas then you add the areas together. You may have to work out some missing lengths	
And as a bonus...		
Find the surface area of a prism	Find the area of a cuboid with measurements of 5cm, 3cm and 4cm, Top and bottom=(5x3)x2=30 Sides= (4x3)x2=24 Front and back= (5x4)x2=40 Total surface area= $30+24+40=94cm^2$	
Find the area of a non right angled triangle	Find the area7 ½ abSinC $0.5 \times 11 \times 12 \times \sin 25 = 27.9cm^2$  	

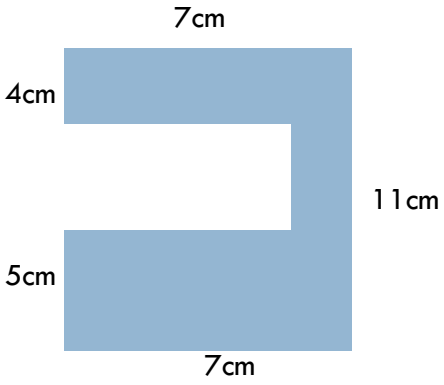
*for area of circles see separate circles sheet

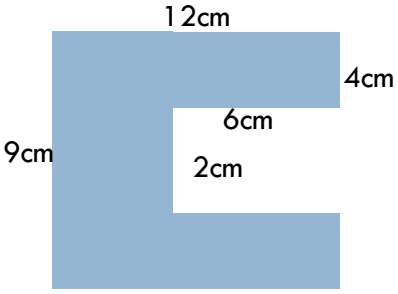
Practise Questions-

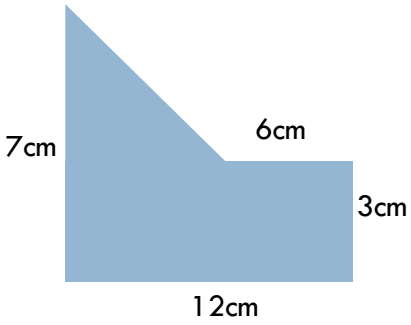
(do not do these questions on the sheet, you may want to do them again at some point!)

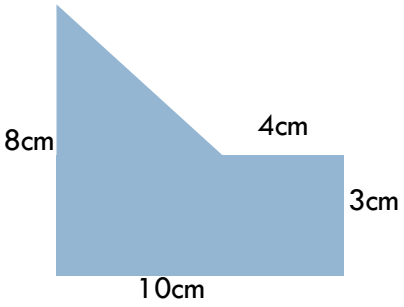


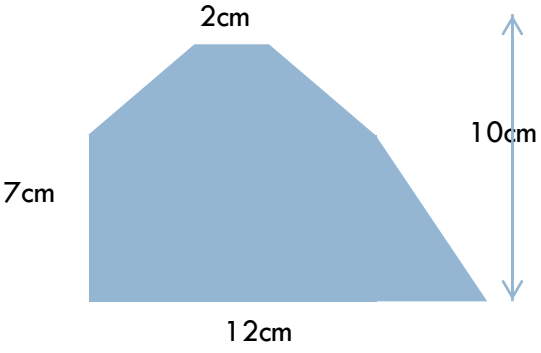


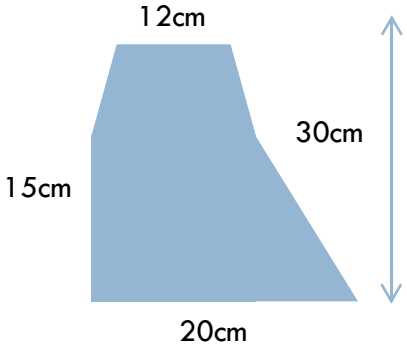


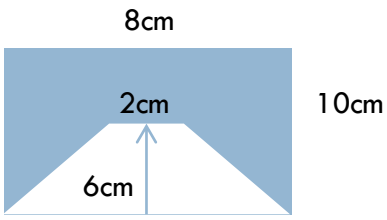


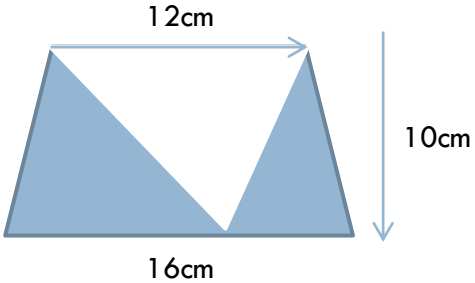






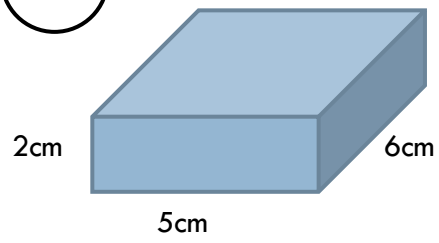




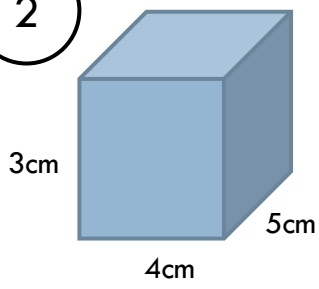


Bonus Questions

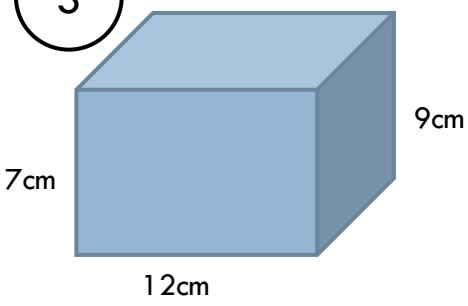
1



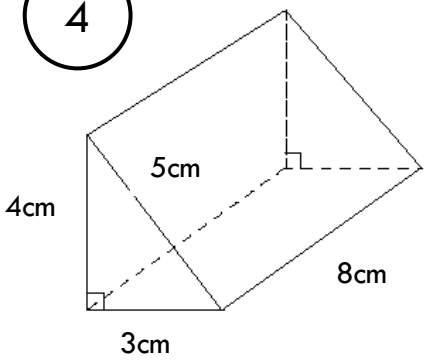
2



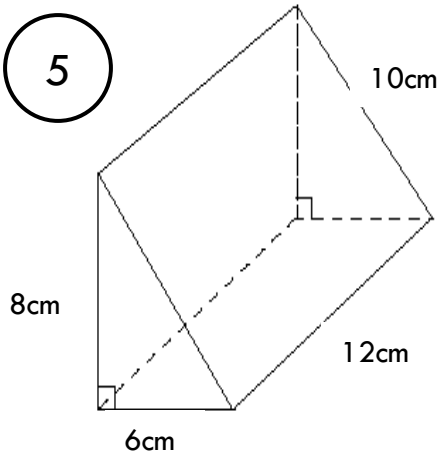
3



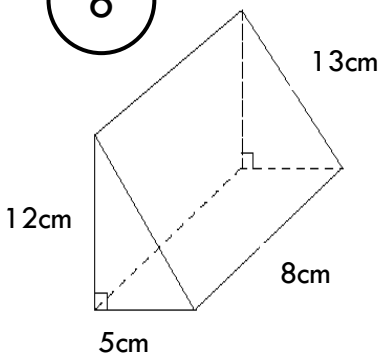
4



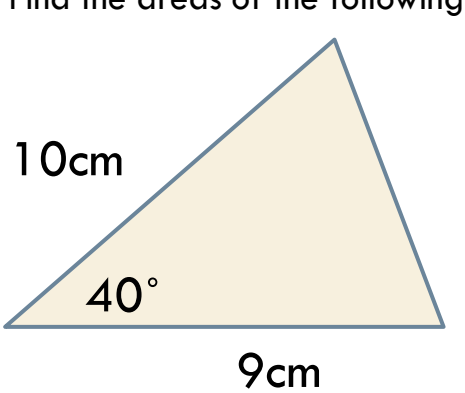
5

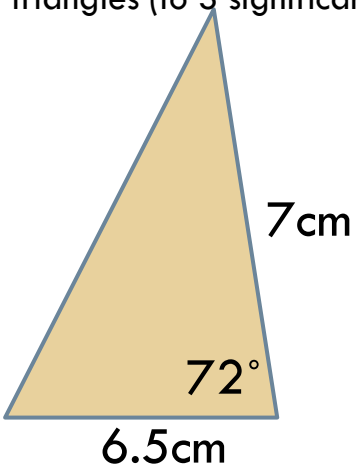


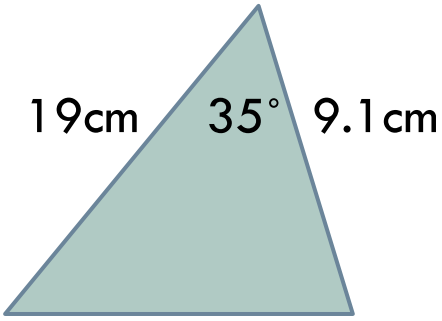
6



Find the areas of the following triangles (to 3 significant figures)







Calculations

Here's what you need to be able to do:	Example	Secure?
Calculate sums with calculations on the top and bottom of a fraction with a calculator	$\frac{4.5 \times 11.63}{19.6-4.33} = 3.427308448$	
Use square root and power buttons on a calculator	Work out the square root of 16.7 to 3 significant figures=	
Substitute negative and decimal values into algebraic expressions	If a=-5 ,b=3.5 and c=-7 Calculate $\frac{cb^2}{a}$ $\frac{(-7) \times 3.5^2}{(-5)} = 17.15$	
Convert fractions to decimals and percentages with a calculator	Convert 11/20 to a decimal 11÷20=0.55	
Use BIDMAS (no calculator)	3+4 x 2 = 11	
Work out long multiplication sums with no calculator	Calculate 96 x 32 96 32 x 192 ⇐ this is 96 x 2 2880 ⇐ this is 96 x 30 3072 ⇐ this is 96 x 32	
Use a known fact to work out other answers	If 96x32=3072 work out 960x0.32 307.2	
And as a bonus...		
Multiply decimals together without a calculator	Calculate 9.6 x 0.32 As above but with 3 decimals in answer = 3.072	

Practise Questions-

(do not do these questions on the sheet, you may want to do them again at some point!)

1)Use a calculator to work out the following:

$\frac{3.11+7.3}{2.3\times0.5}$ $\frac{4.4\times34.2}{12.5\times15.6}$

$\frac{32.9-8.3}{11.3\times0.7}$ $\frac{2.96\times3.4}{23.3+12}$

$\frac{45.4\times34}{12.45-2.88}$ $\frac{34.2+2.3}{2.3\times3.99}$

$\frac{4.3\times9.3}{5.3\times6.5}$ $\frac{5.11\times4.3}{9.3\times2.5}$

2)Use a calculator to work out the following:

$\sqrt{15.6} + 2.1^3$

$\sqrt{3.4 \times 2.52}$

$2.3^4 \times \sqrt{10}$

$1.9^5 \times \sqrt{18.9 \div 3.2}$

$\sqrt{1.9^5 \div 7.2}$

3)If a=-5, b=-7, c=1.5 and d=-1.2, use a calculator to calculate:

$\frac{ab^2}{c}$ $\frac{ab+d}{c}$

$\frac{a-b^2}{d}$ $\frac{3c-4a}{d}$

$\frac{ad^2}{b}$ $\frac{2b-d}{a}$

$\frac{3d-a^2}{c}$ $\frac{3a+2b}{d}$

4)Use a calculator to turn the following fractions into decimals and percentages

a) 35/80
b) 71/160
c) 96/125
d) 21/32
e) 36/125
f) 112/160
g) 87/150

5)Without using a calculator, work out

a) 10-2x4
b) (8-2)x(12-3)
c) 5x4-3x6
d) 30-2x4+2
e) 2x(3+8)-9
f) 35+3x4-2x
g) 11+4-2x6
h) 12+18÷6-2

6)Without using a calculator, work out:

a) 345x93
b) 734x25
c) 273x53
d) 342x71
e) 948x56
f) 234x83
g) 424x47
h) 342x72

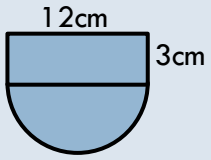
7) If 34 x 52=1768 , work out:

a)340x52
b)340x5.2
c)1768÷520
d) 1768000÷52
e) 17680÷5.2
f) 3400x5.27
g) 1768÷340
h) 176800÷34
i) 17.68÷34
j) 1768÷0.34

*) Bonus questions, without a calculator work out

a) 34.5x9.3
b) 7.34x2.5
c) 2.73x5.3
d) 34.2x7.1
e) 9.48x5.6
f) 2.34x8.3
g) 42.4x4.7
h) 3.42x0.72

Circles

Here's what you need to be able to do:	Example	Secure?
Find the area of a circle	Find the area of a circle with radius 4cm $\pi x\ 4^2 = 50.3\ cm^2$ (1dp)	
Find the circumference of a circle	Find the circumference of a circle with radius 10cm $\pi x\ 20 = 62.8$ cm (3 significant figures)	
Find the area of a semi or quarter circle	Find the area of a semi circle with diameter 8cm $\pi x\ 4^2 \div 2 = 25.1cm^2$ (1dp)	
Find the perimeter of a semi or quarter circle	Find the perimeter of a quarter circle with radius of 8cm Diameter is 16cm $\pi x\ 16 \div 4 + 8 + 8 = 41.1$cm (a decimal place)	
Find the area of shapes made up of circles	Find the area Semi circle$=\pi x\ 6^2 \div 2$ Rectangle$=12x3$ Total area$=92.5cm^2$ (1dp)  	
***ROUND ANSWERS TO DECIMAL PLACES		
***ROUND ANSWERS TO SIGNIFICANT FIGURES		
And as a bonus...		
Find the area of a sector	Find the area of a sector with radius 10cm and an angle of 36° $\pi x\ 10^2 \div 360\ x\ 36 = 31.4\ cm^2$ (1 d.p)	
Find the perimeter of a sector	Find the perimeter of a sector with radius 10cm and an angle of 36° $\pi x\ 20 \div 360\ x\ 36 + 10 + 10 = 26.3$cm (1 d.p)	

Practise Questions-

(do not do these questions on the sheet, you may want to do them again at some point!)

Find the area of the circles described below, (give your answers to 3 significant figures):

1) radius of 5cm
2) radius of 5cm
3) radius of 5cm
4) Diameter of 5cm
5) Diameter of 5cm
6) Diameter of 5cm

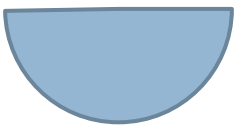
Find the circumference of the circles described below (give your answers to 3 significant figures):

1) radius of 5cm
2) radius of 5cm
3) radius of 5cm
4) Diameter of 5cm
5) Diameter of 5cm
6) Diameter of 5cm

For the following shapes, find the:

a) Area
b) perimeter, (give your answers to 1 decimal place)

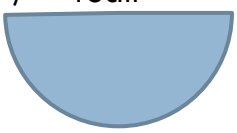
1) 10cm



2) 12cm

3) 20cm

4) 15cm



5) 10cm

6) 12cm

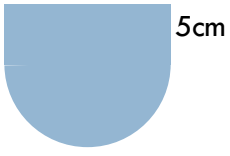
7) 9cm

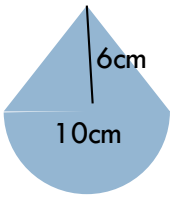
8) 7cm

Find the area of the following shapes, give your answers to 3 significant figures

13cm

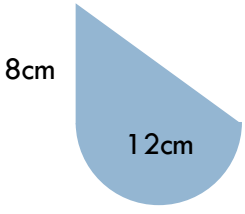
5cm





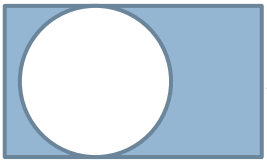
8cm

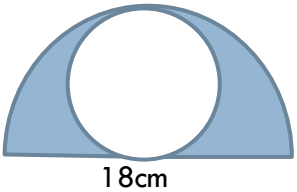
12cm



27cm

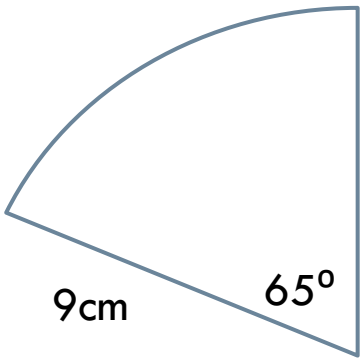
10cm



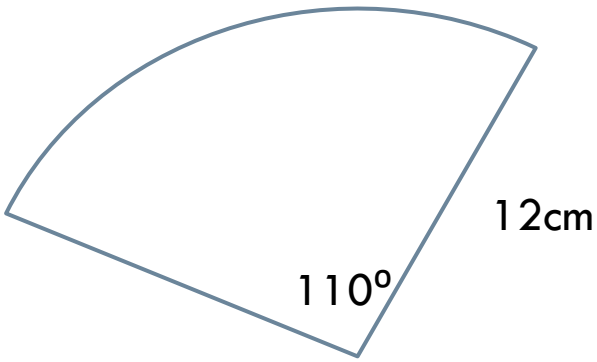


Bonus Questions

Find the area of this sector, give your answer to 2 decimal places



Find the perimeter of this sector, give your answer to 3 significant figures



Find the area and perimeter the following sectors, give your answers to 3 significant figures.

1. Radius 8cm and angle 50°
2. Radius 2cm and angle 60°
3. Radius 6cm and angle 30°
4. Radius 5cm and angle 100°
5. Radius 9cm and angle 120°
6. Radius 3cm and angle 150°
7. Radius 4cm and angle 200°
8. Radius 5cm and angle 190°
9. Radius 7cm and angle 95°
10. Radius 11cm and angle 300°

Expanding, Simplifying and Factorising

Here's what you need to be able to do:	Example	Secure?
Multiply out a single bracket	$3(2x-4)= 6x-12$	
Simplify by collecting like terms	$3a+4b-a+2b=2a+6b$	
Multiple out two lots of single brackets and simplify the result	$2(a+3)+4(a+1)=6a+10$	
Multiply out double brackets	$(x+3)(x+4)=x^2+7x+12$	
Factorise expressions	$5xy+20x=5x(y+4)$	
Factorise quadratics	$X^2+6x+8=(x+2)(x+4)$	
Multiply expressions together	$3xy \times 5x = 15x^2y$	
And as a bonus...		
Solve quadratics by factorising	Solve $X^2+6x+8=0$ $(x+2)(x+4)=0$ $X=-2$ and $x=-4$	
Factorise using the difference of two squares	$X^2-81= (x+9)(x-9)$	
Simplify alegbraic fractions	$\frac{10x+15}{x^2+5x+6} = \frac{5}{x+2}$	

Practise Questions-

(do not do these questions on the sheet, you may want to do them again at some point!)

Expand out the brackets:

1) $3(x-2)$
2) $4(x+3)$
3) $5(x-4)$
4) $6(2x+3)$
5) $3x(x-2)$
6) $4x(x+2)$
7) $3x(3x+2)$
8) $5x(4x+3)$
9) $6x(2x-2)$
10) $10x(3x-8)$

Simplify:

1) $10a + 4b - a + 5b$
2) $8a + 5a + 5b - 3b$
3) $12b - 7a + 3b + a$
4) $2b - 8b - a + 9a$
5) $-13b + 4a - 5b - 4a$
6) $11a + 8b + 2c + 6a + 3b - 2c$
7) $6b + 4b - a + 6c + 5a - 4c$
8) $7c + 4b - 3b + a + 10c - 5a$
9) $10a + 4b + 7a + 10b - 17a - 14b$
10) $5b + 4c + 18c - 22a + z$

Expand and simplify:

1) $3(x-2) + 2(x+3)$
2) $4(x+3) + 3(x+2)$
3) $5(x-4) + 2(x+5)$
4) $6(2x+3) + 3(2x+4)$
5) $3x(x-2) + 2(3x+2)$
6) $4(x+2) - 2(x+3)$
7) $3(3x+2) - 2(2x+3)$
8) $5(4x+3) - 2(3x-3)$
9) $6(2x-2) - 2(4x-5)$
10) $10(3x-8) - 2(3x+3)$

Expand and simplify:

1) $(x+2)(x+5)$
2) $(x+3)(x+2)$
3) $(x+4)(x+3)$
4) $(x+5)(x-2)$
5) $(x+3)(x-4)$
6) $(x-2)(x-3)$
7) $(x-6)(x-4)$
8) $(x-1)(x+7)$
9) $(x+8)(x-9)$
10) $(x-3)(x-8)$

Factorise:

1) $9AB + 6A$
2) $16AB - 4B$
3) $30A^2B + 24AB$
4) $10AB^2 - 15B^2$
5) $12ABC + 20\,AB$
6) $28A^2BC + 14ABC$
7) $4AB - 8A + 16B$
8) $15A - 18B - 21AB$
9) $9B^3 + 18BC + 30AB$
10) $ABC - 10AB + AB$

Factorise:

1) x^2+5x+6
2) $x^2+7x+12$
3) $x^2-8x+15$
4) x^2+4x-5
5) $x^2+7x-30$
6) $X^2-7x+12$
7) X^2-2x+1
8) $x^2+3x-10$
9) $x^2+10x+25$
10) $x^2+9x+18$

Simplify:

1) $2a \times 6a$
2) $4a^2 \times 3ab$
3) $6ab \times 2ab$
4) $2a^2b \times 5b$
5) $7ab \times 5a$
6) $8ac \times 5ab$
7) $10ab^2 \times 4a^2b$
8) $7a \times 5a^3$
9) $4ab^3 \times 3abc$
10) $5ab \times 3ac \times 2bc$

Bonus questions

Solve:

1) $x^2+5x+6=0$
2) $x^2+7x+12=0$
3) $x^2-8x+15=0$
4) $x^2+4x-5=0$
5) $x^2+7x-30=0$
6) $X^2-7x+12=0$
7) $X^2-2x+1=0$
8) $x^2+3x-10=0$
9) $x^2+10x+25=0$
10) $x^2+9x+18=0$

Factorise:

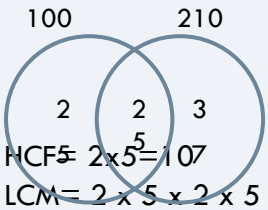
1) X^2-81
2) X^2-25
3) X^2-49
4) X^2-36
5) $4X^2-81$
6) $9X^2-16$
7) $25X^2-36$
8) $49X^2-64$
9) $81X^2-100$
10) $144X^2-121$

Simplify:

$\frac{x^2+4x+3}{x+1}$ $\quad$ $\frac{x^2+7x+15}{x+2}$ $\quad$ $\frac{x^2+9x+18}{x+3}$

$\frac{x^2+9x+20}{2x+8}$ $\quad$ $\frac{32+4x}{x^2+11x+24}$ $\quad$ $\frac{x^2+12x+32}{12+3x}$

HCF, LCM and Prime factors

Here's what you need to be able to do:	Example	Secure?
Find the HCF (highest common factor) of two small numbers using a list	Find the HCF of 20 and 16 20 — 16 1 and 20 — 1 and 16 2 and 10 — 2 and 8 4 and 5 — 4 HCF = 4	
Find the LCM (lowest common multiple) of two small numbers using a list	Find the LCM of 15 and 6 15,**30**,45,60 6,12,18,24,**30** LCM=30	
Express a number as a product of it's prime factors	Write 100 as a product of it's prime factors. $100= 2^2 \times 5^2$	
Use prime factor decomposition to find the HCF and LCM of larger number pairs	If 100= 2 x 2 x 5 x 5 and 210= 2x3x5x7 find the HCF and LCM of 100 and 210  HCF= 2x5=10 LCM= 2 x 5 x 2 x 5 x 3 x 7= 2100	

Practise Questions-

(do not do these questions on the sheet, you may want to do them again at some point!)

Find the HCF of the following numbers

1) 18 and 30
2) 15 and 20
3) 16 and 24
4) 12 and 36
5) 20 and 30
6) 28 and 70
7) 39 and 65
8) 38 and 57

Find the LCM of the following numbers

1) 16 and 24
2) 15 and 18
3) 25 and 15
4) 35 and 14
5) 21 and 28
6) 21 and 5
7) 13 and 4
8) 24 and 18

Express the following numbers as products of their prime factors

1) 200
2) 240
3) 480
4) 500
5) 360
6) 720
7) 1080
8) 1200

Here are some numbers expressed as products of their prime factors;

- 20= 2 x 2 x 5
- 24= 2 x 2 x 2 x 3
- 48 = 2 x 2 x 2 x 2 x 3
- 50= 2 x 5 x 5
- 75= 3 x 5 x 5
- 90= 2 x 3 x 3 x 5
- 120= 2 x 2 x 2 x 3 x 5

Use your answers from earlier to find the HCF and LCM of-

1) 20 and 24
2) 20 and 48
3) 24 and 90
4) 50 and 75
5) 48 and 120

Index Laws

Here's what you need to be able to do:	Example	Secure?
Know the multiplication rule	$a^4 \times a^5 = a^9$	
Know the division rule	$a^{10} \div a^2 = a^8$	
Know the zero power rule	$a^0 = 1$	
Know the brackets rule	$(a^3)^2 = a^6$	
Know the negative power rule	$a^{-2} = \frac{1}{a^2}$	
Know what powers of 1/2 , ¼ and 1/3 mean	$a^{\frac{1}{2}} = \sqrt{a}$	
Write expressions as one number to a power	$2^4 \times 8^2 = 2^x$ $2^4 \times (2^3)^2$ $2^4 \times 2^6 = 2^8$	
Be able to combine rules	$\frac{a^4 \times (a^3)^2}{a^3} = a^7$	
And as a bonus...		
Be able to use the fraction rule where the top number isn't one	$25^{3/2} = 125$	

Practise Questions-

(do not do these questions on the sheet, you may want to do them again at some point!)

Multiply rule:

1) $a^2 \times a^3 =$
2) $a^5 \times a^2 =$
3) $a^6 \times a^4 =$
4) $a^4 \times a^5 =$
5) $a^6 \times a^{-2} =$
6) $a^3 \times a^5 =$

Division rule:

1) $a^{11} \div a^3 =$
2) $a^6 \div a^2 =$
3) $a^8 \div a^3 =$
4) $a^6 \div a^5 =$
5) $a^{12} \div a^4 =$
6) $a^{20} \div a^7 =$

Zero rule:

1) $a^0 =$
2) $b^0 =$
3) $4^0 =$
4) $8^0 =$
5) $2a^0 =$
6) $3a^0 =$

Negative rule:

1) $a^{-1} =$
2) $a^{-2} =$
3) $3^{-1} =$
4) $4^{-2} =$
5) $5^{-2} =$
6) $2^{-3} =$

Brackets rule:

1) $(a^4)^3 =$
2) $(a^5)^6 =$
3) $(a^6)^2 =$
4) $(a^7)^3 =$
5) $(a^2)^4 =$
6) $(a^5)^3 =$

Combine:

1) $a^5 \times a^6 \div a^2$
2) $a^3 \times a^5 \div a^4$
3) $(a^4)^3 \div a^3$
4) $(a^2)^8 \times a^7$
5) $16^{-1/2}$
6) $25^{-1/2}$
7) $36^{-1/2}$

Express as a power of a single number:

1) $2^5 \times 8^2 \div 4^3$
2) $9^2 \times 3^6 \div 27$
3) $10^5 \times 1000^2 \div 100^2$
4) $25^5 \times 125^3 \div 5^4$
5) $4^5 \times 2^6 \div 16^2$

Bonus questions

Solve:

1) $16^{3/2} =$
2) $25^{3/2} =$
3) $8^{2/3} =$
4) $16^{3/4} =$
5) $125^{2/3} =$
6) $100^{3/2} =$
7) $16^{-3/2} =$
8) $27^{-2/3} =$
9) $16^{-3/2} =$
10) $8^{-3/2} =$

Inequalities

Here's what you need to be able to do:	Example	Secure?
Be able to list solutions to an inequality	List all integer solutions for $2<x\leq 6$ 3,4,5,6	
To be able to write down an inequality which is shown on a umber line	Write down an inequality for the following number line  $-1\leq x<8$	
To be able to solve an inequality (like an equation)	Solve $3x+1<16$ $16-1=15$ $15\div 3=5$ $x<5$	
And as a bonus...		
Write an inequality describing a situation and then solve	A rectangle has integer height and lengths. The width 2cm longer than it's height. The perimeter is less than 40cm. What is the greatest possible height? $x+x+2+x+x+2<40$ $4x+4<40$ $x<9$ Largest value is 8cm	

Practise Questions-

(do not do these questions on the sheet, you may want to do them again at some point!)

List all integer solutions:

1) $3<x<9$

2) $2\leq x<7$

3) $4<x\leq 10$

4) $0<x<6$

5) $-2<x\leq 3$

6) $-3\leq x<3$

7) $4<x\leq 9$

8) $-5\leq x<2$

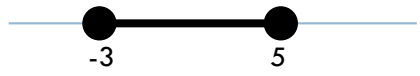
9) $-6<x\leq -1$

10) $0\leq x\leq 9$

Write down the inequalities shown:

1)

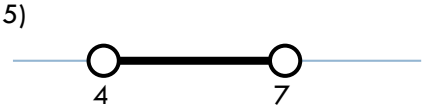
2)



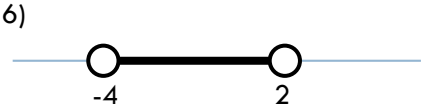
3)

4)

5)



6)



7)

8)

9)

10)

Solve:

1) $2x+3<13$

2) $3x-4>17$

3) $5x+1\geq 21$

4) $9x-6\leq 84$

5) $4x+10<42$

6) $6x-2>16$

7) $7x+4\geq 39$

8) $5x-11\leq 14$

9) $4x+9<45$

10) $6x-4>56$

11) $5x+8\geq 43$

12) $7x-6\leq 50$

Bonus Questions

1) A rectangle has a length which is 5cm longer than it's height. The perimeter of the rectangle is more than 50cm. If the length and height are integers, what is the smallest possible height of the rectangle.

2) A rectangle has a length which is 7cm longer than it's height. The perimeter of the rectangle is less than 60cm .If the length and height are integers, what is the largest possible height of the rectangle.

3) A rectangle has a length which is 10cm longer than it's height. The perimeter of the rectangle is more than 80cm. If the length and height are integers, what is the smallest possible length of the rectangle.

4) A rectangle has a length which is 5cm shorter than it's height. The perimeter of the rectangle is less than 40cm. If the length and height are integers, what is the largest possible height of the rectangle.

5) A rectangle has a length which is 8cm shorter than it's height. The perimeter of the rectangle is less than 70cm. If the length and height are integers, what is the largest possible length of the rectangle.

Linear graphs

Here's what you need to be able to do:	Example	Secure?
Plot a linear graph	Plot the graph y=2x-3 X) 0 1 2 3 Y) -3 -1 1 3 Plot points (0,-3)(1,-1)(2,1)(3,3) connect with a line which extends across the axis	
Know what the gradient and intercept of a line are from the equation	Find the gradient and y intercept of y=3x+2 Gradient=3 Y Intercept= (0,2)	
Find a line which is parallel to another	Find a line which is parallel to y=5x+6 Y=5x+7	

Practise Questions-

(do not do these questions on the sheet, you may want to do them again at some point!)

For the following questions draw a pair of axis from -10 to 10 on the x and y axis. Plot the following lines:

1) $y=2x+1$
2) $y=3x-2$
3) $y=6x+1$
4) $y=5x-3$
5) $y=3x+4$
6) $y=7x-5$
7) $y=10-x$
8) $y=8-2x$
9) $y=12-3x$
10) $y=-5+2x$

For each equation state the gradient and y intercept:

1) $y=2x+1$
2) $y=3x-2$
3) $y=6x+1$
4) $y=5x-3$
5) $y=3x+4$
6) $y=7x-5$
7) $y=10-x$
8) $y=8-2x$
9) $y=12-3x$
10) $y=-5+2x$

For each equation give the equation of a line which would be parallel

1) $y=2x+1$
2) $y=3x-2$
3) $y=6x+1$
4) $y=5x-3$
5) $y=3x+4$
6) $y=7x-5$
7) $y=10-x$
8) $y=8-2x$
9) $y=12-3x$
10) $y=-5+2x$

Percentages

Here's what you need to be able to do:	Example	Secure?
Find percentages of an amount without a calculator	Find 40% of 150 10%=15 40% is 4 x 10% 4 x 15=60 40%=60	
Find the percentage of an amount with a calculator	Find 35% of 120 0.35 x 120=42	
Increase an amount by given percentage (calculator)	Increase 120 by 35% 120 x 1.35= 162	
Decrease an amount by given percentage (calculator)	Decrease 120 by 35% 120 x 0.65= 78	
Find the original amount after a percentage increase or decrease	An amount has been increased by 35% the answer is 162, what was the amount? 162÷1.35=120	
Express an amount as a percentage of another	Express 28 as a percentage of 35 28÷35 x 100= 80%	

Practise Questions-

(do not do these questions on the sheet, you may want to do them again at some point!)

Find (without a calculator):

1) 30% of 120
2) 40% of 120
3) 20% of 480
4) 60% of 240
5) 15% of 300
6) 75% of 360
7) 35% of 400
8) 80% of 120
9) 90% of 400
10) 95% of 120

Find (with a calculator):

1) 15% of 300
2) 32% of 80
3) 45% of 160
4) 67% of 150
5) 12% of 95
6) 6% of 80
7) 4% of 46
8) 12.5% of 88
9) 23.5% of 300
10) 3.5% of 96

Increase:

1) 240 by 15%
2) 360 by 35%
3) 240 by 21%
4) 480 by 17%
5) 980 by 54%
6) 560 by 62%
7) 900 by 19%
8) 1020 by 85%
9) 1750 by 45%
10) 260 by 11%

Decrease:

1) 240 by 15%
2) 360 by 35%
3) 240 by 21%
4) 480 by 17%
5) 980 by 54%
6) 560 by 62%
7) 900 by 19%
8) 1020 by 85%
9) 1750 by 45%
10) 260 by 11%

Find the original amount if after....

1) a 35% increase the amount is now 270
2) a 45% increase the amount is now 348
3) a 36% increase the amount is now 448.8
4) a 55% increase the amount is now 651

Find the original amount if after....

1) a 35% decrease the amount is now 162.5
2) a 15% decrease the amount is now 408
3) a 20% decrease the amount is now 176
4) a 55% decrease the amount is now 247.5

Express:

1) 12 as a percentage of 48
2) 36 as a percentage of 72
3) 56 as a percentage of 80
4) 28 as a percentage of 70
5) 44 as a percentage of 88
6) 12 as a percentage of 96
7) 15 as a percentage of 25
8) 14 as a percentage of 70
9) 18 as a percentage of 45
10) 21 as a percentage of 35

Probability

Here's what you need to be able to do:	Example	Secure?
Create a sample space diagram	Two dice are rolled and the scores are added together. Draw a sample space diagram. Table will have 1-6 along the top and 1-6 down the left and the middle will show the scores added together	
Find probabilities from a sample space diagram	what is the probability the score will be less than 3? 1/36	
Use relative frequency to find the expected number of outcomes	If the probability that I win a game is 0.8, and I play 100 games, how many will I expect to win? 0.8 x 100=80	
Find the missing probability of mutually exclusive events	I have a bag with counters, the probability that I select different colours are shown below. Find the missing probability P(red)=0.2 P(green)=0.35 P(blue)= x P(black)=0.09 Probability should add to 1 1-0.2-0.35-0.09=0.36 P(blue)=0.36	

Practise Questions-

(do not do these questions on the sheet, you may want to do them again at some point!)

For each scenario create a sample space diagram to help you answer the question.

1. I roll two dice and add the scores together, what is the probability I score more than 10

2. I have two spinners labelled 1-4. I spin them and multiply the scores, what is the probability that I score 6 or less.

3. I have a spinner labelled 1,3,5,7 and one labelled 2,4,6,8. I spin them and add the scores, what is the probability that my score is more than 10

4. I have a dice and a spinner labelled 1,2,3. I roll and spin and multiply the scores. What is the probability that I score 12 or more.

5. I have 2 spinners labelled 1 to 5. I spin them and find the difference between the two numbers. What is the probability I score less than 2?

Below are the probabilities that I will win a game, for each state the probability that I will loose and estimate the number of times I will win.

1. P(win)=0.6 and I play 200 games
2. P(win)=0.2 and I play 180 games
3. P(win)=0.7 and I play 420 games
4. P(win)=0.1 and I play 400 games
5. P(win)=0.55 and I play 80 games
6. P(win)=0.12 and I play 60 games

I have a bag with counters, the probability I select a colour is shown below. What is the probability I select a blue?

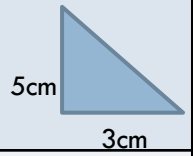
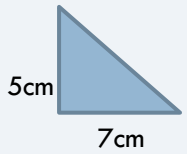
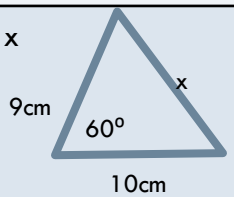
Colour	Red	Pink	Blue	Green
Probability	0.2	0.5		0.1

Colour	Red	Pink	Blue	Green
Probability	0.13	0.24		0.35

Colour	Red	Pink	Blue	Green
Probability	0.34	0.27		0.3

Colour	Red	Pink	Blue	Green
Probability	0.29	0.4		0.0.9

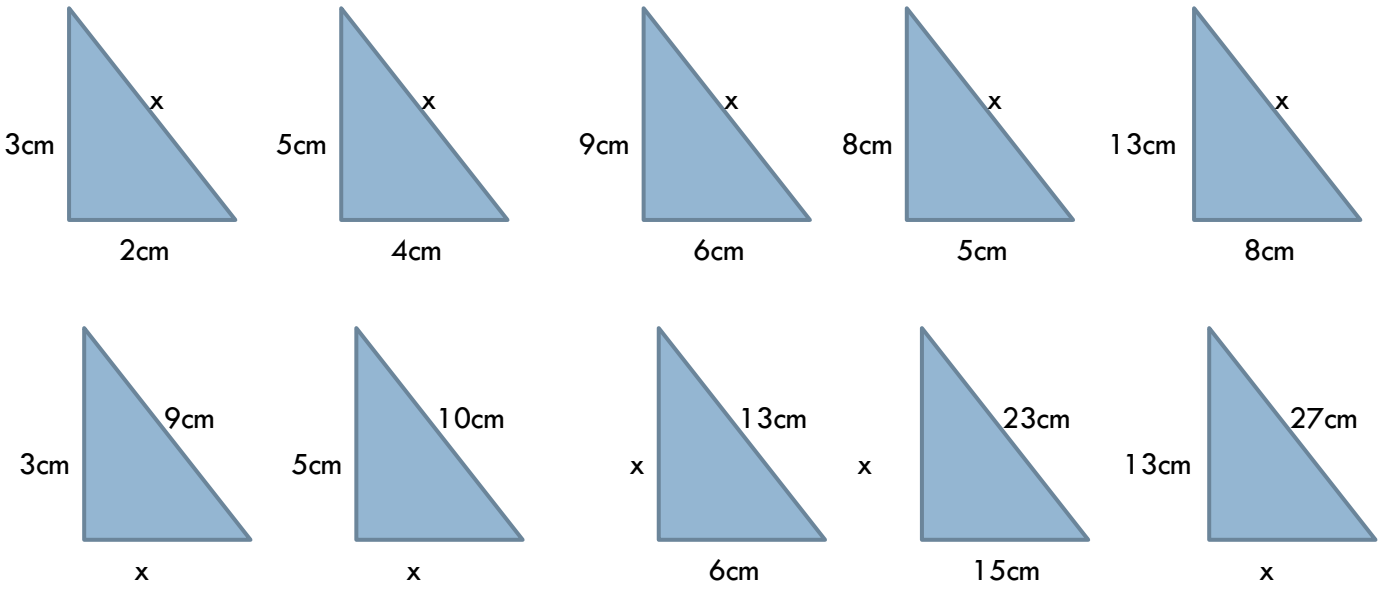
Pythagoras

Here's what you need to be able to do:	Example	Secure?
Find the longest length of a right angled triangle	$3^2+5^2=34$ $\sqrt{34}=5.83095$ 5.8 (1 d.p)  	
Find one of the shorter lengths of a right angled triangle	$7^2-5^2=24$ $\sqrt{24}=4.89897$ 4.9 (1 d.p)  	
***ROUND ANSWERS TO DECIMAL PLACES AND SIGNIFICANT FIGURES		
Find the distance between 2 points	Find distance between (1,1) and (8,6) 8-1=7 and 6-1=5 $7^2-5^2=24$ $\sqrt{24}=4.89897$ 4.9 (1 d.p)	
Solve problems using Pythagoras	What is the length of the diagonal of a square with area of 25cm2. Lengths must be 5 $5^2+5^2=50$ $\sqrt{50}=7.0716..$ 7.1 (1 d.p)	
And as a bonus...		
Find a missing length using the other two sides and the opposite angle using the cosine rule	Find x  $X^2=9^2+10^2-$ 2x9x10xc-s60 $X^2=91$ X=9.53 (3 significant figures)	

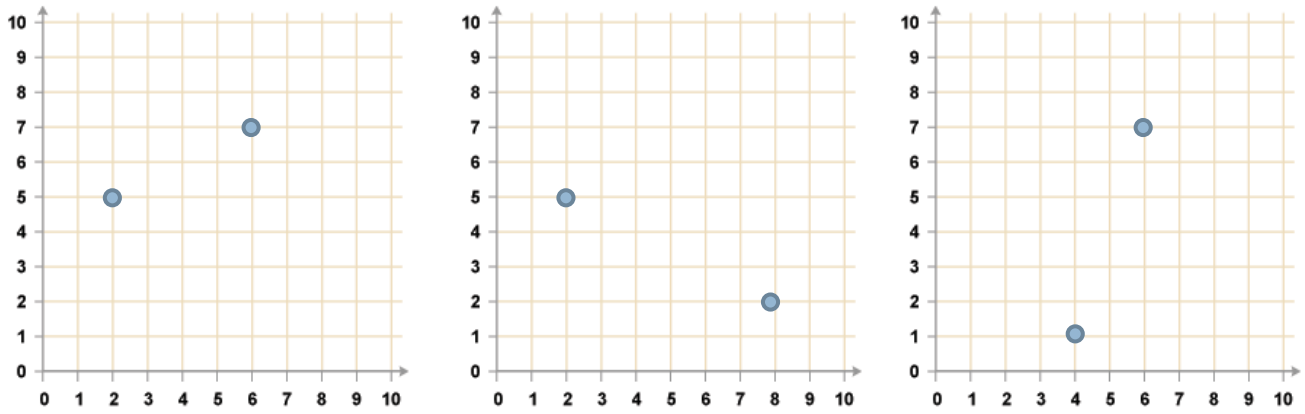
Practise Questions-

(do not do these questions on the sheet, you may want to do them again at some point!)

Find the missing lengths to 3 significant figures:



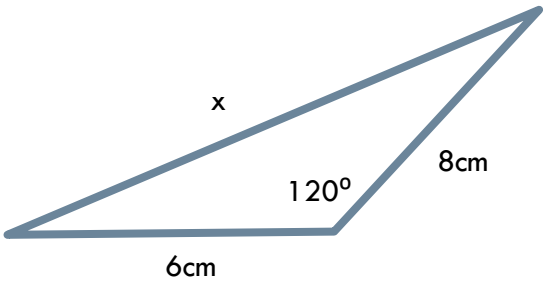
Find the distance between the coordinates to 2 decimal places.

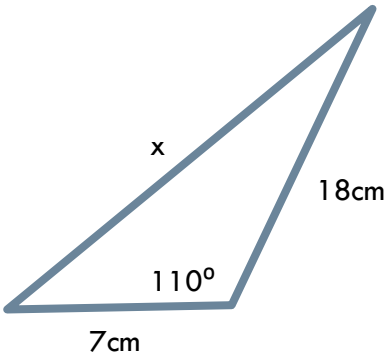


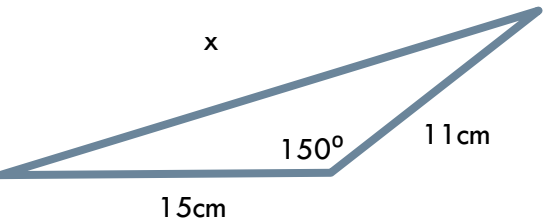
Bonus Questions

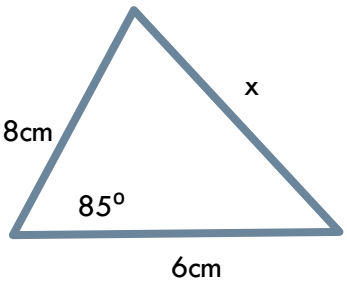
Use the cosine rule to find the missing lengths to 3 significant figures

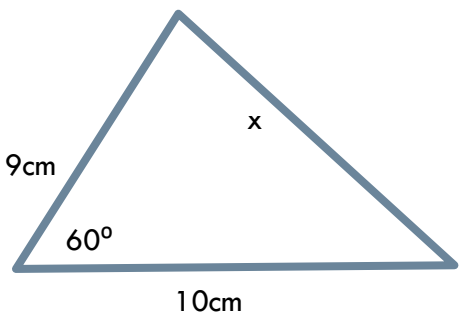
$$a^2 = b^2 + c^2 - 2bc \cos A$$

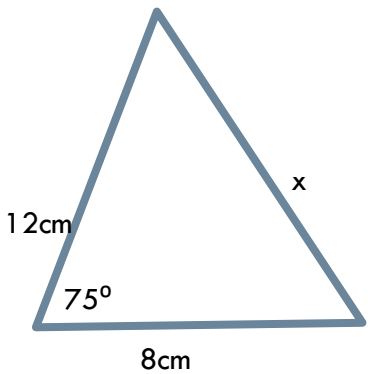












Quadratic Graphs

<table>
<tr><th>Here's what you need to be able to do:</th><th>Example</th><th>Secure?</th></tr>
<tr><td>Complete a table to find coordinates for quadratic graphs</td><td>Find coordinates for $y=2x^2-5$<table><tr><th>x</th><th>-2</th><th>-1</th><th>0</th><th>1</th></tr><tr><td>y</td><td>3</td><td>-3</td><td>-5</td><td>-3</td></tr></table></td><td></td></tr>
<tr><td>Plot the coordinates to create a quadratic curve</td><td>Plot the coordinates and join together with a smooth curve.
No dot to dot
No sketching
No pen
Line must go through the points</td><td></td></tr>
<tr><td>Read off where the curve crosses the x axis to solve a quadratic equation</td><td>Use your graph to solve the equation $2x^2-5=0$
There will 2 answers and numbers will most likely have a decimal place (or two)</td><td></td></tr>
</table>

Practise Questions-

(do not do these questions on the sheet, you may want to do them again at some point!)

Fill in the following tables:

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

x	-2	-1	0	1	2
y					

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

x	-2	-1	0	1	2
y					

$y=2x^2-3x-4$

x	-2	-1	0	1	2
y					

$y=3x^2+4x-2$

x	-2	-1	0	1	2
y					

$y=3x^2-2x-6$

x	-2	-1	0	1	2
y					

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

x	-2	-1	0	1	2
y					

Plot the equations onto graph paper.

Use your graphs to solve the following equations.

1) $3x^2-2x-5=0$
2) $x^2+2x-4=0$
3) $2x^2-3x-4=0$
4) $3x^2+4x-2=0$
5) $3x^2-2x-6=0$
6) $2x^2+2x-3=0$

Ratio

Here's what you need to be able to do:	Example	Secure?
Write a ratio in it's simplest form	A B A B B A A B B Write the number of A's to B's in its simplest form 4:6= 2:3	
Share an amount in a given ratio	Share £120 in the ratio 1:2:3. 1+2+3=6 120÷6=20 1x20=**20** 2x20=**40** 3x 20=**60**	
Express a ratio as two fractions or percentages	Andy and Lawrence share some money in the ratio 3:7, What fraction does Andy get? 3/10 What percentage does Lawrence get 70%	

Practise Questions-

(do not do these questions on the sheet, you may want to do them again at some point!)

For each group of letters, write the ratio of A's to B's in its simplest form:

1) A B A B A B B
2) A A A B B B B B B A A A
3) B B A A B B A B A A A A A A A A
4) B B A A B B B B A A A A A A
5) B A B A B A B A B B A A A A A A

Betty and Gavin share some money in the following ratios, for each state what fraction Betty gets and what percentage Gavin gets.

1) 2:3
2) 1:4
3) 3:7
4) 9:11
5) 5:15
6) 2:8
7) 8:12

Betty, Gavin and Jack share some money, say what fraction each person gets

8) 1:3:6
9) 1:7:8
10) 4:5:9

Share the following amount in the ratios given:

1) 100 in ratio 2:3
2) 240 in ratio 3:5
3) 360 in ratio 1:5
4) 90 in ratio 1:2:3
5) 120 in the ratio 2:3:5
6) 240 in the ratio 1:3:4
7) 480 in the ratio 3:4:5
8) 160 in the ratio 1:2:5
9) 300 in the ratio 2:5:8
10) 500 in the ratio 2:3:5

Probability

Here's what you need to be able to do:	Example	Secure?
Create a sample space diagram	Two dice are rolled and the scores are added together. Draw a sample space diagram. Table will have 1-6 along the top and 1-6 down the left and the middle will show the scores added together	
Find probabilities from a sample space diagram	what is the probability the score will be less than 3? 1/36	
Use relative frequency to find the expected number of outcomes	If the probability that I win a game is 0.8, and I play 100 games, how many will I expect to win? 0.8 x 100=80	
Find the missing probability of mutually exclusive events	I have a bag with counters, the probability that I select different colours are shown below. Find the missing probability P(red)=0.2 P(green)=0.35 P(blue)= x P(black)=0.09 Probability should add to 1 1-0.2-0.35-0.09=0.36 P(blue)=0.36	

Practise Questions-

(do not do these questions on the sheet, you may want to do them again at some point!)

For each scenario create a sample space diagram to help you answer the question.

1. I roll two dice and add the scores together, what is the probability I score more than 10

2. I have two spinners labelled 1-4. I spin them and multiply the scores, what is the probability that I score 6 or less.

3. I have a spinner labelled 1,3,5,7 and one labelled 2,4,6,8. I spin them and add the scores, what is the probability that my score is more than 10

4. I have a dice and a spinner labelled 1,2,3. I roll and spin and multiply the scores. What is the probability that I score 12 or more.

5. I have 2 spinners labelled 1 to 5. I spin them and find the difference between the two numbers. What is the probability I score less than 2?

Below are the probabilities that I will win a game, for each state the probability that I will loose and estimate the number of times I will win.

1. P(win)=0.6 and I play 200 games
2. P(win)=0.2 and I play 180 games
3. P(win)=0.7 and I play 420 games
4. P(win)=0.1 and I play 400 games
5. P(win)=0.55 and I play 80 games
6. P(win)=0.12 and I play 60 games

I have a bag with counters, the probability I select a colour is shown below. What is the probability I select a blue?

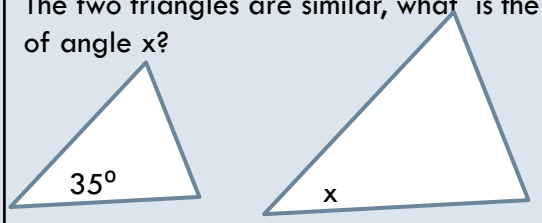
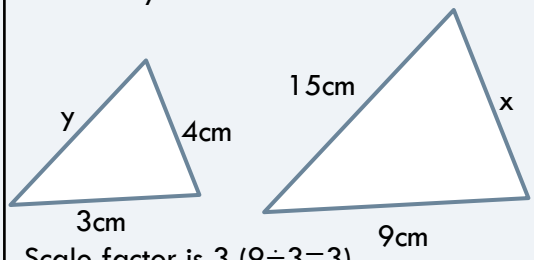
Colour	Red	Pink	Blue	Green
Probability	0.2	0.5		0.1

Colour	Red	Pink	Blue	Green
Probability	0.13	0.24		0.35

Colour	Red	Pink	Blue	Green
Probability	0.34	0.27		0.3

Colour	Red	Pink	Blue	Green
Probability	0.29	0.4		0.0.9

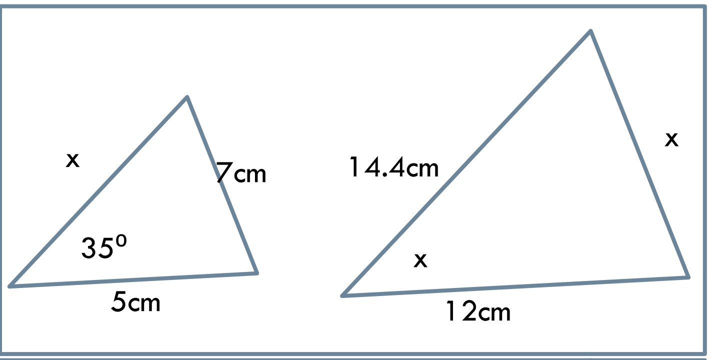
Similar Shapes

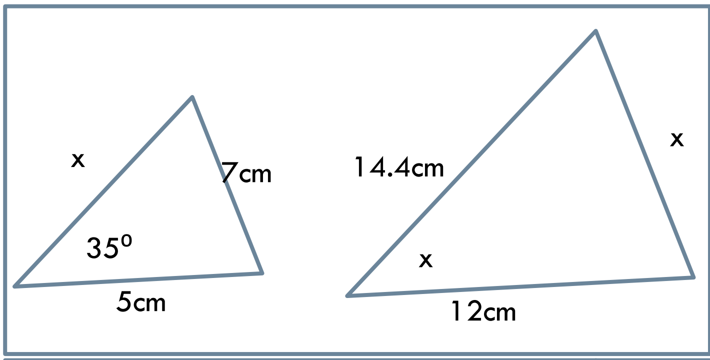
Here's what you need to be able to do:	Example	Secure?
Know that angles in similar shapes are equal	The two triangles are similar, what is the size of angle x?  X=35°	
Find missing lengths on similar shapes	The two triangles are similar, what is the length of x and y?  Scale factor is 3 (9÷3=3) x=4x3=12cm Y=15÷3=5cm	
And as a bonus...		
Work out areas of similar shapes	Two shapes are similar the scale factor for the lengths is 2 (you would need to work this out from a diagram). The area of the smaller shape is $10cm^2$, what is the area of the larger shape. Length scale factor=2 Area scale factor = $2^2=4$ $10cm^2 \times 4 = 40cm^2$	

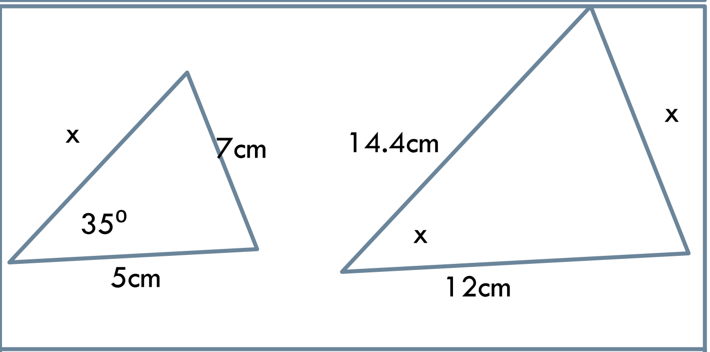
Practise Questions-

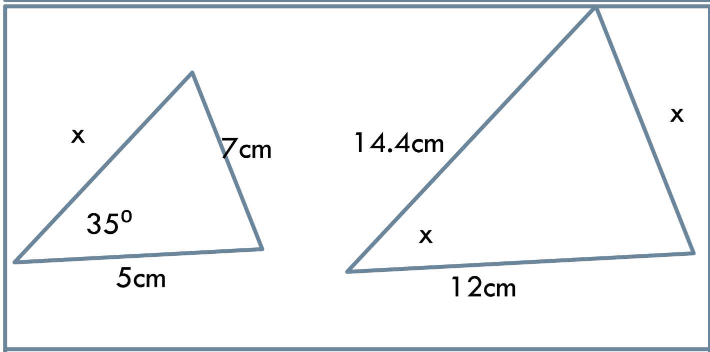
(do not do these questions on the sheet, you may want to do them again at some point!)

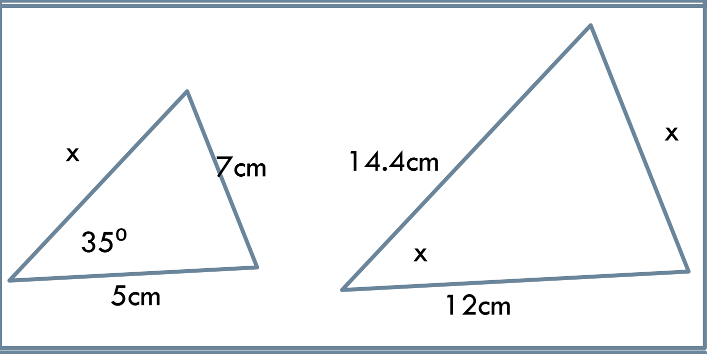
The following diagrams show similar triangles (not drawn to scale) find lengths and angles marked with letters

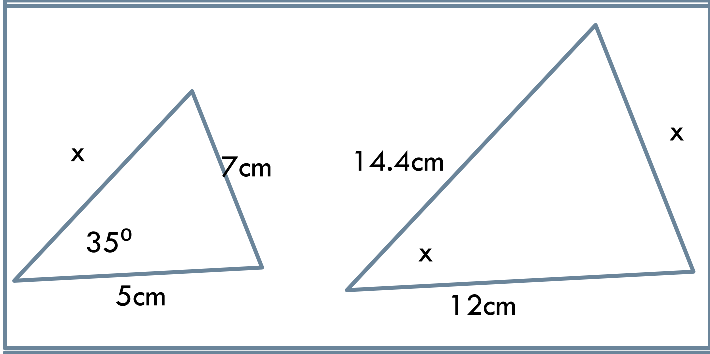


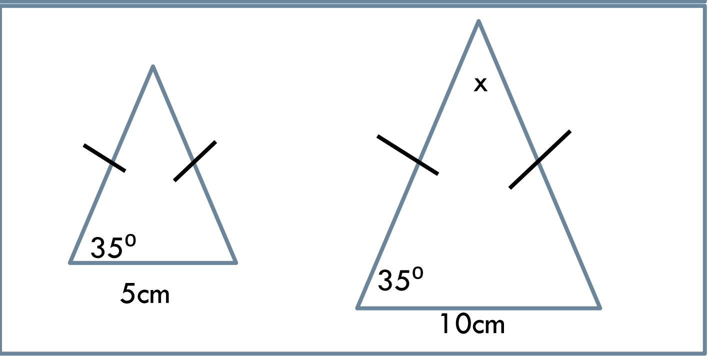


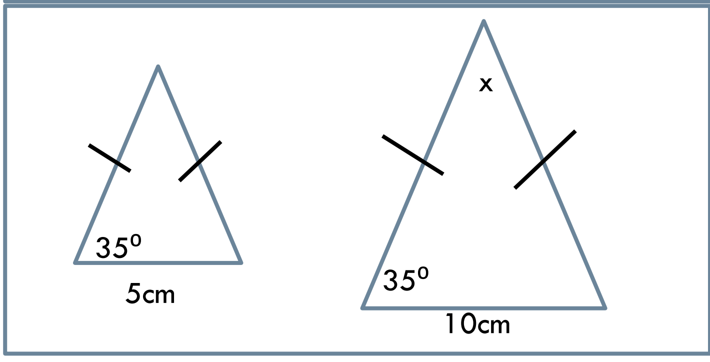








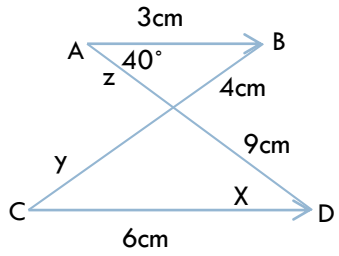




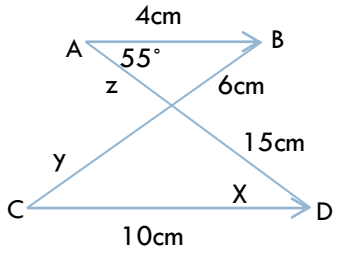
Practise Questions 2

In the following diagrams AB is parallel to CD. Find angle x and lengths y and z

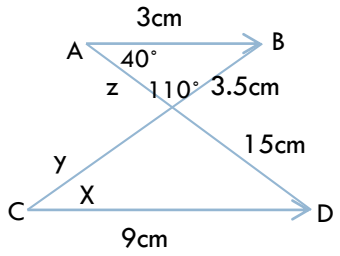
1)



2)

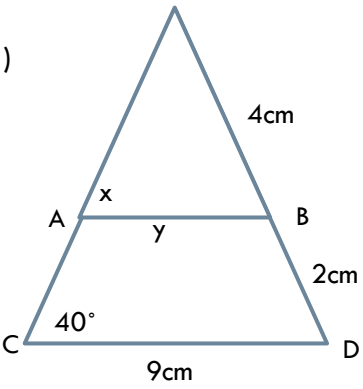


3)

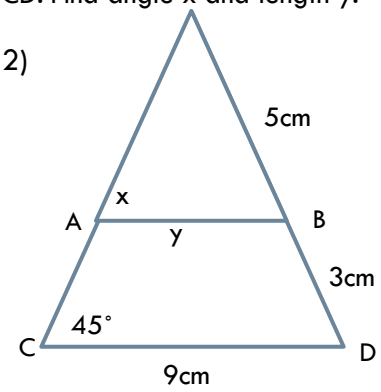


In the following diagrams AB is parallel to CD. Find angle x and length y.

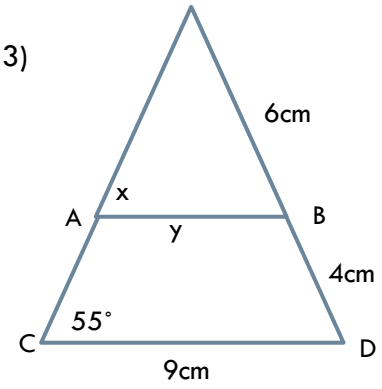
1)



2)

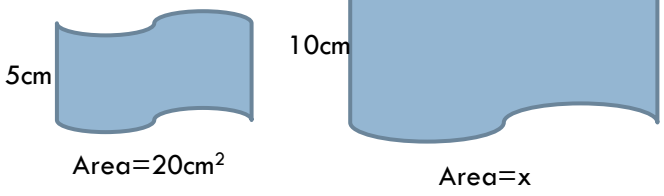


3)



Bonus Questions. The shapes shown are similar, find the missing area.

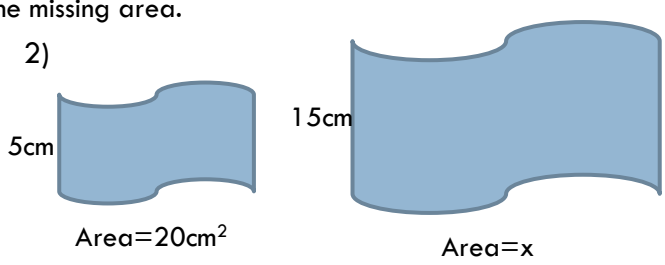
1)



Area=20cm^2

Area=x

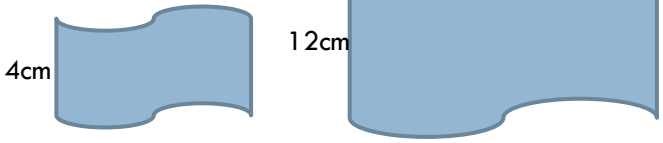
2)



Area=20cm^2

Area=x

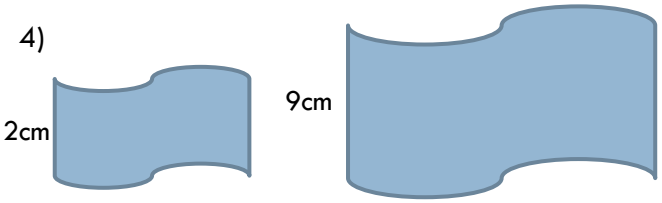
3)



Area=30cm^2

Area=x

4)



Area=x

Area=202.5cm^2

Simultaneous Equations

Here's what you need to be able to do:	Example	Secure?
Solve simultaneous Equations	Solve $2y+3x=16$ $3y+4x=23$ Multiply top by 4 and bottom by 3 $8y+12x=64$ $9y+12x=69$ The sign in the middle is the same so subtract $Y=5$ Substitute $y=5$ back into the first equation $2x5+3x=16$ $10+3x=16$ $3x=6$ $X=2$	

Practise Questions-

(do not do these questions on the sheet, you may want to do them again at some point!)

1. $2x - 4y = -2$
$2x + 3y = 12$

2. $3a + 5b = 26$
$a + 5b = 22$

3. $4x - 2y = -4$
$4x + 3y = 16$

4. $3x + 5y = 31$
$5x + 2y = 39$

5. $7x + 6y = 32$
$3x + 5y = 21$

6. $6x - 3y = 15$
$4x - 6y = -2$

7. $6x - 3y = 27$
$3x + 4y = 8$

8. $6x - 4y = -12$
$8x - 3y = -2$

Standard Form

Here's what you need to be able to do:	Example	Secure?
Express a number in standard form	Write 45000 in standard form= 4.5×10^4 Write 0.00035 in standard form= 3.5×10^{-4}	
Express a standard form number as a normal number	Write 3.6×10^5 as a normal number= 360000 Write 3.6×10^{-5} as a normal number= 0.000036	
Complete calculations with standard form numbers without a calculator- giving your answer in standard form	What is $6.1 \times 10^6 \times 3 \times 10^4$, give your answer in standard form. $6.1 \times 3 = 18.3$ $10^6 \times 10^4 = 10^{10}$ $18.3 \times 10^{10} = 1.83 \times 10^{11}$	
Complete standard form calculations with a calculator- giving your answer in standard form	$\frac{4.3 \times 10^3 \times 3.9 \times 10^{-4}}{6.1 \times 10^9}$	

Practise Questions-

(do not do these questions on the sheet, you may want to do them again at some point!)

Express the following numbers in standard form:

1) 356000
2) 84000000
3) 394000
4) 19000
5) 47300000
6) 0.000045
7) 0.0000234
8) 0.0034
9) 0.00000561
10) 0.00000493

Write the following as ordinary numbers:

1) 3.7×10^{7}
2) 6.6×10^{5}
3) 8.5×10^{4}
4) 1.65×10^{8}
5) 2.32×10^{2}
6) 3.76×10^{-5}
7) 6.5×10^{-4}
8) 6.4×10^{-5}
9) 5.96×10^{-6}
10) 4.15×10^{-5}

Calculate the following (without a calculator) give your answer in standard form:

1) $3 \times 10^{3} \times 4 \times 10^{7}$
2) $5 \times 10^{5} \times 2.1 \times 10^{2}$
3) $4 \times 10^{6} \times 3.2 \times 10^{5}$
4) $7 \times 10^{9} \times 6 \times 10^{-3}$
5) $4 \times 10^{-3} \times 5.2 \times 10^{-4}$
6) $7 \times 10^{-8} \times 4 \times 10^{11}$

Calculate the following (with a calculator) give your answer in standard form correct to 3 significant figures :

$$\frac{4.3 \times 10^{3} \times 5.1 \times 10^{-4}}{7.2 \times 10^{9}}$$

$$\frac{6.3 \times 10^{3} + 4.5 \times 10^{4}}{3.2 \times 10^{-3} \times 9 \times 10^{5}}$$

$$\frac{5.11 \times 10^{9} - 4.5 \times 10^{8}}{4.3 \times 10^{3} \times 2.3 \times 10^{5}}$$

$$\frac{8.5 \times 10^{9} + 9.3 \times 10^{10}}{3.4 \times 10^{5} - 3.4 \times 10^{3}}$$

$$\frac{3.1 \times 10^{4} \times 8.1 \times 10^{9}}{5.2 \times 10^{3} \times 1.8 \times 10^{5}}$$

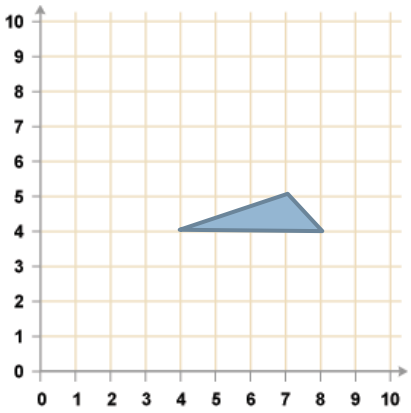
Transformations

Here's what you need to be able to do:	Example	Secure?
Rotate a shape from a centre of rotation	Rotate shape A by 90 degrees clockwise about (2,3)	
Translate a shape using a vector	Translate shape A by $\begin{pmatrix} 2 \\ -4 \end{pmatrix}$	
Reflect a shape in a mirror line	Reflect shape A in the line y=3	
Enlarge a shape using a scale factor and centre of enlargement	Enlarge shape A by scale factor 3 from point (2,1)	
Describe all of the above transformations	Describe the transformation that take shape A to shape B	
And as a bonus...		
Enlarge a shape with a fractional scale factor	Enlarge shape A by scale factor ½ from point (2,1)	
Enlarge a shape with a negative scale factor	Enlarge shape A by scale factor -2 from point (2,1)	

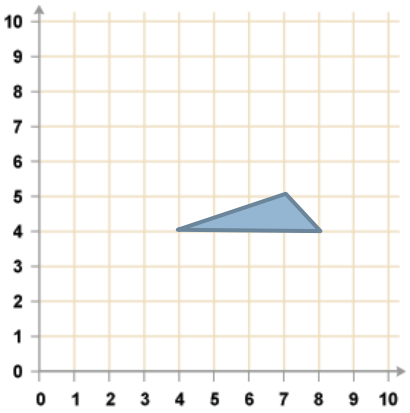
Practise Questions-

(do not do these questions on the sheet, you may want to do them again at some point!)

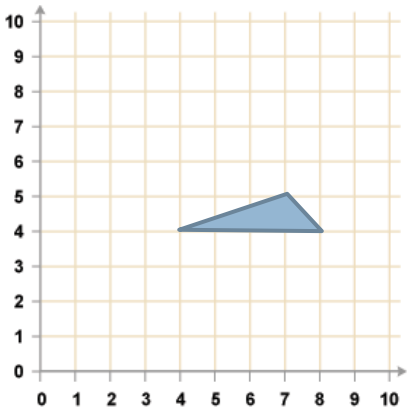
Reflect in the line y=5



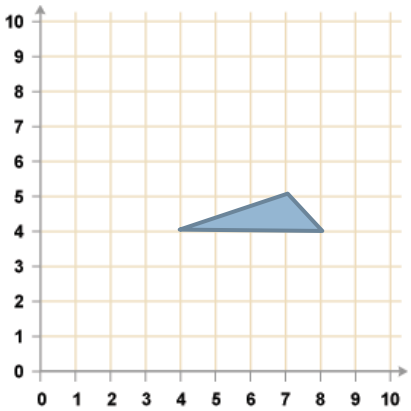
Reflect in the line y=3



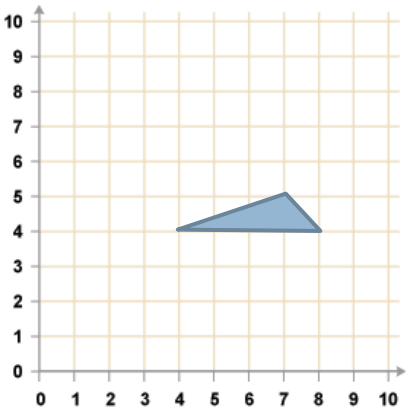
Reflect in the line x=y



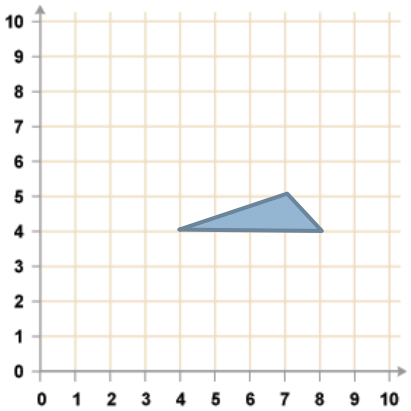
Rotate 90° clockwise from (4,4)



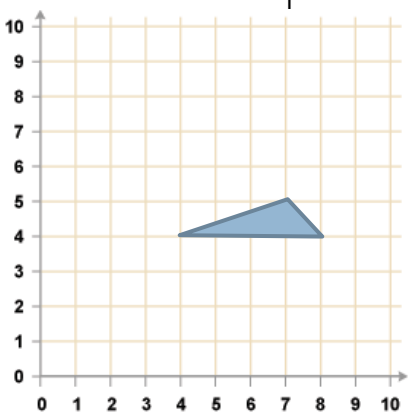
Rotate 180° clockwise from (6,3)



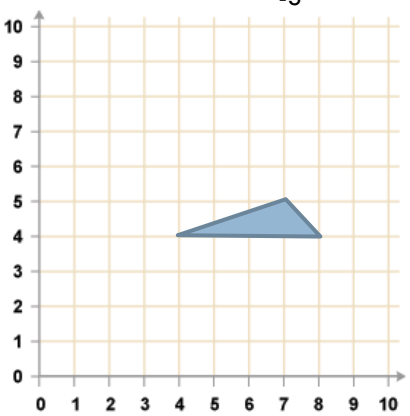
Rotate 270° clockwise from (6,6)



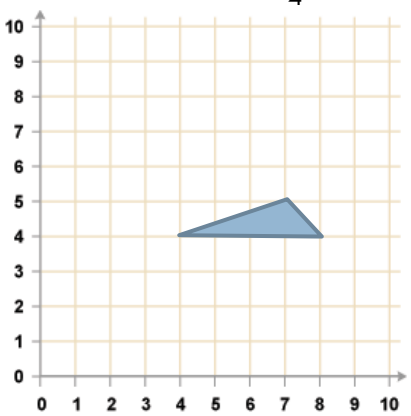
Translate by vector $\begin{pmatrix} 2 \\ 1 \end{pmatrix}$



Translate by vector $\begin{pmatrix} -2 \\ -3 \end{pmatrix}$

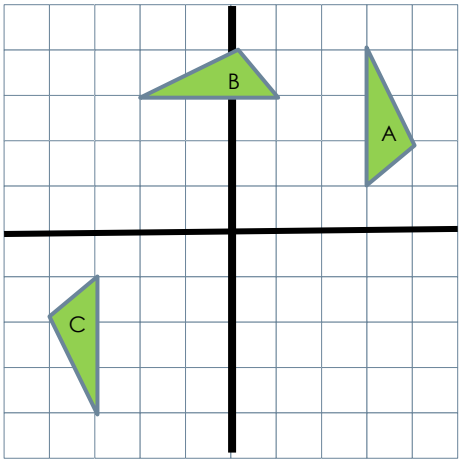


Translate by vector $\begin{pmatrix} -4 \\ 4 \end{pmatrix}$



Practise Questions 2-

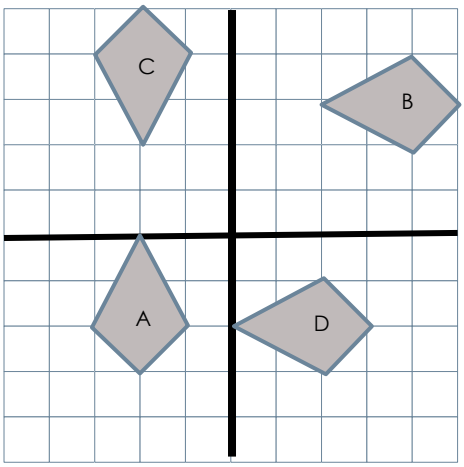
(do not do these questions on the sheet, you may want to do them again at some point!)



Describe the transformation which takes A to:

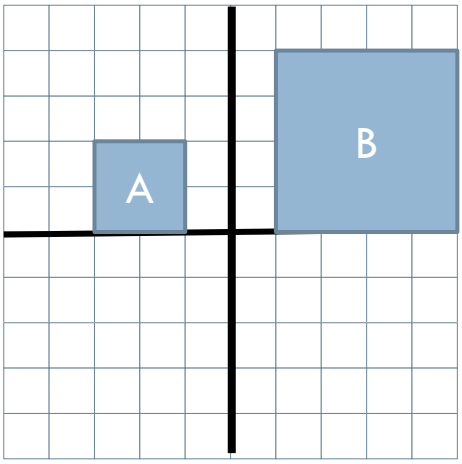
B-

C-

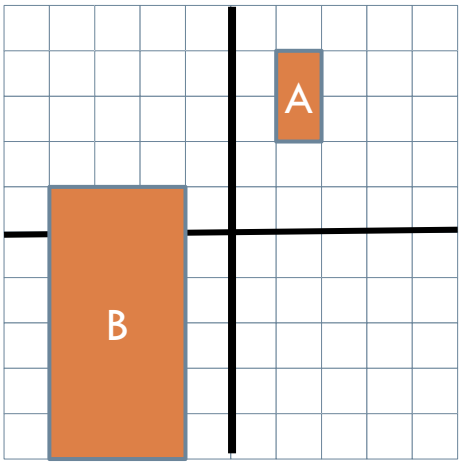


Describe the transformation which takes A to C

Describe the transformation which takes B to D, and then D to B



Describe the transformation that takes A to B

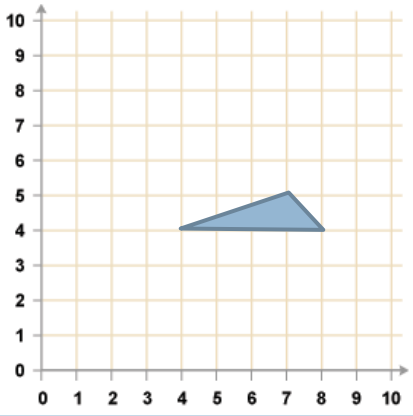


Describe the transformation that takes B to A

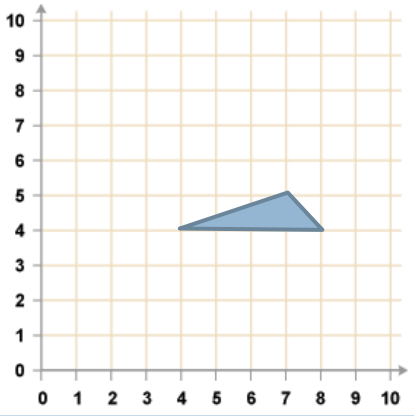
Practise Questions 2-

(do not do these questions on the sheet, you may want to do them again at some point!)

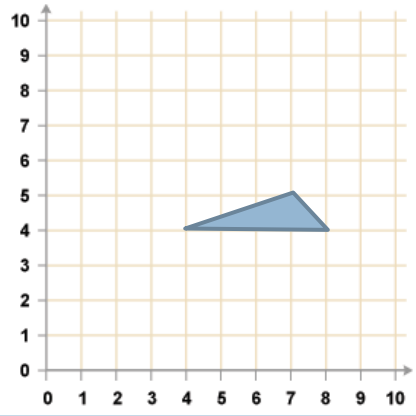
Enlarge by scale factor 2 from (1,1)



Enlarge by scale factor 3 from (6,3)

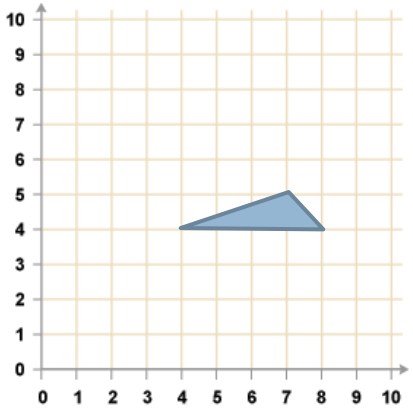


Enlarge by scale factor 4 from (8,4)

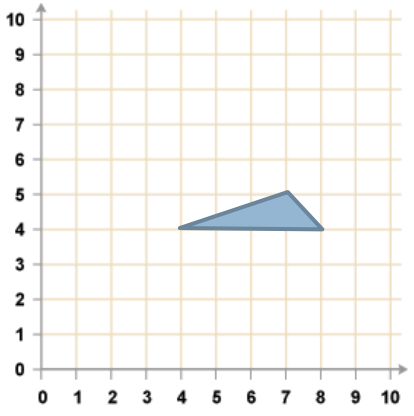


Bonus questions

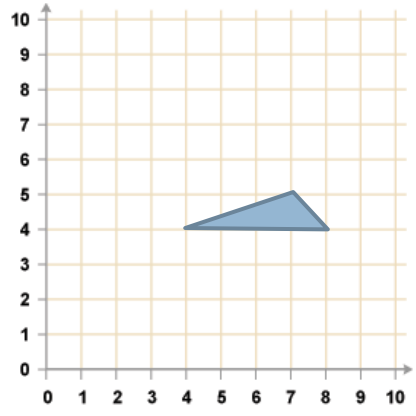
Enlarge by scale factor -1 from (6,3)



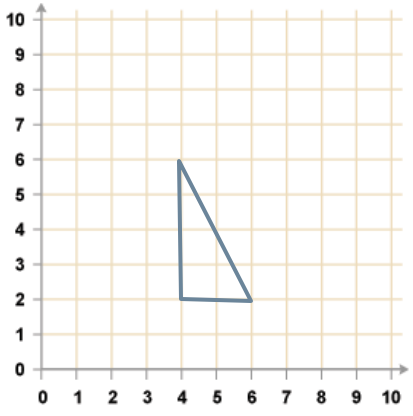
Enlarge by scale factor -1 from (3,3)



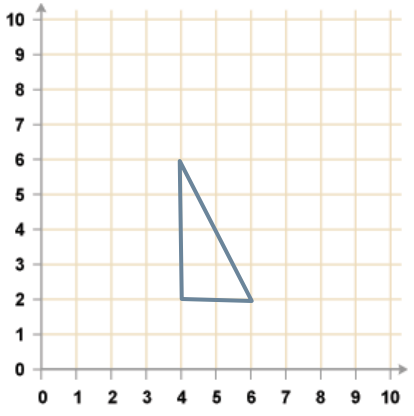
Enlarge by scale factor -2 from (7,6)



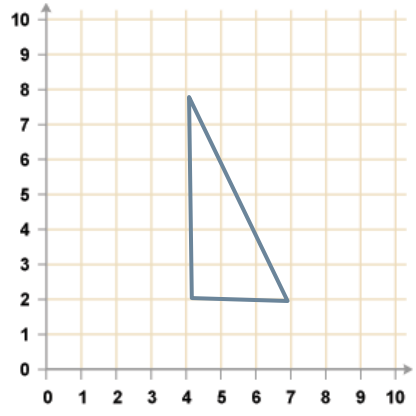
Enlarge by scale factor ½ from (2,2)



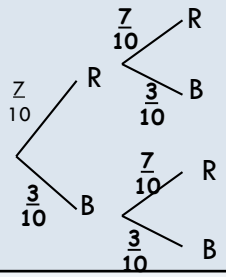
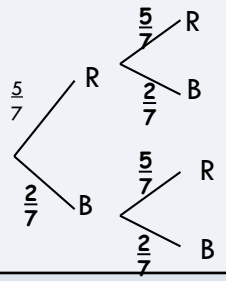
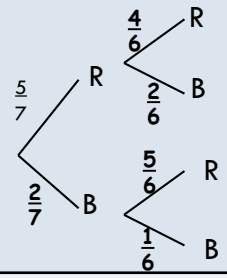
Translate by vector ( )



Enlarge by scale factor 1/3 from (1,2)



Tree Diagrams

Here's what you need to be able to do:	Example	Secure?
Fill in a tree diagram which has been drawn for you	I have 7 red and 3 blue counters, I pick one, replace it and pick again. Fill in the blanks. 	
Draw a tree diagram to show possible outcome of independent events	I have 5 red and 2 blue counters, I pick one, replace it and pick again. Draw a tree diagram 	
Draw a tree diagram to show possible outcome of dependant events	I have 5 red and 2 blue counters, I pick one, don't replace it and pick again. Draw a tree diagram 	
Use a tree diagrams to find probabilities	For the above example find the probability of getting two different colours. P(R then B)= 5/7 x 2/6=10/42 P(B then R)= 2/7 x 5/6= 10/42 P(two different)=10/42 + 10/42= 20/42	

Practise Questions-

(do not do these questions on the sheet, you may want to do them again at some point!)

A) I have a bag with 20 balls in, there are 13 pink, 7 orange pull a ball out, put it back then pull another.

1. Draw a tree diagram showing all possible outcomes
2. Use your tree diagram to find the probability of getting:
    a. 2 pink
    b. 2 orange,
    c. A pink and an orange.

B) The probability I have toast for breakfast is 0.6, the probability I will miss my bus is completely unrelated to my breakfast choice and is 0.2

1. What is the probability I will NOT:
    a. Have toast for breakfast
    b. Miss my bus
2. Draw a tree diagram showing all possible outcomes
3. Use your tree diagram to find the probability of:
    a. Having toast and missing my bus
    b. Not having toast and missing my bus
    c. Not having toast and not missing my bus

C) I am tossing a coin and rolling a dice:

1. Draw a tree diagram to show all possible outcomes.
2. Use your tree diagram to find the probability of:
    a. A head a 3
    b. A tails and a number bigger than 4
    c. A tails with a 3 or a heads with a 1

D) I have some songs on my mp3 player, 4 are rock, 7 are Pop and 11 are Hip Hop. I put my mp3 player on shuffle and listen to 2 songs (it is possible to listen to the same song twice in a row)

1. Draw a tree diagram to show all the possible outcomes,
    a. Find the probability that I will listen to:
        i. Hip Hop then Pop
        ii. Rock twice
        iii. A Rock song and a pop song in any order
        iv. 2 songs which are the same style (rock and rock or pop and pop ect.)

Practise Questions 2

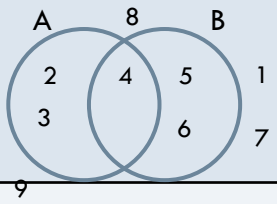
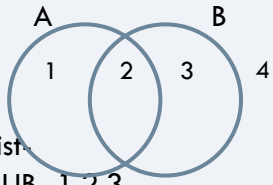
1. I have a bag of sweets, the sweets are toffees and fruit drops. There are 8 toffees and 6 fruit drops. I have a sweet at random then I my mate has one at random. Find the probability that:
   a) I have a toffee and my friend has a fruit drop
   b) We both have fruit drops
   c) We both have the same
   d) We end up with different sweets

2. If I catch my bus on time the probability that I will be on time for work is 0.9, if I miss my bus the probability is 0.4. The probability that I will miss my bus is 0.3. Find the probability that:
   a) I will catch my bus and be on time
   b) I will miss my bus and be late
   c) I will be on time for work
   d) I will be late for work

3. There are 10 pupils in my class, 4 boys and 6 girls. I need three of them to do a job for me. I select one pupil at a time at random, no pupil will be selected twice. What is the probability that the people doing the jobs will be:
   a) 3 boys
   b) 3 girls
   c) 1 boy and 2 girls

   What is the probability that:
   a) The second job will be done by a giirl?
   b) There will be at least 1 boy.

Venn Diagrams

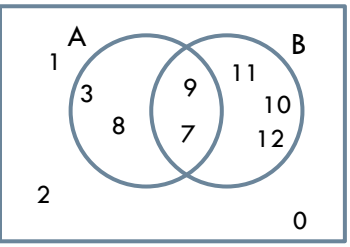
Here's what you need to be able to do:	Example	Secure?
Put numbers into a Venn diagram	Draw a Venn diagram from the following data The universal set is 1,2,3,4,5,6,7,8,9 Set A=2,3,4 Set B=4,5,6  	
Understand the following notation AUB A ∩ B A'  List- AUB- 1,2,3 A ∩ B-2 A'-3,4 B'- 1,4	
Find probabilities based on Venn diagrams	For the above example find P(AUB)= ¾	
And as a bonus...		
Create a Venn diagram from a worded situation	In a sports club there are 50 members 20 play tennis 35 play squash How many people play both? 5 (you will have to draw a Venn diagram and may be asked about probability)	

Practise Questions-

(do not do these questions on the sheet, you may want to do them again at some point!)

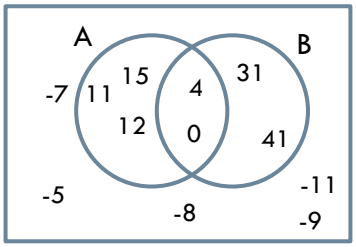
Create Venn diagrams for the following sets of numbers

1) Universal set= 0 to 10 set A = 1,2,3,4,5 set B= 4,5,6,7
2) Universal set= 3 to12 set A = 3,4,6,7,9 set B= 7,9,11
3) Universal set= 1to 10 set A = 2,4,6,8 set B= 1,3,5,7
4) Universal set= -10 to 0 set A = -2,-3,-4,-5 set B= -5,-2,-8,-7
5) Universal set 1to 6 set A = 1,2,3,4,5 set B= 1,2,3,4,5,6



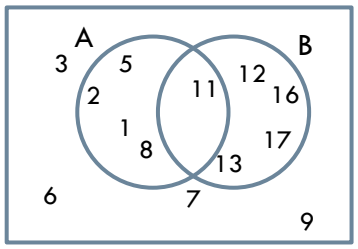
For the Venn diagram above find:

a) AUB=
b) A'=
c) B'=
d) A∩B=
e) P(A)=
f) P(AUB)=
g) P(B')=



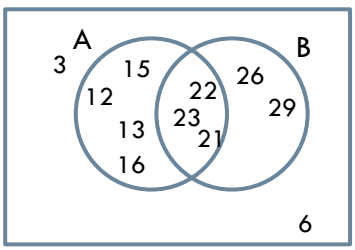
For the Venn diagram above find:

a) AUB=
b) A'=
c) B'=
d) A∩B=
e) P(A)=
f) P(AUB)=
g) P(B')=



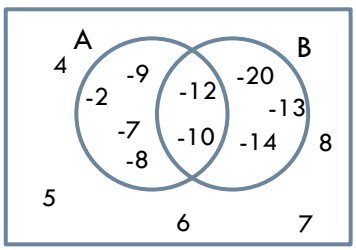
For the Venn diagram above find:

a) AUB=
b) A'=
c) B'=
d) A∩B=
e) P(A)=
f) P(AUB)=
g) P(B')=



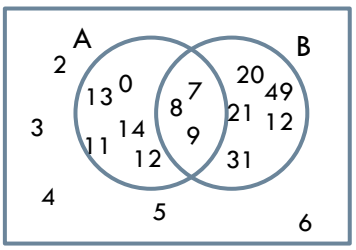
For the Venn diagram above find:

a) AUB=
b) A'=
c) B'=
d) A∩B=
e) P(A)=
f) P(AUB)=
g) P(B')=



For the Venn diagram above find:

a) AUB=
b) A'=
c) B'=
d) A∩B=
e) P(A)=
f) P(AUB)=
g) P(B')=



For the Venn diagram above find:

a) AUB=
b) A'=
c) B'=
d) A∩B=
e) P(A)=
f) P(AUB)=
g) P(B')=

Bonus Questions

1. Some cars come into a garage. There are 50 cars altogether,
   30 of them have faulty break lights
   35 have faulty breaks.
   A car is selected at random what is the probability that the car has faulty break lights and breaks.

2. There are 30 pupils in a class, they are asked if the watch eastenders or corrie.
   5 pupils watch neither corrie or eastenders
   10 pupils say they watch both,
   11 pupils just watch eastenders.
   A pupil is selected at random, what is the probability that they only watch corrie.

3. There are 100 girls in year 9.
   45 play hockey,
   70 of them play rugby and
   6 play no sport at all.
   A pupil is selected at random what is the probability that they play both hockey and rugby?

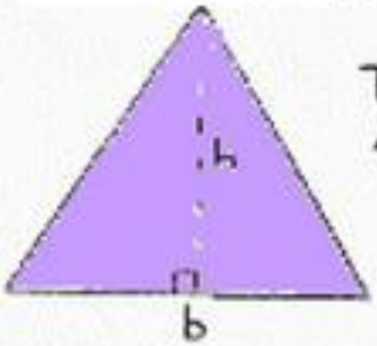
4. In a sandwich shop customers are offered mayo and ketchup. 100 customers come in during lunch
   55 customers have ketchup
   15 customers have ketchup and mayo
   10 customers do not have ketchup or mayo
   A customer is selected at random, what is the probability that they had just mayo?

5. In a class of 30 pupils children are asked if they had a cat or a dog.
   3 children didn't have any pets
   20 pupils had a cat
   18 pupils had a dog
   A pupil is selected at random, what is the probability that they had a cat and a dog?

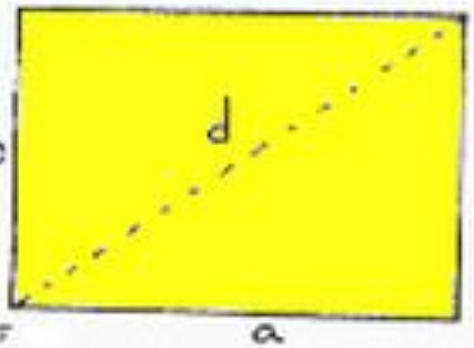
Volume

Here's what you need to be able to do:	Example	Secure?
Find the volume of a prism	Find the volume of a cylinder with radius of 8cm and height of 10cm Area x height $\pi \times 8^2 \times 10$	
Find the volume of a sphere	Find the volume of a sphere with a diameter of 15cm Radius=7.5 $4/3(\pi \times 7.5^3)$	
Find the volume of a cone or pyramid	Find the volume of a cone with diameter 11cm and height 8cm Radius=5.5 Volume = 1/3 x base x height Volume = $\pi \times 5.5^2 \times 8 \div 3$ Volume	
Find the volume of compound 3D shapes	A hemisphere (half a sphere) is placed on a cylinder, the cylinder has height 11cm and diameter of 7cm, find the volume. Radius=3.5 Hemisphere= $4/3(\pi \times 3.5^3) \div 2$ Cylinder= $\pi \times 3.5^2 \times 11$ Add answers together Volume=	
**** Round answers to decimal places and significant figures		

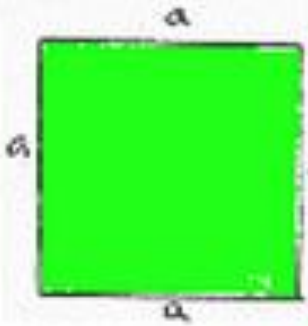
ALL THE SHAPE AND LUMP FORMULAS YOU'LL PROBABLY EVER NEED



TRIANGLE
Area $= \frac{1}{2}bh$



RECTANGLE
Area $= ab$ Perimeter $= 2(a+b)$
Diagonal $= \sqrt{a^2+b^2}$

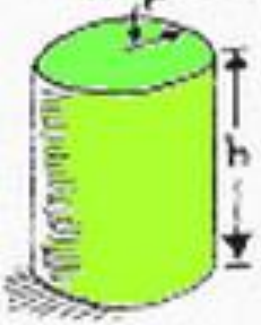


SQUARE
Area $= a^2$

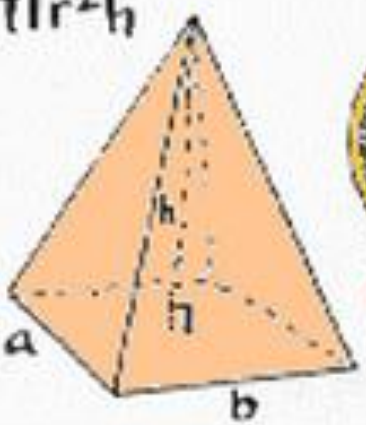
CUBOID
Volume $= abc$

CUBE
Volume $= a^3$

CIRCLE
Area $= \pi r^2$ OR $\frac{\pi d^2}{4}$
Circumference $= 2\pi r$ OR πd



CYLINDER
Volume $= \pi r^2 h$



PYRAMID
Volume $= \frac{1}{3}abh$

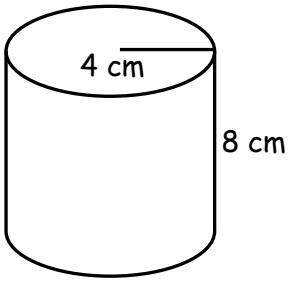
SPHERE
Volume $= \frac{4}{3}\pi r^3$

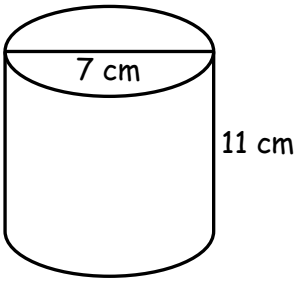
(cone is $\frac{1}{3} \times \pi r^2 \times h$)

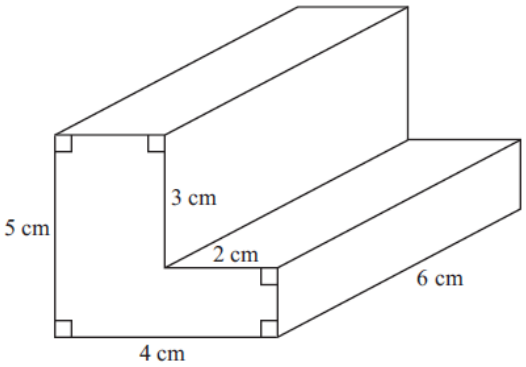
Practise Questions-

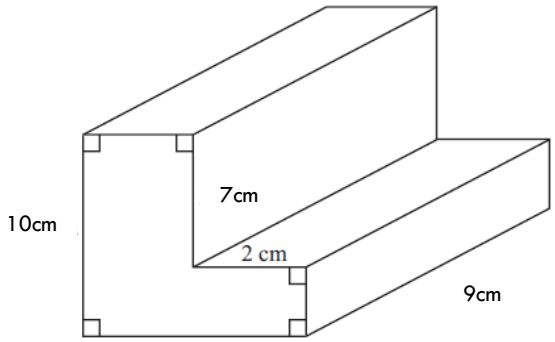
(do not do these questions on the sheet, you may want to do them again at some point!)

Find the volumes to 3 significant figures

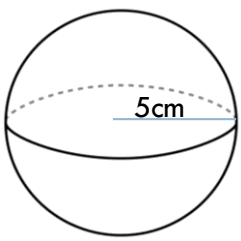


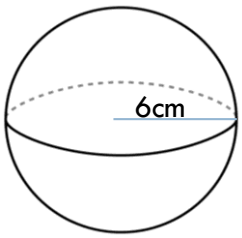


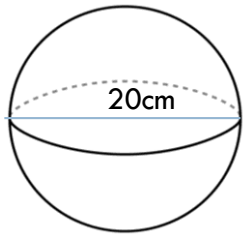


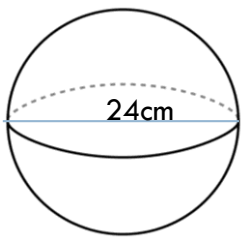


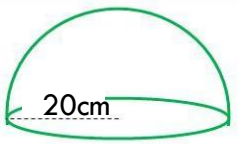
Find the volumes to 3 significant figure

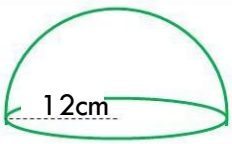




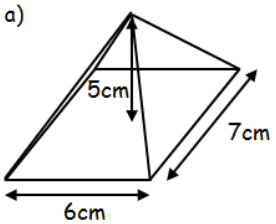




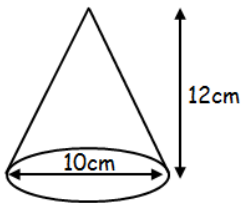




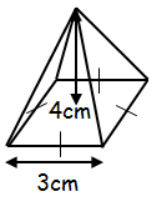
a)



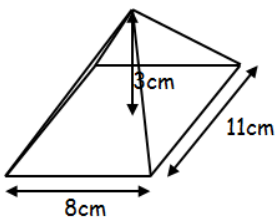
b)



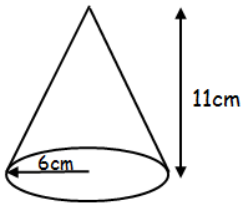
c)



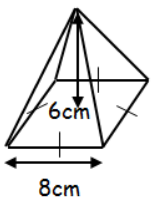
d)



e)



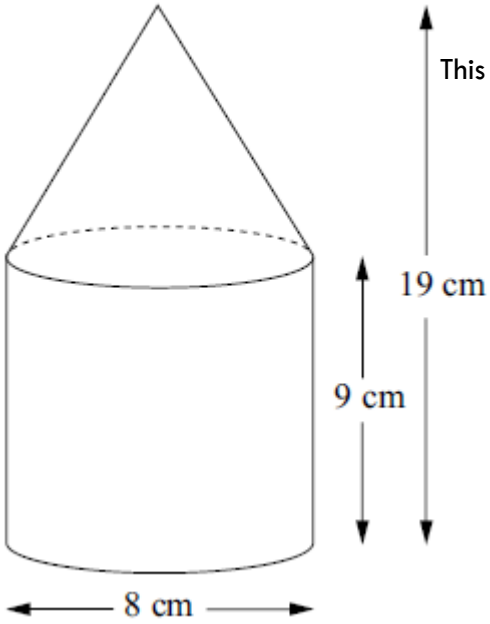
f)



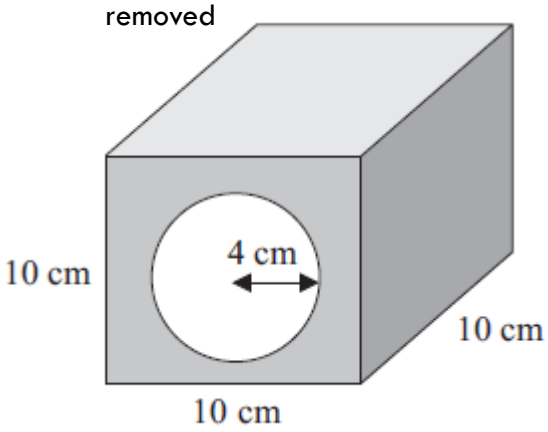
Bonus Questions

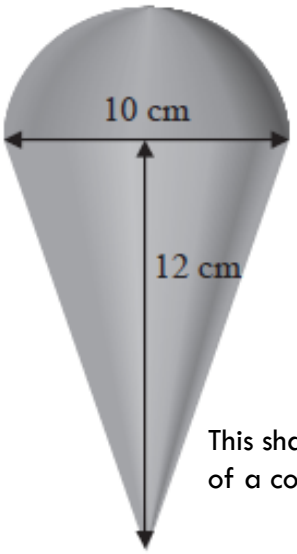
Find the volumes of the following shapes, give your answers to 3 significant figures

This shape is a cone on top of a cylinder



This shape is a cuboid with a cylinder removed





This shape is a hemisphere sitting on top of a cone