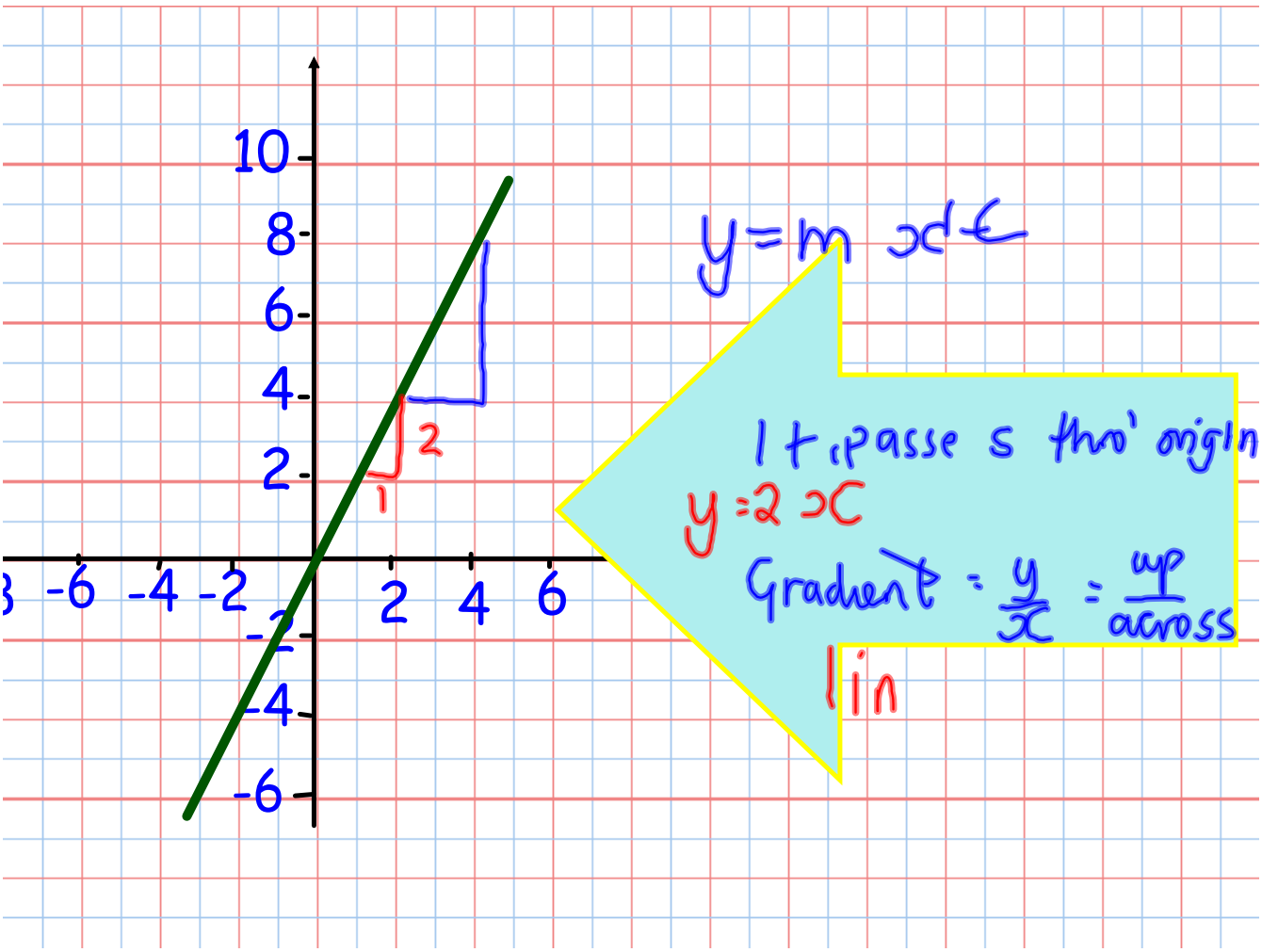
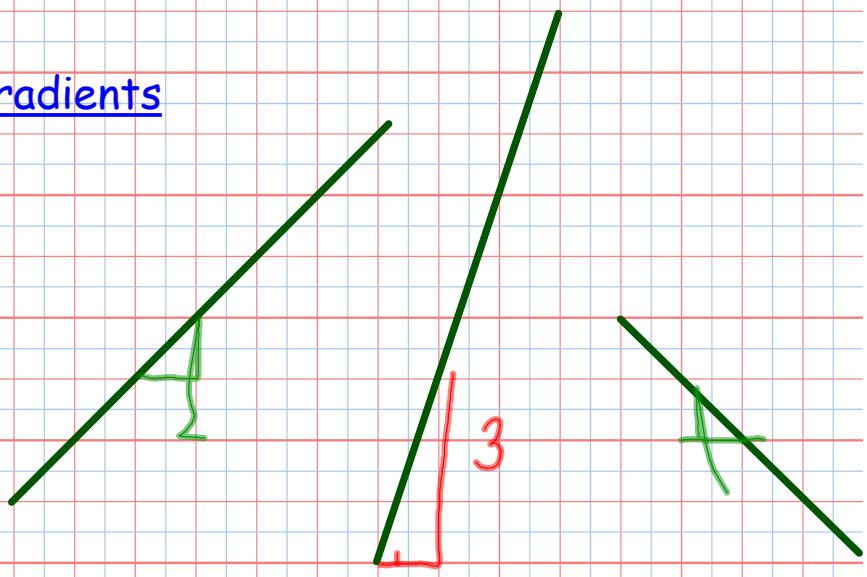

10
8
6
4
2
-6
-4
-2
2
4
6
-4
-6
2
1
y = m x + c
It passes thro' origin
y = 2x
Gradient = y/x = up/across
Win

Gradients



The gradient of a line = $\frac{\text{distance up}}{\text{distance across}} = \frac{y}{x}$

The gradient of a line joining 2 points

Find the gradient of a line joining

a) (0,0) to (5,5) $m = 1$

b) (0,0) to (4, 2) $m = \frac{1}{2}$

c) (1,1) to (11,11) $m = 1$

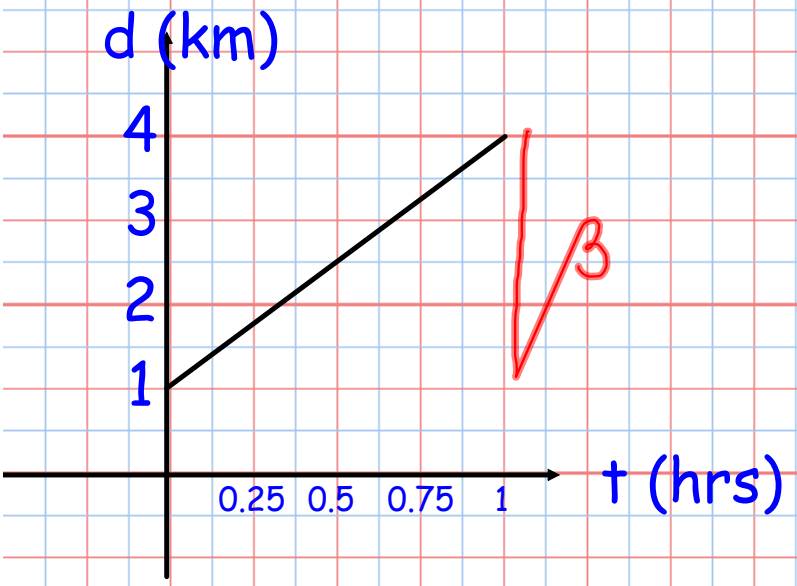
d) (4,5) to (5,6) $m = 1$

(x_1, y_1) (x_2, y_2)

page 128: A1

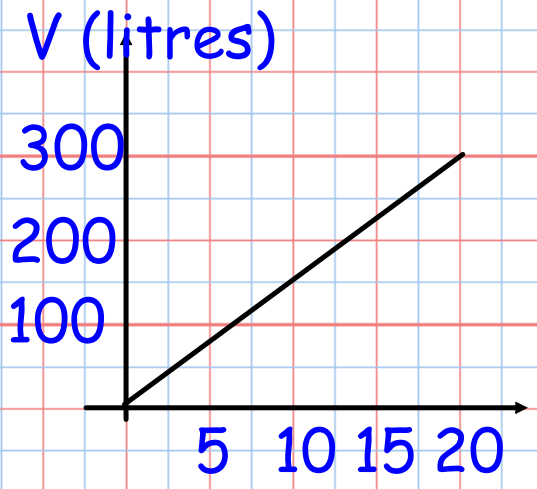
Gradient of line joining (x_1,y_1) to (x_2,y_2) = $\frac{y_2-y_1}{x_2-x_1}$

Rates of change



Find the speed.

3 km/h



Find the speed of filling the petrol tank in litres per min.

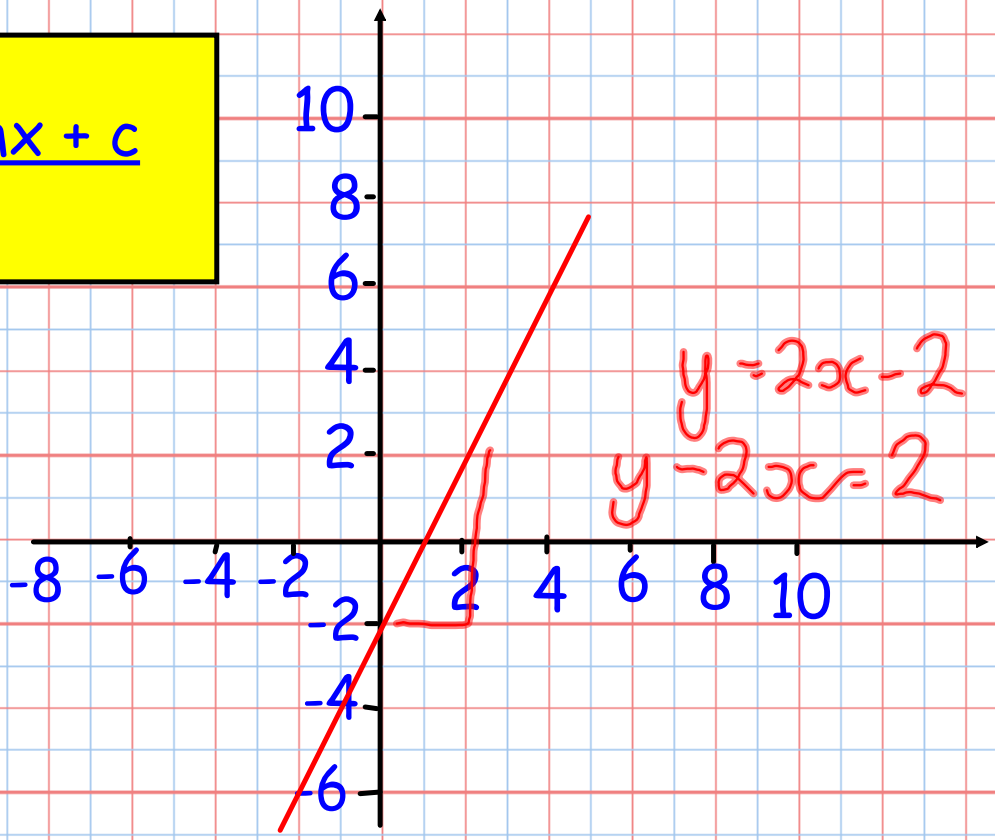
$\frac{300}{20} = 15$ l/m

km/h

1/2

Page 120 try all B questions

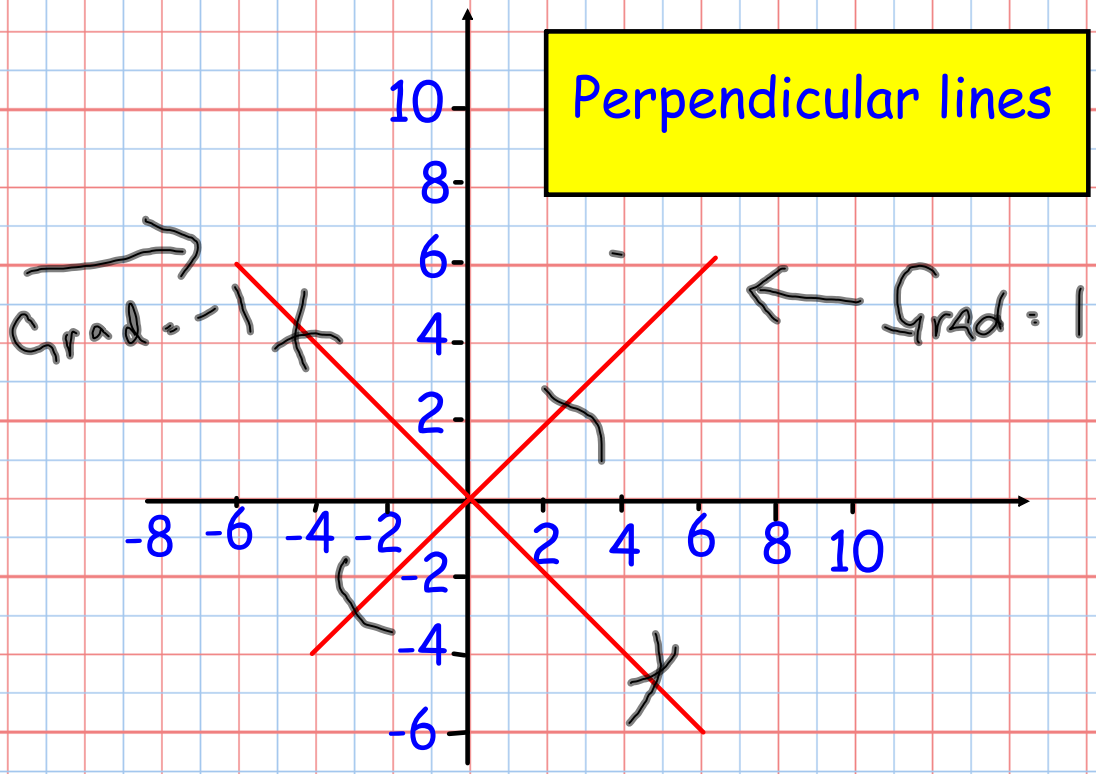
y=mx + c



Draw the graph of y = 3x.
Draw and name 3 parallel straight line graphs.

Page 130 C1 - C9 odds only, and C10. Ds!

Perpendicular lines



Draw a straight line graph with grad ≠1

Draw a line perpendicular to it.

Find its gradient.

If the gradient of a line is m, then the gradient of a line perpendicular is the negative, reciprocal of m: -1/m.

page 134 E1 and E2

Equations of line of best fit

monopoly mayhem

Draw a scatter diagram for the data.
Put in a line of best fit.
Find the equation of your line.
Estimate the cost of a property 50 spaces away from GO.
Estimate how far from GO a property costing £160 would be.

page 138 H3

Monopoly Mayhem

The game of Monopoly was created in 1935. Since then it has been published in 26 languages and is available in 80 countries across the world. 200 million sets have been sold and it is estimated that there is 300 billion pounds of Monopoly money in UK homes. For those of you who have never played, you move around a board with the option to purchase the property that you land on. As a property tycoon you are trying to bankrupt your fellow players and take home all the loot.

Property	Spaces from Go	Cost
Old Kent Rd	1	£60
Whitechapel Rd	3	£60
Kings Cross Station	5	£200
The Angel, Islington	6	£100
Euston Rd	8	£100
Pentonville Rd	9	£120
Pall Mall	11	£140
Electric Company	12	£150
Whitehall	13	£140
Northumberland Ave	14	£160
Marylebone Station	15	£200
Bow Street	16	£180
Marlborough St	18	£180
Vine St	19	£200
The Strand	21	£220
Fleet St	23	£220
Trafalgar Square	24	£240
Fenchurch St Station	25	£200
Leicester Square	26	£260
Coventry St	27	£260
Water Works	28	£150
Piccadilly	29	£280
Regent St	31	£300
Oxford St	32	£300
Bond St	34	£320
Liverpool St Station	35	£200
Park Lane	37	£350
Mayfair	39	£400

The properties vary in price. The more illustrious locations, like Park Lane, will, of course, cost you more. Looking at the table opposite, can you see a relationship between the spaces from GO and how much the property costs? One way of displaying this information is to plot a scatter graph. It clearly shows any patterns or trends in the data and helps you describe the relationship between the two variables (the things you are comparing - see the axis labels). Either plot this yourself, or use the graph ready prepared on the next page.

Can you see a relationship between 'Spaces from GO' and the 'Cost' of the property? Write a sentence to describe it. Are there any points which do not seem to fit the trend? Without looking at the table can you guess which properties they are?

In order to show the trend more clearly we can draw on the graph a 'Line of Best Fit', or 'Trendline'. Draw a line on your graph (or the one above) which best fits the points. We use this line to make estimates. For example, if you put a property 22 spaces away from GO, how much do you think it should cost? Why would this only be an estimate?

All straight lines can be written in the format $y=mx+c$. This describes the relationship between the x axis variable and the y axis variable. Find out what the 'm' and 'c' mean and try to calculate the equation of your Line of Best Fit.

You can use this equation to help you predict what might happen. Use your equation to find out the cost of a property that is 50 spaces away from GO. Why might this not be right? What assumptions would you be making?

In Monopoly you throw two dice for your turn. On your first go, how many spaces from 'GO' are you most likely to end up? Why?

The makers, Hasbro, tell us that the most landed on properties are Bow Street, Vine Street and Marlborough Street (the orange ones). Can you think why? Discuss with your class.

There are 10 tokens that represent the players on the board. Brainstorm or use this link to find out what they are:

http://www.monopoly.co.uk/index2.asp .

If you had first choice at the start of the game and you picked one at random what is the chance of you picking an animal? Would this probability be the same if you were choosing for yourself? Why?

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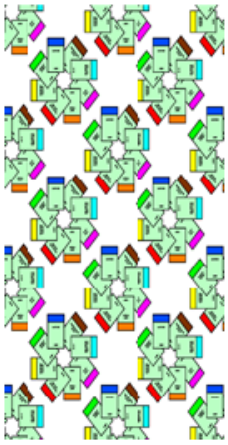
Graph created using Autograph V 3

Images courtesy of 'Monopoly' © 2004 Hasbro. Used with permission



Equations of line of best fit

Simultaneous Equations

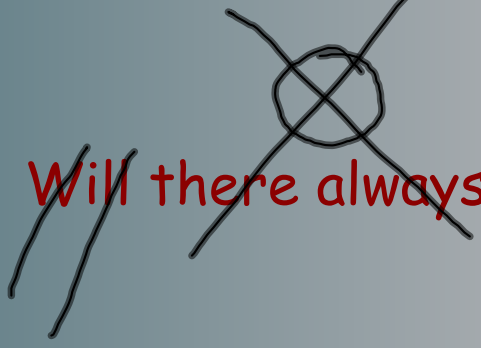
Method 3: Graphical

Draw graphs and find out where they intersect.

$3x+2y=4$ } $\times 2$
$y=2-\frac{3}{2}x$ $2x-4y=12$ }

$y=\frac{1}{2}x$ $6x+4y=8$ } +
$2x-4y=12$ }

$8x=20$
$x=2.5$



Will there always be a solution?

$5-4y=12$
$5-12=4y$
$-7=4y$
$-1.75=y$

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

$x=0 \Rightarrow 2y+3x=4$
$2y=4 \quad y=2$

$x=1 \Rightarrow 2y+3=4$
$2y=1$
$y=\frac{1}{2}$

$x=3 \Rightarrow 2y+9=4$
$2y=-5$
$y=-2.5$

How to find the equation of the line passing through two points

A/A*

Find the equation of the line that passes through (1,2) and (5, 14).

1. Find the gradient $= \frac{14-2}{5-1} = \frac{12}{4} = 3$

2. Find the y intercept

x	y
1	2
5	14

$y = 3x + C$

$y = 3 + C = 2$

$y = 15 + C = 14$

$y = 3x - 1$

Find the equation of the line that passes through (-3, 10) and (1, 2)

$G = \frac{2-10}{1--3} = \frac{-8}{4} = -2$

$y = -2x + C$

$y = -2 + C = 2$

$C = 4$

$y = 6 + C = 10$

$C = 4$

x	y
1	2
-3	10

$y = -2x + 4$

$y = 4 - 2x$

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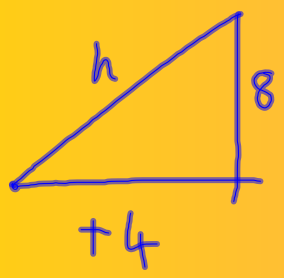
Find the distance between these 2 points.

(-3, 10) and (1, 2)



$h^2 = 8^2 + 4^2$

$= 64 + 16$

$h^2 = 80$

$h = 8.94\text{cm}$

page 187 even nos only