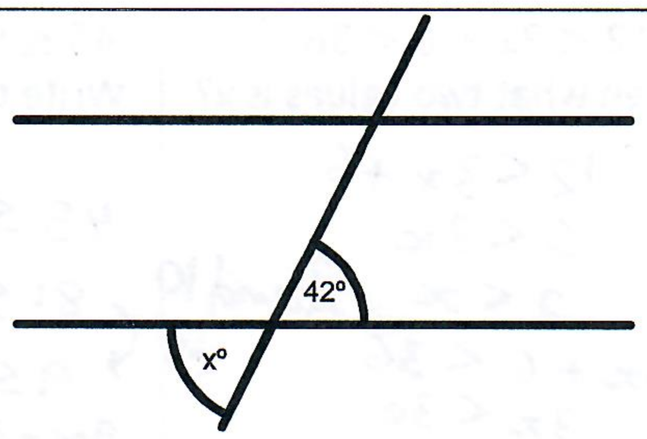
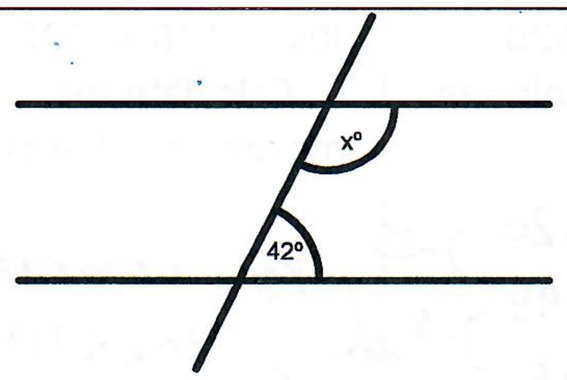
What angle and why?



$x = 42°$ (Vertically opposite)



$x = 180 - 42 = 138°$

(Cointerior angles total 180°)

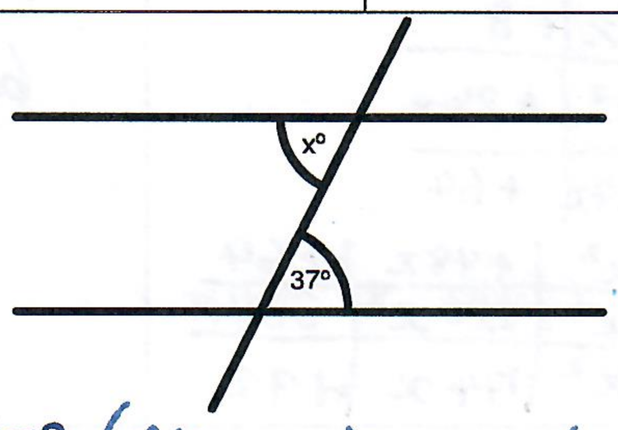
Angles about a point total ?

360°

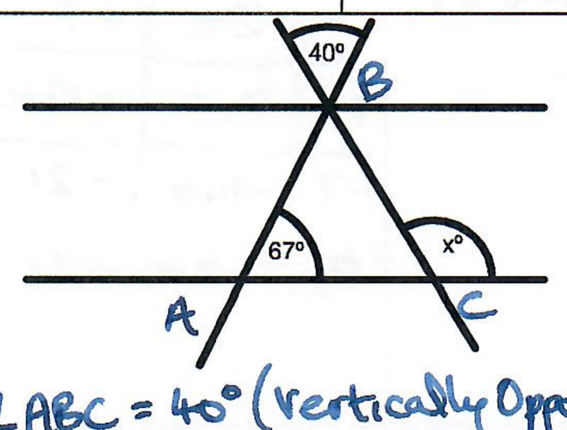
Factorise

16x-24	$4c^3 + 8c$	$2y^2 - 7y$	$\frac{3}{4}x + \frac{7}{8}$	$x^2 - 3x - 28$
$8(2x-3)$ 1 $2 \times 8 = 16$ $3 \times 8 = 24$	$4c(c^2+2)$	$y(2y-7)$	$\frac{6}{8}x + \frac{7}{8}$ $\frac{1}{8}(6x+7)$	$(x+4)(x-7)$

What angle and why?



$x = 37°$ (Alternate angles are equal)



$\angle ABC = 40°$ (Vertically Opposite)

$\angle ACB = 180 - (40+67) = 73°$

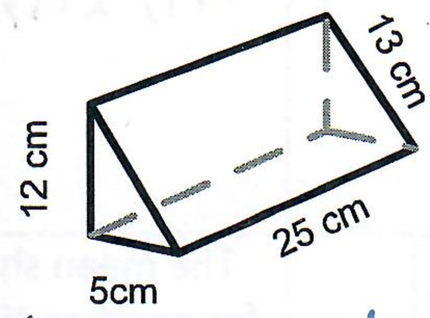
(Ls in a triangle total 180°)

$x = 107$ (Ls on a straight line)

Exterior angle in a nonagon?

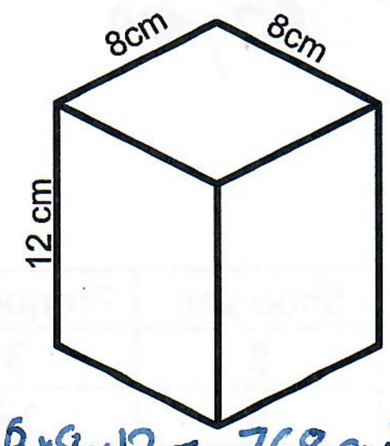
$\frac{360}{9} = 40°$

Volume



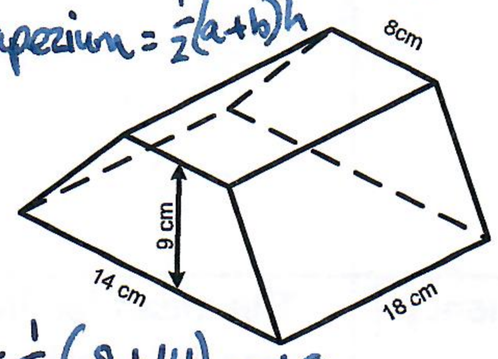
V = X sect area x length

$= \frac{1}{2} \times 5 \times 12 \times 25 = 750 cm^3$



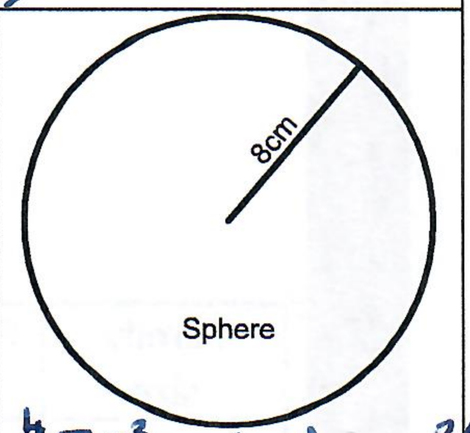
$8 \times 8 \times 12 = 768 cm^3$

Trapezium $= \frac{1}{2}(a+b)h$



$= \frac{1}{2}(8+14) \times 18$

$= 11 \times 18 = 198 cm^3$



$\frac{4}{3}\pi r^3 = \frac{4}{3}(512)\pi = \frac{2048}{3}\pi$

Percentage Increase

The price of fuel increases from £1.48 per litre to £1.71 per litre. Calculate the percentage increase.

$\left(\frac{1.71}{1.48} \times 100\right) - 100 =$

15.54054%

Bill grows from being 150 cm to 168cm in a year. Calculate the percentage increase.

$\left(\frac{168}{150} \times 100\right) - 100$

$= 12\%$

A cuboid pond is 3m by 1.5 m by 75cm deep. The owner increases the dimensions to 3.2m by 1.8m by 1.25m deep. Calculate the percentage increase in size.

$3 \times 1.5 \times 0.75 = 3.375$

$3.2 \times 1.8 \times 1.25 = 7.2$

$\left(\frac{7.2}{3.375} \times 100\right) - 100 = 113\frac{1}{3}\%$

Gas prices rise by 20%. The cost of my gas bill is now £165 per month. How much was it before the rise?

$\frac{165}{100+20} = \frac{165}{120} = 1.375$

1.375×100

$= £137.50$

Inequalities

$8x + 25 > 620$
Calculate the minimum value of x.

$8x + 25 > 620$)-25
$8x > 595$)÷8
$x > 74{\cdot}375$

$80x + 120 < 1200$
Calculate the maximum value of x.

$80x + 120 < 1200$
$80x < 1180$
$x < 14{\cdot}75$

$12 < 3x + 6 < 36$
Between what two values is x?

$12 < 3x + 6$
$6 < 3x$
$2 < x$
$3x + 6 < 36$
$3x < 30$
$x < 10$
2 and 10
÷9

$45 \leq 9x - 36 \leq 81$
Write the interval for x.

$45 \leq 9x - 36$)+36
$81 \leq 9x$
$9 \leq x$
$9x - 36 \leq 81$
$9x \leq 117$
$x = 13$
$9 \leq x \leq 13$

Formulae

Find s

$$s = ut + \frac{1}{2}at^2$$

u=2
t=40
a=7

$s = (2 \times 40) + (\frac{1}{2} \times 7 \times 40^2)$
$= 80 + 5600 = 5680$

Find v

v=u+at
u=2 t=45 a=7

$V = 2 + (7 \times 45)$
$= 2 + 315$
$= 317$

Is (2,-7) on the line $(x-2)^2 + (y+3)^2 = 16$?

$(2-2)^2 + (-7+3)^2 = 16$
$0^2 + -4^2 = 16$
So yes it is

The surface area of a ball is $4\pi r^2$.
How much leather is needed for a ball of diameter 34cm?

$34 \div 2 = 17$
$4 \times \pi \times 17^2 =$
$3631{\cdot}681108\ cm^2$

Algebraic Expansions

$6(3x + 2) + 4(5x - 2)$
$18x + 12 + 20x - 8$
$= 38x + 4$

$(2x + 3)(4x - 7)$

	$2x$	$+3$
$4x$	$8x^2$	$+12x$
-7	$-14x$	-21

$8x^2 - 2x - 21$

$(6x + 3)(3x + 8)^2$

	$3x$	$+8$
$3x$	$9x^2$	$+24x$
$+8$	$+24x$	$+64$

	$9x^2$	$+48x$	$+64$
$6x$	$54x^3$	$288x^2$	$384x$
$+3$	$27x^2$	$144x$	$+192$

$\left(\sqrt{a^2 + b^2}\right)^4$
$(a+b)^4$

Prime Numbers between

80 and 100

83, 87, 89, 97

20 and 30

23, 29

68 and 89

71, 73, 79, 83, 87, 89

260 and 290

263, 269, 271, 277, 281, 283

Find the mean size

Family size	Frequency
3	4
4	11
5	6
6	3

$\frac{(3\times4)+(4\times11)+(6\times5)+(6\times3)}{4+11+6+3}$
$= \frac{12+44+30+18}{24}$
$= \frac{104}{24} = 4\frac{1}{3}$

The mean family size for another group of 24 people is 2.25. Work out the mean for both groups of people combined.

$104 + (24 \times 2{\cdot}25)$
$= 158$
$24 + 24 = 48$
$\frac{158}{48} = 3{\cdot}29\dot{1}6$

Shoe size	Frequency
8	3
9	17
10	14
11	13
12	4

$\frac{24 + 153 + 140 + 143 + 48}{51}$
$\frac{508}{51} = 9{\cdot}960784314$

The mean shoe size for another 35 people is 12.4. Find the mean when both groups are combined

$12{\cdot}4 \times 35$
$= 434$
$434 + 508 = 942$
$51 + 35 = 86$
$\frac{942}{86} = 10{\cdot}95\ldots$

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Factorise

$(4x-25)^2$

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

$(4x-25)(4x+25)$

$16x^2-200x+625$

$(25x^2y^4-16x^6)^2$

$(5xy^2+4x^3)$

$\times(5xy^2-4x^3)$

Write 84 as a product of prime factors

84 $2^2 \times 3 \times 7$

7, 12

3, 4

2, 2

HCF(24,96)

$=24$

HCF(85,150)-HCF(12,34)

$5-2=3$

Inequalities =, <, >

$\frac{17}{5} < 3\frac{2}{3}$

$\frac{4}{5}$ of $35 < 2^5$

28 32

$\sqrt{\frac{16}{25}} > \frac{3}{4}$

$\frac{4}{5}$

$(\sqrt{64})^4 = 2^{12}$

4096 4096

Exchange Rates £1:$1.29

Which is the better value per item?
3 pairs of socks in the UK for £4.80 or 5 pairs of socks in the US for $8.20?

$4.80 \times 1.29 = 6.192$

$6.192 \div 3 = 2.064$

$8.20 \div 5 = 1.64$

USA

Which is the better value per item?
2 jumpers in the UK for £64 or 3 jumpers in the US for $126?

UK 41.28/Jumper

US 41/Jumper

USA

Which is better value per item?
6 holidays in Florida for £1500 or 5 holidays in London for $1800?

UK 322.50/holiday

US 360/holiday

UK → USA

Which is the better value per item?
3 pairs of shoes in the UK for £135 or 2 pairs in the US for $118?

UK 58.05

US 59

UK

Ratio

David plants orange trees and lemon trees in the ratio 5:3. He plants 15 lemon trees. How many orange trees does he plant?

$15 \div 3 = 5$

$5 \times 5 = 25$ orange trees.

Red cars and blue cars are sold in the ratio 3:7. 20 more blue cars are sold than red ones. If each car costs £16,500, how much money is paid for the cars altogether?

$7-3=4$

$20 \div 4 = 5$

$3+7=10$

$10 \times 5 = 50$

$50 \times 16500 = 825000$

Green cubes cost £30. Red cubes cost $1\frac{1}{2}$ times as much. The ratio of money spent on red to green cubes is 3:1. What is the minimum amount of money spent on cubes assuming that there was at least two of each colour?

Red £45 £330

270 : 60

Draw a scattergraph

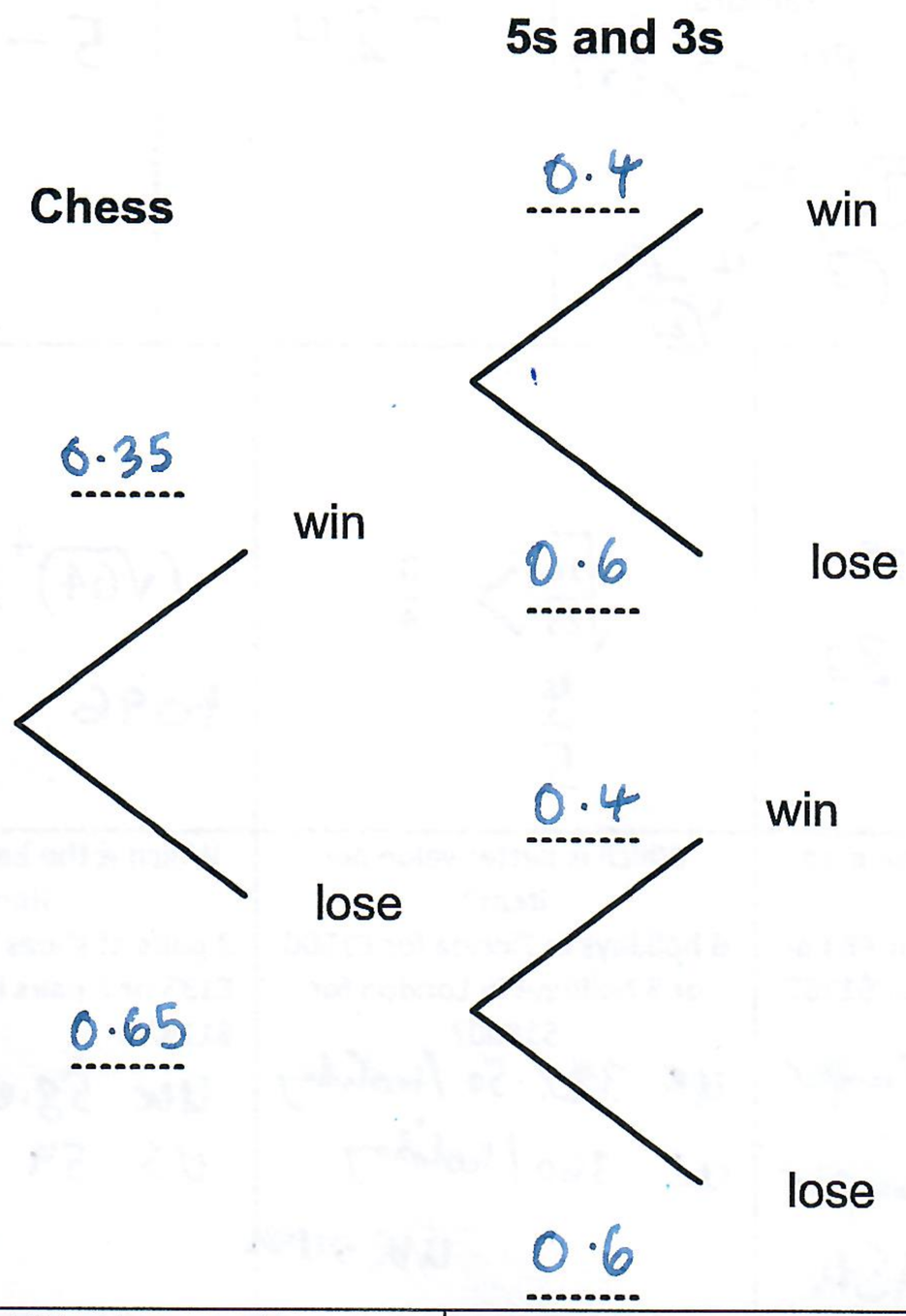
negative correlation

positive correlation

no correlation

Probability

The probability of Zach winning at Chess is 0.35. The probability that he will win at fives and threes is 0.4. Complete the probability tree diagram.



What are the chances of Zach winning at both games?

$0.35 \times 0.4 = 0.14$

What are the chances of Zach winning one game and losing the other?

$0.35 \times 0.6 = 0.21$

$0.65 \times 0.4 = 0.26$ +

0.47

Standard form

Write these numbers in standard form.	Write these numbers in standard form.	Write these numbers in standard form.	Write these numbers in standard form.
12	1293.392	6	0.007
1.2×10^1	1.293392×10^3	6×10^0	7×10^{-3}

Ordinary form

Write these numbers in ordinary form.	Write these numbers in ordinary form.	Write these numbers in ordinary form.
7×10^0	8.937×10^{-4}	3.938×10^4
7	0.0008937	39,380