MisMaths

MisMaths is the term used here to embrace this particular collection of mistakes, misconceptions and misrepresentations involving mathematics, which have appeared in some media or other, at some time. In the context of an examination paper we would refer to such things as 'howlers'. Most of the examples given here were taken from newspapers, but other sources have also been used: radio, television, books, magazines and even conversation.

So what use are they? They can, of course, be perused merely for pleasure, raising a smile or a 'tut', and possibly pondering what was actually meant and how the mistake came to be made. But it is hoped that they will be used, with a suitable audience, to initiate some discussion on just exactly what the mistake is. In other words, providing a reason to talk about some mathematical concepts. It can be surprising how difficult it is to explain why something is wrong or funny. And, rather like a joke, if it has to be explained then much of the amusement is lost.

The sheets (1 to 6) provide a total of 136 extracts. All of them have been numbered as an aid to finding and referring to them. Very roughly they have been ordered with some thought as to their degree of complexity, but this is an extremely subjective assessment and will really depend upon the sophistication of the audience. Certainly Sheet 6 requires some work to be done upon most of the extracts to see what the error is. Of course it is much easier to detect an error when one is pointed directly at it as is done here, but it should be borne in mind that when the one or two sentences given are read in the context of a much fuller article, then they can be easily missed.

Introduction. For the purpose of introducing this work to a wider audience, 3 sheets have been provided here with 9 of the excerpts printed large. These can be made into ohp transparencies. If the supporting technology is available then the slide-show (available from the MisMaths opening menu) could be projected onto a screen. A summary of all the extracts used in that show is on the last two pages of these notes. For this purpose it is best if the computer display is set to 800 by 600 to maximise the size of each slide within the browser, and thus on the screen. Also it is better if all the necessary files can be downloaded beforehand rather than keeping a Web connection open with the attendant risk of losing it during the show, to say nothing of the download times of some of the slides. But all of this requires technology (and expertise) which is not yet available to most. Perhaps one day?

Continuation. Read (individually or in groups). Discuss? Explain? Why did it happen? Are there categories of errors? Look for other examples? Display? This is definitely a piece of work that only individual teachers can plan for and use with particular classes.

In view of these uncertainties, any further notes would be superfluous. But an explanation of one of the more frequently seen types of error might be useful. It arises when two or more fractions are being used to make comparisons. Often they do not add up either to 1 or to 100%; or else they do not entirely justify the conclusions being drawn. Consider this example:

> **Majority want a change!**
> **…** of all the people interviewed, only three eighths
> did not want a change while 40 per cent spoke
> overwhelmingly in favour. Just one person in five
> expressed no views on the subject.

Change each of the fractions into a percentage (37**.**5, 40, 20) and two things become apparent: 2**.**5% have gone missing, and the words 'only' 'overwhelmingly' and 'Just' are emotional rather than objective. Very likely it was not a deliberate attempt to confuse or mislead anyone, but the writer wanted some variation in expression (it sounds much 'flatter' if it is read with all the fractions given as percentages) and then got lost in doing the arithmetic and consequent rounding. There is a separate ohp master for that extract.

MisMaths ~ 1

1. Beware of special offers. Not all two for the price of three deals are as good a value as they seem.

2. Answer both questions.
Both questions carry equal marks.
The maximum mark for this paper is 121.

3. Their dividends can be held on the company's books for decades - or even longer.

4. The 203mm gun has a range of plus or minus eighteen miles and can do tremendous damage.

5. Belgium beat North Korea nearly 2 – 0

6. Police have doubled the number of officers on the beat to five.

7. "I rarely watch TV these days; I don't like the programmes", complained a woman. "Too true", replied her friend, " I switch mine off more than I switch it on."

8. "But isn't it the case that 50 per cent of your members are ready to accept this deal now?"
"That's not the case at all - quite the reverse in fact."

9. The ship is facing the wrong way and will need a 360° turn before sliding through the relatively tiny harbour entrance.

10. The claim that the estimated cost is in excess of £60 is untrue. The estimated cost is around £35 million.

11. The sharpest drop in the table was recorded by Bristol and West, which plunged eight places to fifth.

12. When the World Cup is beamed across the globe this year it will be watched by an estimated 15 billion people - three times the population of the planet.

13. In the days of steam it took around one hour 30 minutes to get from Liverpool Street to Stanstead. That has now been cut to 93 minutes.

14. INGREDIENTS: Cured pork and beef (pork, beef, salt, antioxidant - sodium l'ascorbate, preservative - sodium nitrite), sugar, spices, garlic.
NOT LESS THAN 100% MEAT

15. On an average weekday 4.5 million letters and 100,000 parcels are posted, and 3.3 million letters and 79,000 parcels are delivered.

16. He was the middle child in a competitive family of six in Oamaru, New Zealand ...

17. Postage, Packing and Insurance:
For orders up to £34.99 _ _ _ £2.50
For orders over £35.00 _ _ _ Free

18. The number of women professors will more than double from 12 to 20.

19. Last week new data revealed Glaswegians died younger and more frequently than anywhere else.

20. Copland has a number of new and enhanced features which will maximise the time you spend using the computer.

21. The council tax and grant system is immensely complicated. Some of the mathematical factors in the 64 pages of calculations run to thirteen decimal points.

22. British Rail is failing to inform passengers of cheap fares sold by the rival train companies now running on the network. Staff are refusing to disclose tickets offering savings of 200% when there are different companies operating similar routes.

23. The £10 Christmas bonus will go to about 13.1 pensioners this year, the Social Security department said last night.

24. There is already a small national nature reserve in the Wash, covering less than one square mile. This is being expanded tenfold to cover 35 square miles.

25. A police source said the incident was being treated as atempted murder, and described it as "a domestic, eternal triangle situation" involving at least four people.

26. The prison was designed to hold two inmates in a cell, today it has 800.

27. Around a quarter to one third of the women recruited to IBM as graduate trainees are female.

28. He broke off as, with a splintering crash the maintop-gallant canted over, the sail whipping madly in a web of parted rigging, while the yard itself snapped into equal halves before pitching towards the deck.

29. Professor Parkinson said: "The 1999 eclipse will be seen as total at the tip of Cornwall, but in Exeter, the eclipse will be 99.6 per cent total, but I can assure you that the extra 0.6 per cent is worth all the effort it will take to witness it."

30. These figures coincide to establish that the yew grows about a foot in girth every 30 years. Rich or poor soil can add or subtract about five feet to this figure.

31. Some companies have already reported cost savings of as much as 1000 per cent.

32. The Russian wrestler stands 6ft 3inches ... He can stand upright and kick a chandelier hanging eight feet over his head ...

33. More than half English 11-year olds have below average reading skills.

34. A bottle of wine a day keeps death at bay according to Danish researchers who have found that drinking three to five glasses daily reduces the overall risk of death by half.

35. With a £4 million purse awaiting him, he was quick to draw attention to the challenger's £20 million pay cheque. "I'm not a greedy man, but Tyson is getting 16 to 20 times more than I'm getting", Bruno said. "Would you be happy if you were the champion and were being treated like the challenger?"

36. When the tape is not long enough to record all the tracks on a CD in their original sequence, it is sometimes possible to record all the tracks by re-aranging their order.

37. Srinivasa Ramanujan: born in 1877, invited to Cambridge 1914, produced work of highest quality in the theory of numbers, died of tuberculosis at the age of 32.

38. In the survey ... 74% of those who responded were female and 22% male. 4% were undecided.

39. Few programmes can boast a 100 per cent increase in their viewing figures since first going on air, but *Match of the Day*, which celebrates its 30th birthday this week proudly makes that claim. The first programme ... attracted just 50,000 viewers. Tonight ... it is estimated that the audience will be in excess of five million.

40. Drop-out rates are said to be rising. *Push*, the alternative university guide, claims that one in eight students fails to complete the course because of overcrowding and student debt. The CVCP insists the figure is lower - around 13 per cent.

41. Heart by-pass operations have risen by a quarter since the appointment of a fourth cardiac surgeon at the local hospital. Twenty patients are now being operated on every week, compared with fifteen before the new appointment was made.

42. The baby-boomers have now been replaced, in real estate language at least, by the baby-busters. These are apparently, couples who have no, or fewer, children.

43. By the end of September, 272 770 people had flocked into the city's tourist office in Wheeler Street - and that is not counting visitors who did not go there.

44. The Lebanese pound has lost more than 100 per cent of its value against the United States dollar in the past three years.

45. A young man approached us. He was wrapped up against the biting 38 degrees centigrade cold, his face barely visible.

46. In Leningrad in December, beset by wet snow and Baltic gales, the number of hours of sunshine per day, averages an appalling zero.

47. Some goverment advisers are arguing that it would get a better price by selling 69% now and the remaining 40% later.

48. The chimpanzee appeared to be able to count up to four objects with accuracy. When the number of objects was between five and six the number of mistakes increased.

49. The direction of the North Pole is different for every point on Earth.

50. The RAF fighter pilor Andy Green drove his Thrust SSC car on the fastest officially timed run in land speed racing history, but missed breaking the sound barrier by a frustrating 0.003 per cent of the speed of sound ... Timing officials gave the run a provisional Mach 0.997

51. A third of members wanted conversion last year. A third is a big majority. Yes it's not the whole majority ...

52. More than two fifths of men aged 20 to 24 smoke, the highest proportion in any age group. Women of 20 to 24 are not far behind, with more than two thirds lighting up, according the the latest official survey of British life-styles, published today.

53.   THIS WEEK in NORTH WALES
            August 19th - September 1st

54. In fact men who did less than 20 minutes of walking a day were twice as likely to die than men who did more than an hour every day.

55. We also learnt simple division by repetition. Having thus established that six divided by two was three, it was but a small step to determining that the value of pi to ten decimal places was 3.1428571429

56. Bolitho saw the damaged chebeck ... and managed not to watch the seamen frantically trying to reload [the cannon] before she was gone from view. But a Long Nine normally had a crew of fifteen men to attend its need. Meheux had half that number.

57. Coaching Fees are Per Person Per Hour (Divide by 50% for 30 minute sessions.)

58. A snowflake is made up of millions of water molecules - ten plus sixteen zeros.

59. ... although levels are perilously low. Kirkless is now 137 per cent of capacity, Calderdale 183 per cent and Leeds 20 per cent.

60. His height was 5 feet 6½ inches without shoes ... or 5 feet 3 inches without boots.

61. Some overseas call will be as much as 111 per cent less than Mercury.

62. At the moment the average daily intake is about 1.3 milligrams, but some people may be eating less and some more.

63. Folding wings could complicate further the development of an already complex wing structure for the 777 which is capable of carrying huge jet engines with diameters of 120 feet or more.

64. As far as babies are concerned, one and one do not make two. One and one make at least one cubed. To put it another way having a second baby amounts to a lot more than having twice what you had before.

65. The June figures will show unemployment at the minus 3 million level.

66. The ECU is the standard financial unit used by the EEC and currently equals £0.70p. One million ECU equals about £600,000

67. Statistical projections from such figures have been used to indicate that by the year 2000 the number of AIDS cases could be 100 million times the population of the world, but among official bodies only West Germany's Ministry of Health believed this possible.

68. In some places there just aren't enough dormice. In other places they seem to be reasonably numerate.

69. A proposal to reduce the work force by one third proves that this will result in it being decimated.

70. At Princeton, reading English, I saw no computers in anyone's room up through the year I graduated, 1981. At Oxford University, where I spent the next two years, computers were even scarcer.

71. The annual subscription is to be increased to £2.20 in order to make division by 12 easier.

72. However, it was still far below the US government's safety level ... If everyone in the US had drunk water with this level of plutonium for a lifetime, the number of deaths from all causes in the last year would have increased by less than one.

73. Accident statistics show that you are far more likely to be seriously injured as a result of an accident than you are to die. This means **. . .**

74. The rock, valued at $500,000 was cut from one of the biggest diamonds ever discovered **. . .** "The savviest jewellers can't wait to grab it at the auction", explains a gem merchant. "The plan is to cut it down into 40 to 80 little diamonds, mount them in a variety of ways, and market them as Jackie Kennedy relics at $2000 to $4000 apiece."

75. The most powerful arithmetical computer known to man, capable of opening up realms of knowledge never before accessible to mankind has finally been put together. The four man team who built it last year computed π, the ratio between the diameter and the radius of a circle, to more than one thousand million decimal places.

76. You may remember that *pi* is something to do with calculating dimensions of a circle and derives from dividing 22 by seven, a sum that can be continued indefinitely. Most folks are happy to leave the solution at 3.14 but last week Yasumasa Kanada, a professor at Tokyo University, announced he had calculated it to a billion decimal places on a supercomputer.

77. Lewis produced her career-best effort, 15.27 metres, to win the shot and move into first place before slipping back with a poor 200 metres.

78. "Variation in health between different electoral wards is considerable. In dental decay we can find as much a five-fold difference. For instance, in one ward there may be a 70% incidence of dental decay while in another ward 70% have no dental decay."

79. "We sold 7,000 tickets for tonight's performance, but I have heard that two people decided to stay at home to watch the World Cup Final on television. That means that there are 6,998 people here tonight - an impressive 96 per cent turnout"

80. The final figure raised from all events at the Summer Festival will be in excess of £4,900. The Church Hall Rebuilding Fund will get 2/3 and the Church Army and Children's Society will each receive 1/3.

81. Out of every 100 young adults who start smoking when they are teenagers, 1 will be murdered, 6 will die on the roads, and 250 will be killed by smoking.

82. America's mid-west is not easily shaken, but thanks to one man's prediction that a severe earthquake will strike **. . .** The dreaded day is December 3 when the sun and moon will be directly in line with one another.

83. Cars 50% cheaper in Europe
Car manufacturers launched a counter-attack yesterday against a Monopolies and Mergers Commission investigation showing some British pre-tax car prices are 50% above comparable Continental levels.

84. More than 2.25m people in the UK hold charge cards and owe an average of £150m each.

85. If you can produce 20 per cent more milk per cow you can decrease your herd by 20 per cent to produce the same amount of milk.

86. A person holding just £1000 of Premium Bonds may expect to win a prize every year. A person holding £500 could expect 5 prizes a year.

87. Every insurance disc shall be in the shape of a rectangle.

88. 4% of nothing is nothing. We want 12% !

89. The number of varieties is 24. One of each would require a planting area of 4 square metres (3 metres long by 1 metre wide).

90. Half of Zimbabwe's 3.8 million women and 20% of the total population of 7.5 million suffered, or are suffering from, the disease.

91. With 50% off the sofa, 25% off the light and 35% off that smart little table, I've just saved 110%

92. The facts about speeding are clear. At 20mph, one in 20 pedestrians are killed, at 30mph half are killed and at 40mph only one in ten will survive.

93. On the empty desk stood an empty glass of milk.

94. For example, not only can you calculate an expression like $(3 + 4)^2 = 49$ you can also solve an algebraic equation like $(3 + x)^2 = 9 + 6x + x^2$

95. The 2.5 million customers who have kept the shares since Abbey floated in July 1989 have seen their value rise from 130p to over 900p this week. Few other investments have grown seven-fold over just eight years. You could say the shares have almost doubled in value each year.

96. Take any calculator and work out 4×-5 which should be -20. "Most calculators I have tried this sum on give -1 without reporting an error." he says. "There is a way of getting the right answer, but it involves mangling the algebra."

97. However, as lighter doses of anaesthetic were used, more patients began to wake. In the 1960's about 3 per cent of patients had some recollection of of their operation. Today the figure is nearer one in 1,000.

98. The golden mean appears throughout art and nature, including the human body, in the ratio of the total height of the average adult to the height of his/her navel. For a newborn child the ratio is 1:1.

99. Inserting a bracket ... can transform the meaning of a line just as much as a bracket can alter a line of algebra: for we all remember do we not that $x^2 + x^3y^2 + 173$ is a very different kettle of fish from $x^2 + (x^3y^2) + 173$.

100. Backing a show or a play is like playing roulette. In the West-End, investors have a three-in-ten chance of making a profit, one-in-ten chance of a runaway success, seven chances in ten of making a loss, and four-in-ten of losing all.

101. By the simple addition of fractions, which so many people seem unable to do these days, it is suggested that the result of merging the 17/21 and 16/5 Lancers to form a new regiment, should be called the 105/521.

102. In the sciences the quantity of data is doubling every five years, but in the business world there is exponential growth.

103. It all depends on the difficulty of factorising very large prime numbers.

104. Readers may wish to tell their classes that the equation $y - b = m(x - a)$ for a line through (a,b) with gradient m can be re-arranged as $m(x - a) = b - y$

105. In fact men who did less than 20 minutes of walking a day were twice as likely to die than men who did more than an hour every day.

106. For roses, trees, flowers and vegetables, mix 1/2 peat moss and 2/3 good soil to a depth of six inches.

107. Distinguished visitors were invited to marvel at young Zerah's powers ... he was asked to confirm that 4 294 967 296 was a prime.

108. The latest figures on drink-driving show the crackdown is failing to deter Hampshire motorists. The proportion who fail in Hampshire is well above the national average say the Association of Chief Police Officers. One in ten Hampshire motorists fail compared to one in seven for the country as a whole ... Compared with last year's results Hampshire motorists showed a 2% reduction in the number of failed tests but nationally the decrease was just one-half per cent. The superindent of Hampshire's traffic operations described the results of the survey as very disappointing.

109. Flight 427 had banked sharply to the left, rolled more than 180 degrees - past the point at which its wings were perpendicular to the ground - and dropped 6000 feet in 23 seconds.

110. The prisoners had 75 sq cm of living space each and were packed 140 to a cell, with one tiny window and one toilet, and sleeping in shifts.

111. Fourteen per cent pay less than £60 a week; 34 per cent pay less than £79; 27 per cent pay less than £100.

112.
Dear Editor,
I have a bumblebee nest in my garden. Not being inclined to investigate it too closely, it would still be interesting to know the size of its current population.
So, over a period of time I counted the number of bees entering and the number of bees leaving. The maximum difference that occurs between the two numbers will be the minimum population of the nest.
Yours faithfully

113. The Duke of Buccleuch owns 2,700 acres equivalent, his agent calculates, to a mile-wide, 400 miles long corridor, running from Scotland to London.

114. The fire-fighters say they used 50,000 cubic litres of water a second. Over the 15-odd hours they battled the flames, that's nearly 50 million cubic litres. A thousand swimming pools-worth for those who live in the suburbs.

115. At the water treatment plant ... cleaned water from the Ouse cascades into each tanker. Most hold 200 tonnes and it takes just a minute to be pumped in. It takes one 200-tonne load to keep an average street of between 30 and 40 houses in water for a single day. "If you were to think of water being delivered in the same way as milk, an average family would need 96 pints a day. That is the equivalent of one and a half milk floats" explains the Yorkshire water press officer.

116. If one sells a 172 gram lump of parmesan cheese for £2.60 while the grocer next door has only 220 gram lumps for £3.45, the shopper is unlikely to know that the second retailer is 20 per cent more expensive.

117. What is the legal limit?
80 ml of alcohol per 100ml of blood ... You fail ...

118. A resting individual consumes 0.25 litres of oxygen a minute. At this rate would take 39 hours to use the oxygen in a 12-litre aqualung.

119. "When I first went out we had 240 stones of pilchards on board ... Then on another trip we took a whole ton, with several other hauls of 200 stone."

120. Members of the Town Council Planning Committee considered an application by Coral Racing Limited for the erection of two satellite dishes on the rear extension roof of their shop. Mr ... said that one was 900m in diameter and the other 1500m in diameter. "They will not generally be visible from the street" he added.

121. It is predicted that, because of the greenhouse effect, by the year 2050 the country will be more than 3°C (37.4°F) warmer.

122. These locomotives are some of the most powerful ever built, rated at 7700 hp or 5.76 milliwatts.

123. Today the Tour de France covers the 55 mile stretch from Bourg-D'Oisans to Villard-de-Lans, which at times reaches over 857mm above sea level.

124. The company has applied for permission for an extension of 55 486 feet at the rear of the present shop.

125. ... the Ashkenazys began in one room eight metres square. It soared to 23 square metres when Vladimir's competition endeared him to the party leaders, and it reached palatial proportions - 36 square feet - after he won a piano contest in Brussels.

126. Her temperature climbed to 102 degrees Celsius nearly every night.

127. The reservoir ... will have a capacity of $27\,000\text{cm}^3$ ... it will supply Brechin and Montrose.

128. This week's programme features a nurse attached to 15 clinics within a 700 square mile radius of Bath.

129. The metric equivalent of the calorie is the kilojoule.

130. Each year, visitors to Disneyland buy enough soft drinks to fill a five acre lake.

131. Farmers at the Lenin collective farm ... will have no problem in getting their usual 4200 kilos of winter wheat from each hectare. (That's 10,375 kilos per acre.)

132. Yesterday 20,000 people joined hands to try to form a 57-mile human chain from Chimonix to Geneva.

133. A circle is divided into 360 degrees, each degree into 60 minutes, and each minute into 60 seconds: so one second is 1/1000 of a circle.

134. John reckons to have built between nine and ten thousand model ships working an average 120 hours on each one.

135. If your elephant doubles in height and width its volume will be cubed.

136. Woodward's staff, it said, had worked out that the Falklands consisted of 4,700 square miles of territory with 10,000 Argentinians on them. This meant that there was only 0.47 Argentinians to each square mile.

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In some places there aren't enough dormice. In other places they seem to be reasonably numerate.

For planting roses . . . mix 1/2 peat moss and 2/3 good soil to a depth of 6 inches.

If you can produce 20 per cent more milk per cow you can decrease your herd by 20 per cent to produce the same amount of milk.

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Majority want a change!

... of all the people interviewed, only three eighths did not want a change while 40 per cent spoke overwhelmingly in favour. Just one person in five expressed no views on the subject.

only 37.5% did not want a change while 40% spoke *overwhelmingly* in favour. *Just* 20% expressed no views on the subject.

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