Level 3: Number, Money and Measure
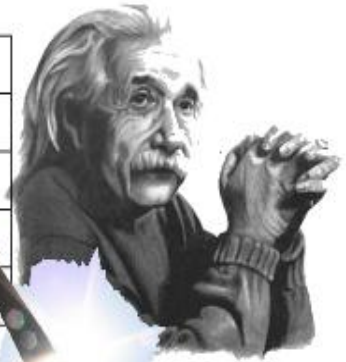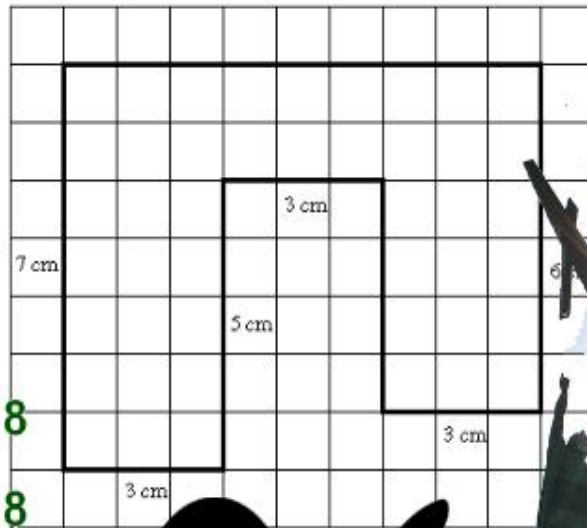
$1/4 + 1/4 + 1/2$

Step 1: $6h = 18$

Step 2: $6h = 18$
          $\div 6 \qquad \div 6$

Step 3: $6h = 18 \div 6$
          $\div 6 \qquad\quad 3$

Step 4: $h = 3$

3 cm

7 cm

5 cm

3 cm

3 cm

Level 3: Number, Money and Measure

Contents

1. Level 2 Recap

1.	Round the following to the **nearest 10**:

a) 26	b) 81	c) 45	d) 159	e) 203

2.	Round the following to the **nearest 100**:

a) 120	b) 480	c) 750	d) 195	e) 921

3.	Round the following to the **nearest 1000**:

a) 1100	b) 3090	c) 4500	d) 8900	e) 500

4.	Round to **approximate** the answers to the following:

a) 39 x 41	b) 402 x 11	c) 699 x 19	d) 516 x 49

5. Write the answers to the following:

a) 45 x 10	b) 85 x 100	c) 479 x 1000

d) 800 ÷ 100	e) 6780 ÷ 10	f) 87 000 ÷ 1000

6. What does the **5** stand for in each of these numbers?

a) 52.37	b) 15.14	c) 39.51	d) 27.45

7. Write these numbers out in order, **smallest first**.

0.004, 0.4, 0.04, 0.044, 0.045, 0.005, 0.05

8. Work out the following:

a) 3.5 + 8.12	b) 6.2 - 5.98	c) 12.8 x 2	d) 13.5 ÷ 5

9. Calculate:

a) 45.3 x 10	b) 4.12 x 100	c) 63.42 ÷ 10	d) 4.32 ÷ 100

10.	Using the correct order of operations, work out the following:

(a) 2 x 3 + 2 x 2	(b) 5 x 5 - 8 x 2	(c) 27 ÷ 3 + 9 ÷ 3

(d) 50 x 2 - 50 ÷ 2	(e) 2 x 12 - 40 ÷ 5	(f) 100 ÷ 2 - 24 x 2

11.   Calculate the following:

(a) $\frac{1}{2}$ of £10   (b) $\frac{1}{3}$ of £27   (c) $\frac{1}{4}$ of £28   (d) $\frac{1}{5}$ of £50

(e) 50% of £40   (f) 10% of £100   (g) 25% of £24   (h) 5% of £200

12.   Find three fractions **equivalent** to the following:

(a) $\frac{1}{2}$ (b) $\frac{1}{3}$ (c) $\frac{1}{4}$ (d) $\frac{1}{5}$ (e) $\frac{1}{10}$

13.   Write these fractions in their **simplest** form:

(a) $\frac{30}{40}$ (b) $\frac{10}{30}$ (c) $\frac{10}{15}$ (d) $\frac{4}{8}$ (e) $\frac{6}{18}$

14.   Callum has antique football cards. He bought one of them for £1.
He has since sold it for £5.
Calculate his profit.

15.   Sophie bought her dolls house for £100. It is now an antique and she
can sell it for at least £250.
What profit will she make if she sells it?

16.   Change the following into **hours** or **hours and minutes**:

(a)   60 minutes   (b)   120 minutes   (c)   240 minutes
(d)   75 minutes   (e)   125 minutes   (f)   180 minutes

17.   Convert the following into **24 hour time**:

a) 3.40 am   b) 7.15 pm   c) 10.20 am   d) 12.55 pm   e) 5.05 pm

18.   Convert the following into **12 hour time**:

a) 04:30   b) 11:20   c) 13:15   d) 09:40   e) 12:05

19.   Fiona is driving from Glasgow to St Andrews. She leaves at 09:23 and
arrives at 12.09 pm.
Calculate her journey time using an appropriate method.

2.   Whole Number Calculations (MNU 3-03b)

1.   Work out the following:

   a) 354 + 1937   b) 2457 + 1577   c) 2291 + 12 101   d) 46 123 + 9871

   e) 313 - 88   f) 432 - 355   g) 1214 - 966   h) 3512 - 2150

   i) 179 x 5   j) 891 x 6   k) 612 x 4   l) 9027 x 7

   m) 92 ÷ 4   n) 133 ÷ 7   o) 378 ÷ 6   p) 4203 ÷ 9

2.   Calculate:

   a) 12 x 100   b) 22 x 100   c) 157 x 10   d) 75 x 10

   e) 300 x 1000   f) 900 x 100   g) 510 ÷ 10   h) 8100 ÷ 100

   i) 8000 ÷ 10   j) 19000 ÷ 1000   k) 12 340 ÷ 10   l) 90 000 ÷ 100

3.   Calculate:

   a) 53 x 200   b) 19 x 60   c) 105 x 300   d) 71 x 4000

   e) 320 ÷ 40   f) 6400 ÷ 800   g) 12 000 ÷ 500   h) 720 000 ÷ 9000

   i) 400 x 40   j) 9000 x 700   k) 20 000 x 7000   l) 500 000 x 20

3. Decimal Calculations (MNU 3-03b)

1.   Work out the following:

   a) 2.3 + 8.5   b) 1.73 + 5.19   c) 3.5 + 8.12   d) 12.33 + 9.8

   e) 7.4 - 5.2   f) 13.6 - 10.8   g) 1.75 - 0.9   h) 6.2 - 5.98

   i) 3.2 x 5   j) 12.8 x 2   k) 5.91 x 3   l) 303.19 x 4

   m) 54.6 ÷ 6   n) 8.4 ÷ 7   o) 13.5 ÷ 5   p) 127.5 ÷ 3

2.   Calculate:

   a) 1.2 x 10   b) 45.3 x 10   c) 3.43 x 100   d) 17.24 x 10

   e) 0.87 x 100   f) 9.213 x 1000   g) 52.1 ÷ 10   h) 13 ÷ 10

   i) 123.1 ÷ 100   j) 2.34 ÷ 10   k) 4.12 ÷ 100   l) 13.24 ÷ 1000

3.   Calculate:

   a) 4.32 x 200   b) 1.85 x 20   c) 3.21 x 400   d) 8.101 x 4000

   e) 32 ÷ 40   f) 5.6 ÷ 70   g) 15.55 ÷ 500   h) 63.42 ÷ 70

4.   Real Life Whole Number & Decimal Problems (MNU 3-03a)

1.   The attendance at both legs of a Champions League semi-final were 79,321 and 85,603. What was the total attendance over both legs?

2.   Fireman Sam earns £9 per hour. In the last month he has worked 180 hours. What was his total wage for the month?

3.   Sean spent £4 on apples. Each apple costs 40 pence. How many apples did he buy?

4.   Amy had €246 for spending money on holiday. She spent €197 during her holiday. How many euros did she have left?

5.   Winners on a National Lottery syndicate have to share £350,000. There are 8 people on the syndicate. How much does each person get?

6.   During a task on the Apprentice, a team sell yoghurt to the public which costs £1.25 to make. They sell the yoghurt for £3.50. What is their profit on each yoghurt?

7.   Brian bought a new TV. He paid a deposit of £129.99 and will make 12 monthly payments of £39.99. How much will he pay for the television altogether?

8.   A pack of 8 plums costs £4.56. How much is it for 1 plum?

9.   An airport minibus holds up to 9 passengers. A group of 115 tourists need transport to the terminal. How many minibuses will it take to transfer all the tourists?

5.   Rounding to the Nearest Decimal Place (MNU 3-01a)

1.   Round the following to the **nearest whole number**:

a) 2.6   b) 8.1   c) 4.5   d) 15.9   e) 20.3

f) 67.8   g) 9.5   h) 7.11   i) 2.92   j) 0.6

k) 14.22   l) 50.57   m) 399.9   n) 6.001   o) 1.345

2.   Round the following to **1 decimal place**:

a) 1.36   b) 0.91   c) 0.55   d) 5.92   e) 2.31

f) 9.89   g) 19.55   h) 3.95   i) 0.99   j) 100.63

k) 1.282   l) 5.561   m) 3.919   n) 12.049   o) 11.453

3.   Round the following to **2 decimal places**:

a) 0.189   b) 0.994   c) 2.177   d) 5.391   e) 0.531

f) 10.105   g) 13.201   h) 7.945   i) 30.199   j) 74.333

k) 101.389   l) 0.999   m) 42.131   n) 132.475   o) 9.999

6. Integer Calculations (MNU 3-04a)

1.   Work out the following:

    a) 3 - 4   b) 4 - 8   c) 1 - 5   d) 3 - 7

    e) 10 - 20   f) 21 - 30   g) -1 + 2   h) -5 + 7

    i) -8 + 5   j) -9 + 8   k) -10 - 5   l) -3 - 27

2.   Work out the following:

    a) 7 + (-4)   b) 10 + (-3)   c) 9 + (-12)   d) 5 + (-5)

    e) 14 + (-20)   f) 35 + (-20)   g) (-8) + (-2)   h) (-3) + (-7)

    i) (-8) + (-7)   j) (-20) + (-9)   k) (-3) + (-5)   l) (-50) + (-50)

3.   Work out the following:

    a) 5 - (-5)   b) 0 - (-6)   c) 4 - (-1)   d) 3 - (-9)

    e) 10 - (-11)   f) 44 - (-11)   g) (-9) - (-10)   h) (-4) - (-7)

    i) (-12) - (-11)   j) (-1) - (-1)   k) (-14) - (-12)   l) (-100) - (-99)

4.   Calculate:

    a) 3 × (-5)   b) 3 × (-7)   c) 2 × (-1)   d) (-8) × (-7)

    e) (-1) × 5   f) (-12) × 3   g) (-5) × (-4)   h) (-9) ÷ 3

    i) (-12) ÷ 6   j) (-21) ÷ (-3)   k) (-36) ÷ (-9)   l) (-40) ÷ 8

7.   Common Factors and Common Multiples (MTH 3-05a)

1.   Write down the **first 5** common multiples between:

a) 3 and 5   b) 2 and 4   c) 3 and 6   d) 2 and 7

e) 4 and 10   f) 5 and 7   g) 3 and 11   h) 12 and 10

i) 9 and 4   j) 6 and 20   k) 3 and 15   l) 2 and 13

2.   List **all** the factors of:

a) 50   b) 35   c) 42   d) 9

e) 200   f) 12   g) 49   h) 28

3.   For the following pairs:
   (i)   Write down any common factors,
   (ii)   Underline the **Highest Common Factor**.

a) 2 and 8   b) 3 and 9   c) 4 and 6   d) 10 and 25

e) 6 and 15   f) 12 and 16   g) 32 and 48   h) 24 and 60

i) 36 and 54   j) 81 and 90   k) 35 and 49   l) 21 and 63

8.   Introduction to Primes (MTH 3-05b)

1.   Write down the definition of a number which is **prime**.

2.   Which of these numbers is prime?
a) 73   b) 87   c) 89   d) 21   e) 33

f) 47   g) 51   h) 1   i) 19   j) 91

3.   List all the prime numbers between 1 and 100.

9.   Calculating Powers (MTH 3-06a)

1.   Write down all the square numbers between 1 and 200.

2.   Find the answer **without** using a calculator:

a) 2^2 b) 4^2 c) 7^2 d) 10^2 e) 12^2

f) 2^3 g) 4^3 h) 1^4 i) 9^1 j) 100^0

k) 9^2 l) 3^4 m) 1^{100} n) 8^2 o) 4000^0

p) 6^2 q) 11^2 r) 2^4 s) 2^5 t) 3^3

3.   Work out the following by using a calculator:

a) 20^2 b) 55^2 c) 19^2 d) 17^2 e) 150^2

f) 22^3 g) 47^3 h) 90^4 i) 2^{10} j) 3^7

k) 1^{100} l) 3^8 m) 100^3 n) 10^6 o) 4^5

p) 61^2 q) 33^2 r) 224^4 s) 85^3 t) 300^4

10. Fraction, Decimal & Percentage Calculations (MNU 3-07a)

1.   Convert the following fractions into percentages and decimals:

a) $^1/_2$ b) $^1/_4$ c) $^1/_5$ d) $^1/_{10}$ e) $^1/_{100}$

f) $^4/_5$ g) $^3/_4$ h) $^3/_5$ i) $^9/_{10}$ j) $^{35}/_{100}$

2.   Convert the following percentages into fractions and decimals (**simplify** where possible):

a) 15%   b) 24%   c) 8%   d) 55%   e) 72%

f) 16%   g) 60%   h) 46%   i) 89%   j) 23%

3.   Use a strategy to arrange the following numbers in **ascending** order:

$^2/_5$ 40.5%   0.047 $^2/_3$ 0.39

4.   Calculate:

a) $^1/_5$ of £65   b) 0.5 of 280 grams   c) $33^1/_3$% of 36 kg

d) $^4/_7$ of 154 metres   e) 0.3 of £920   f) 75% of 148 grams

g) $^5/_9$ of £135   h) 0.8 of 220 centimetres   i) 60% of £4800

5.   The Scotland football kit costs £64. In 'Top Sports' you can buy it with 25% off the price. In 'Sports Paradise' they are selling it with $^1/_3$ off.
Calculate the cost in both shops and state which store is cheaper and by how much.

Now try Harry Potter and the Frightening Fractions!

Or Harry Potter and the Poisoned Percentages!

11. Adding and Subtracting Fractions (MTH 3-07b)

1.   Work out the following, writing the answer in its simplest form:

a) $^1/_2 + ^1/_2$ b) $^1/_4 + ^3/_4$ c) $^1/_5 + ^2/_5$ d) $^1/_{10} + ^7/_{10}$

e) $^4/_5 + ^1/_5$ f) $^2/_3 + ^1/_3$ g) $^5/_{11} + ^2/_{11}$ h) $^7/_{20} + ^9/_{20}$

i) $^4/_5 - ^1/_5$ j) $^2/_3 - ^1/_3$ k) $^5/_7 - ^4/_7$ l) $^3/_4 - ^1/_4$

m) $^9/_{10} - ^3/_{10}$ n) $^4/_{15} - ^1/_{15}$ o) $^{19}/_{25} - ^4/_{25}$ p) $^{23}/_{50} - ^{18}/_{50}$

2.   Work out the following, writing the answer in its simplest form:

a) $^1/_2 + ^1/_3$ b) $^1/_4 + ^1/_8$ c) $^1/_4 + ^1/_5$ d) $^1/_{10} + ^2/_5$

e) $^3/_5 + ^1/_3$ f) $^2/_3 + ^1/_9$ g) $^3/_4 + ^1/_{12}$ h) $^3/_5 + ^1/_{20}$

i) $^4/_5 - ^1/_{25}$ j) $^9/_{10} - ^1/_5$ k) $^5/_7 - ^3/_8$ l) $^{17}/_{20} - ^{14}/_{25}$

m) $^7/_{10} - ^2/_5$ n) $^{13}/_{15} - ^4/_5$ o) $^3/_{20} - ^1/_{40}$ p) $^{27}/_{28} - ^6/_7$

12. Converting Whole and Mixed Numbers to Fractions (MTH 3-07c)
(learningupgrade.com Math Demo Fraction Song)

1.   Convert the following whole numbers into fractions with:
   i)   2 as the denominator,
   ii)   5 as the denominator,
   iii)   10 as the denominator.

   a) 4   b) 6   c) 9   d) 10   e) 20

   f) 25   g) 8   h) 50   i) 100   j) 200

2.   Convert the following into **improper fractions**:

   a) $1^1/_2$ b) $3^1/_3$ c) $7^1/_2$ d) $1^2/_3$ e) $5^1/_4$

   f) $2^3/_4$ g) $6^1/_5$ h) $3^3/_5$ i) $7^1/_{10}$ j) $20^4/_5$

   k) $9^3/_4$ l) $10^1/_8$ m) $13^1/_2$ n) $9^5/_7$ o) $7^2/_{11}$

3.   Convert the following into **mixed numbers**:

   a) $^9/_2$ b) $^{14}/_3$ c) $^{17}/_2$ d) $^{22}/_3$ e) $^{19}/_4$

   f) $^{31}/_4$ g) $^{17}/_5$ h) $^{41}/_5$ i) $^{14}/_4$ j) $^{21}/_6$

   k) $^{38}/_8$ l) $^{30}/_9$ m) $^{24}/_9$ n) $^{26}/_{10}$ o) $^{38}/_{12}$

13. Direct and Indirect Proportion (MNU 3-08a)

1. Find the cost per item:
 (a)   5 bars of chocolate cost £2.50.
 (b)   3 pens cost 66 pence.
 (c)   8 donuts cost £6.40

2. 4 new tyres cost £420. What is the cost of 3 tyres?

3. Nicole exchanges £50 for 75 Euros.
    How many Euros would she get £60?

4. A Formula 1 driver travels 18 miles in 6 laps.
    How far do they travel in 10 laps?

5. 600 rulers cost £36. How much does 450 rulers cost?

6. It takes 5 chefs 30 minutes to make dinner for a restaurant.
    How long would it take 3 chefs? (**INDIRECT** proportion)

7. 6 soldiers have rations for 8 days.
    How many days will the same rations last a squad of 8 soldiers?

8. A train takes 6 hours for a journey travelling at an
    average speed of 90 km/hr.
    What speed would the train have to be travelling for
    the journey time to be 4 hours?

14. Effective Budgeting and Comparing Contracts (MNU 3-09a & b)

In groups of 3 you must manage the finances of your very own Football Club:

1)   Buy Players.
2)   Choose the best Sponsorship deal for your club.
3)   Build a Stadium.
4)   Decide on other contracts.
5)   Successfully budget and manage your finances throughout an entire football season.
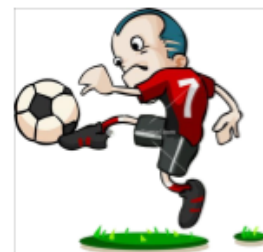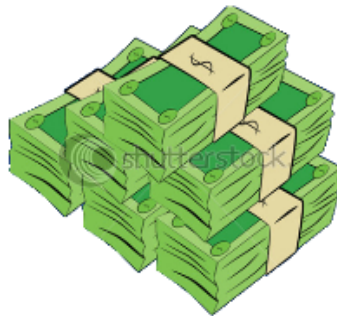
15.   Speed, Distance & Time Calculations (MNU 3-10a)

1.   Calculate the **distance** travelled in each example:

a) **Average Speed** = 30 mph   b) **Average Speed** = 70 mph   c) **Average Speed** = 50 km/hr
   Time = 2 hours   **Time** = 3 hours   **Time** = 6 hours

d) **Average Speed** = 100 km/hr e) **Average Speed** = 10 ms^{-1} f) **Average Speed** = 5 ms^{-1}
   Time = 3 hours   **Time** = 23 seconds   **Time** = 42 seconds

2.   Calculate the **average speed** in each example:

a) **Distance** = 40 miles   b) **Distance** = 100 miles   c) **Distance** = 50 km
   Time = 2 hours   **Time** = 4 hours   **Time** = 5 hours

d) **Distance** = 120 km   e) **Distance** = 100 metres   f) **Distance** = 200 metres
   Time = 3 hours   **Time** = 20 seconds   **Time** = 40 seconds

3.   Calculate the journey **time** in each example:

a) **Distance** = 50 miles   b) **Distance** = 300 miles   c) **Distance** = 120 km
   Average Speed = 25 mph   **Average Speed** = 50 mph   **Average Speed** = 40 km/hr

d) **Distance** = 1400 km   e) **Distance** = 500 metres   f) **Distance** = 320 metres
   Average Speed = 70 km/hr   **Average Speed** = 5 ms^{-1} **Average Speed** = 4 ms^{-1}

4.   Usain Bolt ran the 100 metres race in approximately 10 seconds.
        Calculate his approximate average speed.

5.   The train from Motherwell to London takes approximately 4 hours. The
        average speed of the train is 83 miles per hour.
        Calculate the approximate distance between Motherwell and London.

6.   The school bus from Shotts to St Aidan's travels 8 kilometres each
        morning. It has an average speed of 16 kilometres per hour.
        How long does the journey take. Give your answer **minutes**.

Now try **AVENGERS** Speed, Distance, Time Challenge!

16. Practical Problems Involving Area and Volume (MNU 3-11a)

1.   Paul is putting laminate flooring down in his living room.
        The room is rectangular, 10.5 metres by 6.5 metres.

6.5 m
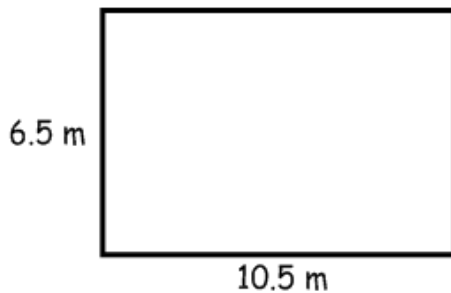
A pack of floor boards costs £12.99 and
covers 8 square metres.
How many packs of floor boards will he need
and what will the total cost of this be?

10.5 m

2.   Nicola is putting slabs down in her garden.
        Her garden is triangular. A box of slabs costs £55 and covers an area of 5
        square metres.
        How many boxes of slabs should she buy and how much will this cost her?

8 metres

25 metres

25 cm

25 cm
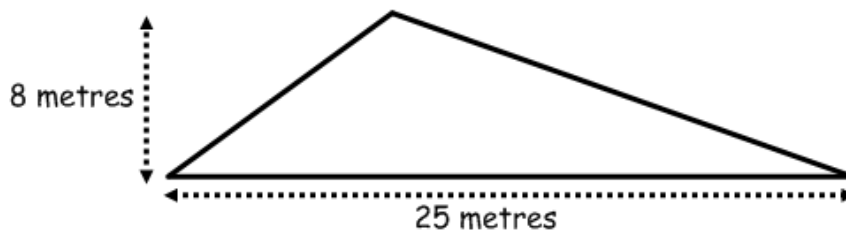
3.   A water dispenser is in the shape of a
        cuboid.
        Calculate the volume of water it holds in
        litres.
        How many 200 cm^3 cups could be filled
        from the dispenser?

70 cm
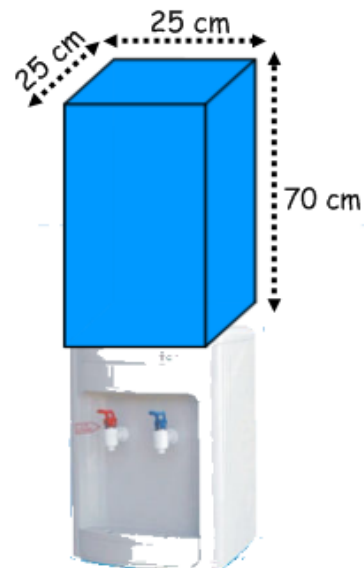
17.   Volume of Prisms (MTH 3-11b)

Calculate the volume of each prism using the area of the cross-section:

(a)

7 cm
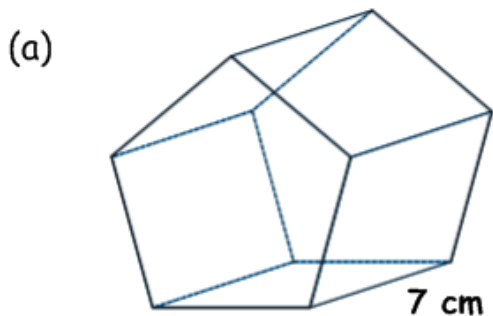
Area of Cross-Section = 12 cm^2

(b)

5 cm
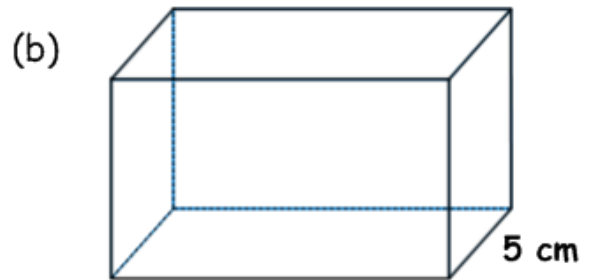
Area of Cross-Section = 22 cm^2

(c)

10 cm
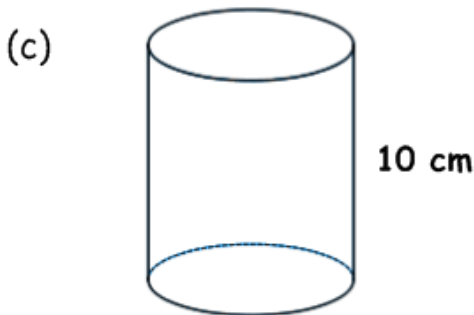
Area of Cross-Section = 9.5 cm^2

(d)

9 cm
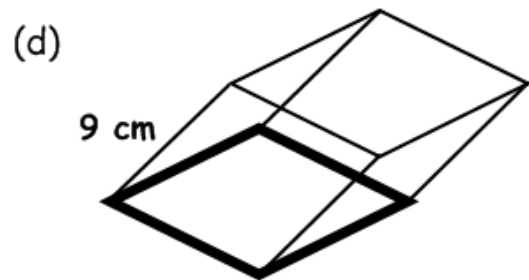
Area of Cross-Section = 28 cm^2

(e)

3 cm
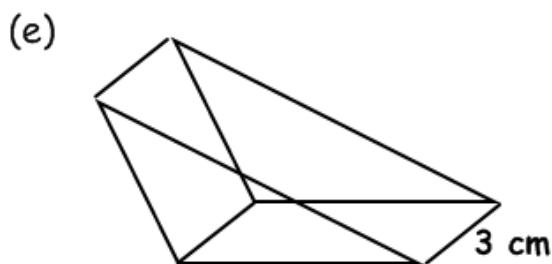
Area of Cross-Section = 16.5 cm^2

(f)   7 cm
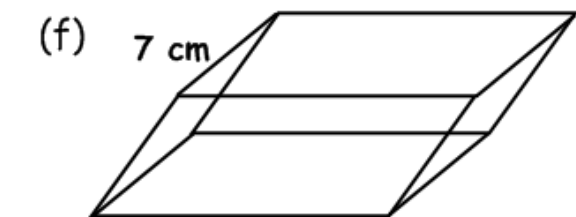
Area of Cross-Section = 31 cm^2

Now try **GREEN LANTERN** Volume Academy!

18. Calculating Compound Area and Volume (MTH 3-11b)

1.   Calculate the **area** of the following shapes:

(a)

2 cm
10 cm
3 cm
8 cm

(b)

13 cm
9 cm
3 cm
8 cm

(c)

2 cm   2 cm
3 cm
8 cm
10 cm

(d)

7 cm
3 cm
10 cm

(e)

15 cm
10 cm
2 cm

(f)

4 cm
10 cm
3 cm
8 cm
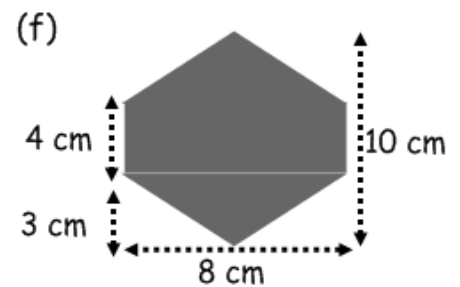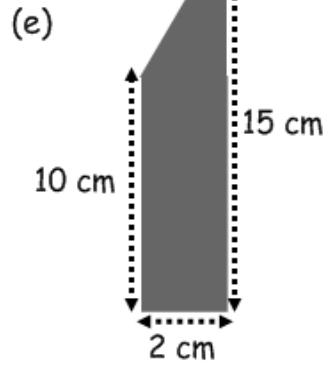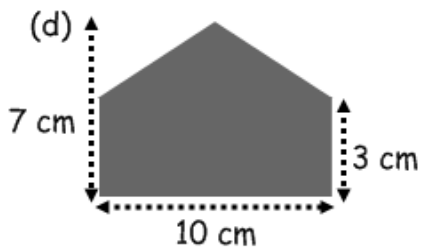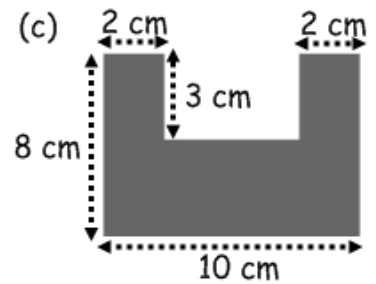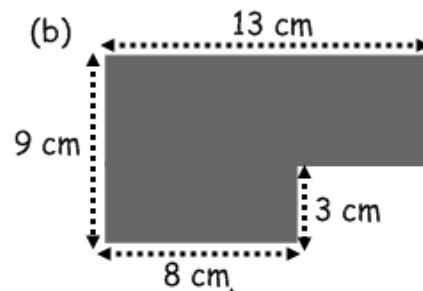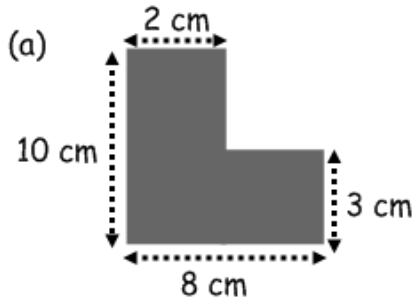
2.   Calculate the **volume** of the following shapes:

(a)

15 cm
4 cm
18 cm
12 cm
9 cm
30 cm

(b)

15 cm
6 cm
15 cm
7 cm
30 cm
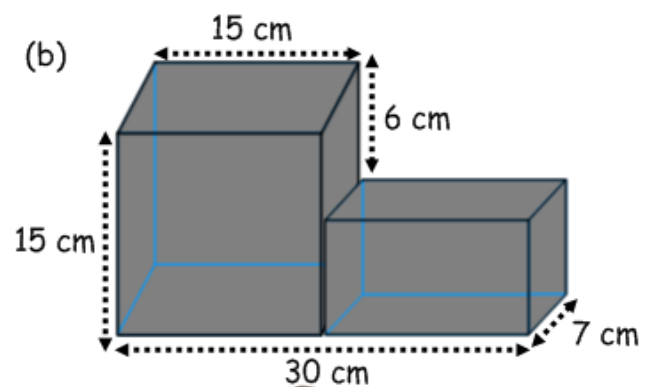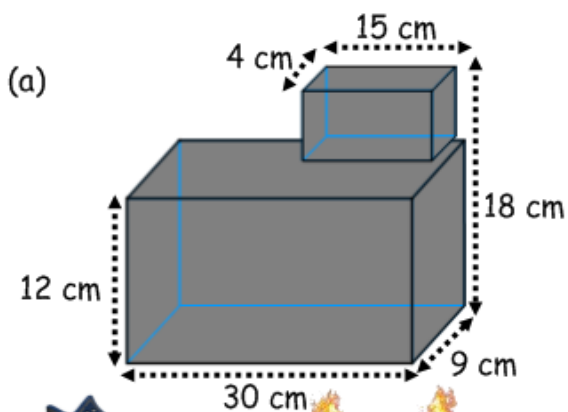
Now try [Pirates of the Caribbean] and the Islands of Area!

19.   Famous Mathematicians (MTH 3-12a)

In groups of 3 research a Famous Mathematician:

1)   Choose a mathematician you find interesting.

2)   Research facts about the mathematician's life and discoveries.

3)   Create a presentation in your group.

4)   Deliver this presentation to your class.

20. Finding the nth Term (MTH 3-13a)

1. Find the **nth term** in each of the following sequences:

   a) 2, 4, 6, 8, ...   b) 5, 10, 15, 20, ...   c) 5, 9, 13, 17, ...   d) 2, 5, 8, 11, ...

   e) 7, 12, 17, 22, ...   f) 4, 10, 16, 22, ...   g) 5, 14, 23, 32, ...   h) 12, 23, 34, 45, ...

   i) 19, 39, 59, 79, ...   j) 8, 10, 12, 14, ...   k) 8, 6, 4, 2, ...   l) 3, -2, -7, -12, ...

2. Generate the **first 4** terms in each sequence:

   a) 4n   b) 10n   c) -2n   d) -11n

   e) 3n + 7   f) 6n - 5   g) 4n + 3   h) 7n - 1

   i) 8n + 11   j) 12n - 8   k) -3n + 10   l) -6n - 1

3. Decide if the term in bold belongs to the sequence:

   (a) 1, 5, 9, 13, ... , **97**, ...   (b) 6, 9, 12, 15, ... , **64**, ...

   (c) 3, 8, 13, 18, ... , **53**, ...   (d) -1, 3, 7, 11, ... , **75**, ...

   (e) 4, 1, -2, -5, ... , **-53**, ...   (f) -6, -10, -14, -18, ... , **-91**, ...

Now try INDIANA JONES and the temple of Deadly Sequences!

21. Simplifying Expressions & Substitution (MTH 3-14a)

1. Find a mathematical way of expressing how many apples and bananas there are below:
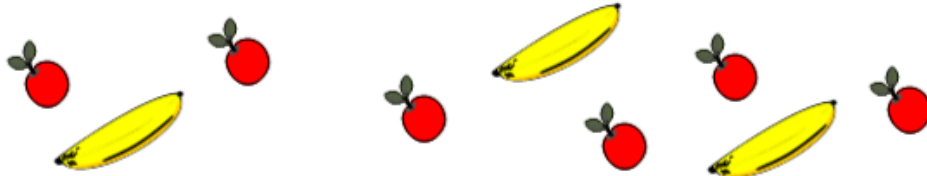
2. By collecting like terms, simplify the following:

    a) a + a + a

    b) b + b - b

    c) 3c - c

    d) 3d + 4d

    e) 3e + e - e

    f) 10f + 20f

    g) 18g - 12g

    h) h + 9h

    i) 15i - 12i + 9i

    j) 19j + 6j - 20j

    k) 4k + 10k

    l) $100x - 55x$

3. Simplify the following expressions:

    a) $x + y + x$

    b) $7x + 2y - 5x$

    c) $21x - 30 + 9x$

    d) $18x + 10y - 5y$

    e) 4a + 9b + 32 + 6b - a

    f) 100 + 6a - 80 + 14a - 3b

    g) 11θ + 8φ + 45 - 8φ + θ

4. If a = 3, b = 7 and c = 4, evaluate:

    a) a + b + c

    b) 3a

    c) 2b

    d) 10c

    e) a + 2b

    f) 4c + 2b

    g) b - a

    h) 5c - 5a

    i) ab

    j) bc

    k) a^2

    l) $a^2 + c^2$

22. Solving Equations (MTH 3-15a)

1. Solve for x:

   a) $x + 3 = 9$ b) $7 + x = 12$ c) $x + 12 = 19$ d) $22 + x = 30$

   e) $x - 7 = 3$ f) $x - 5 = 15$ g) $19 - x = 10$ h) $28 - x = 8$

   i) $x + 40 = 52$ j) $x + 35 = 70$ k) $x - 88 = 2$ l) $67 - x = 27$

2. Solve for x:

   a) $2x = 20$ b) $5x = 45$ c) $6x = 36$ d) $3x = 30$

   e) $4x = 32$ f) $10x = 70$ g) $11x = 99$ h) $7x = 82$

   i) $x \div 3 = 4$ j) $x \div 2 = 12$ k) $15 \div x = 3$ l) $55 \div x = 11$

3. Solve for x:

   a) $2x + 9 = 19$ b) $3x + 5 = 20$ c) $4x + 7 = 35$ d) $10x + 6 = 96$

   e) $4x - 3 = 29$ f) $6x - 5 = 55$ g) $12x - 7 = 29$ h) $7x - 4 = 38$

   i) $2 + 3x = 11$ j) $6 + 5x = 41$ k) $9 - 4x = 13$ l) $16 - 2x = 6$

   m) $3x - 2 = x + 11$ n) $5x + 9 = 37 - x$

   o) $12 + 7x = 2x + 47$ p) $9 - 3x = 3x + 45$

For Level 3 Revision so far, now try

SHERLOCK
and the Great Maths Game

23. Creating Formula (MTH 3-15b)

1. Write down a formula for the **perimeter** of each shape and then solve:

(a)

3a

a

Perimeter = 24 cm

(b)

b   b

b   b

b

Perimeter = 55 cm

(c)

2c   2c

5 cm

Perimeter = 41 cm
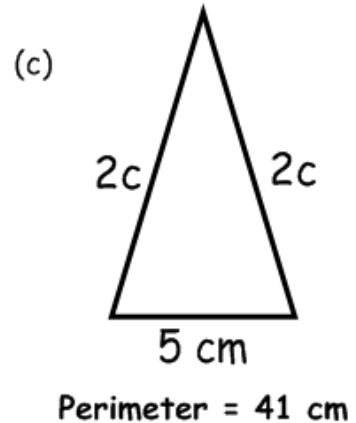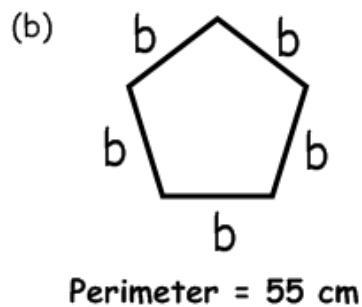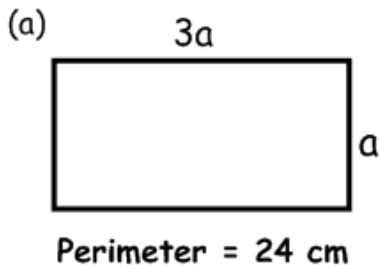
2. Write down a formula for the **area** of each shape and then solve:

(a)

9 cm

2a

Area = 54 cm²

(b)

4

3b

Area = 18 cm²

(c)

c

Area = 49 cm²
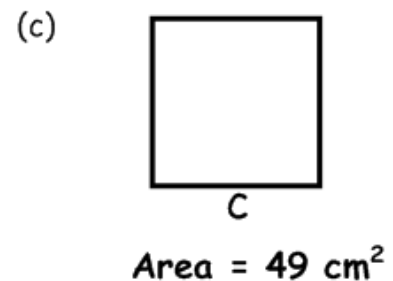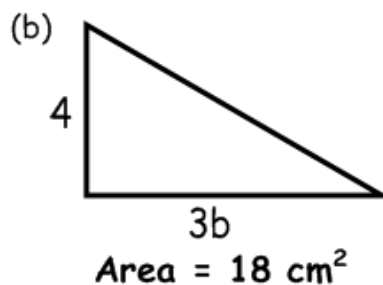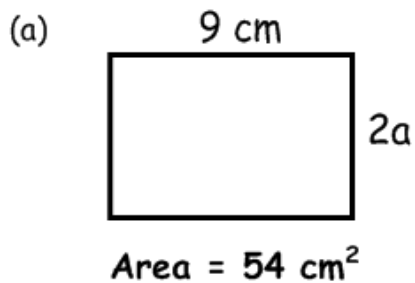
Level 3: Shape, Position and Movement
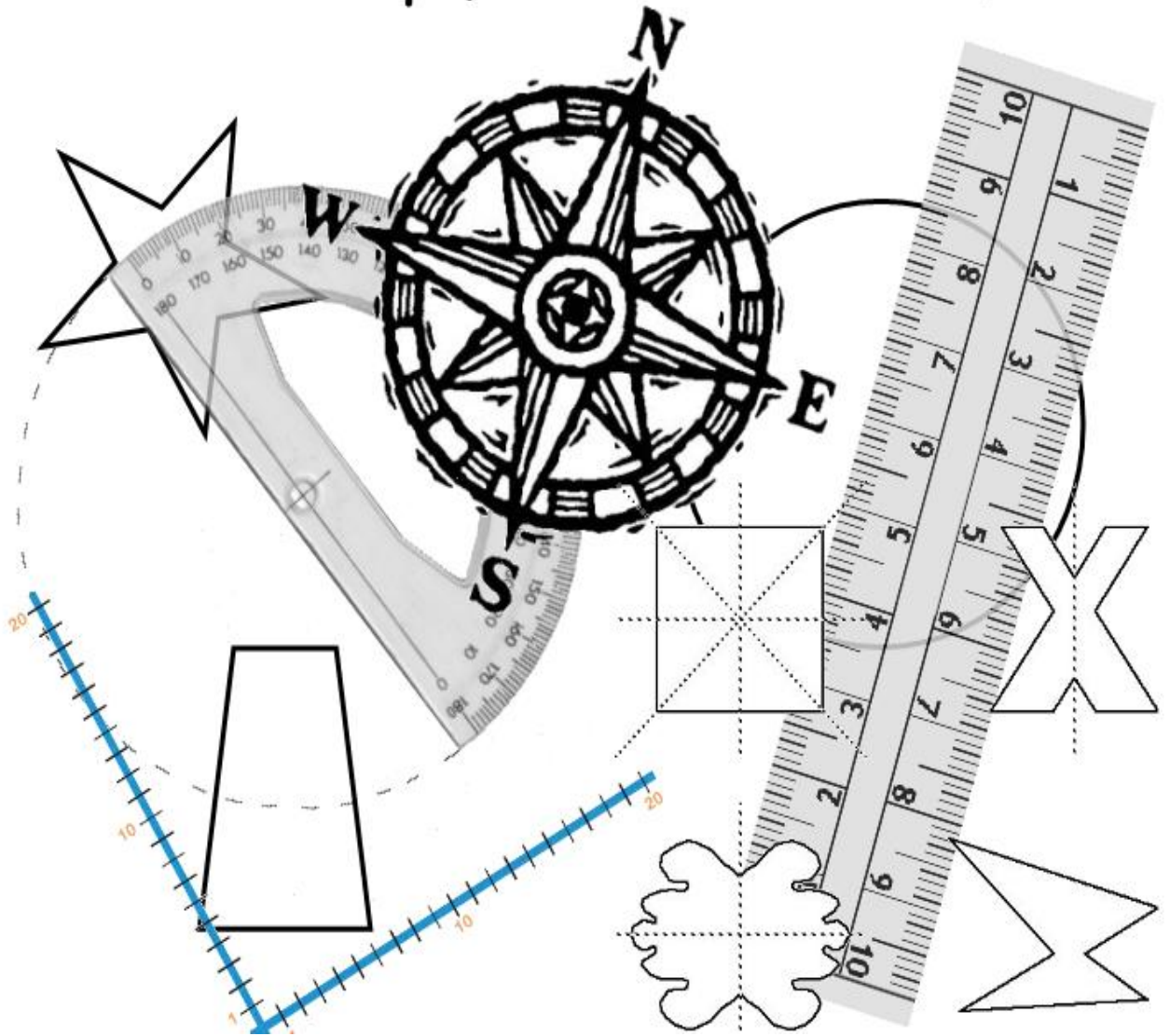
Level 3: Shape, Position and Movement

Contents

24. Drawing 2D Shapes (MTH 3-16a)

1.   Draw a **square** with dimensions:

a) length = 3 cm   b) length = 5 cm   c) length = 10 cm
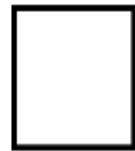
2.   Draw a **rectangle** with dimensions:

a) length = 5 cm   b) length = 6 cm   c) length = 8 cm
   breadth = 2 cm   breadth = 1 cm   breadth = 4 cm
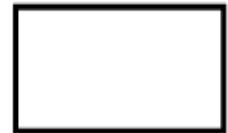
3.   Draw a **rhombus** with dimensions:

a) diagonal 1 = 6 cm   b) diagonal 1 = 10 cm   c) diagonal 1 = 8 cm
   diagonal 2 = 4 cm   diagonal 2 = 4 cm   diagonal 2 = 12 cm
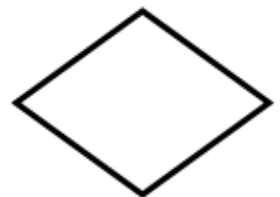
4.   Draw a **parallelogram** with dimensions:

a) length = 5 cm   b) length = 6 cm   c) length = 8 cm
   breadth = 2 cm   breadth = 1 cm   breadth = 4 cm

5.   Draw a regular **kite** with dimensions:

a) diagonal 1 = 8 cm   b) diagonal 1 = 11 cm   c) diagonal 1 = 13 cm
   diagonal 2 = 6 cm   diagonal 2 = 6 cm   diagonal 2 = 4 cm
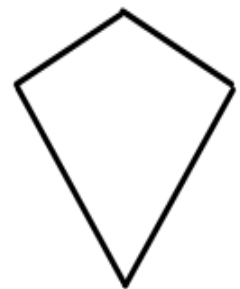
6.   Draw a three different **trapeziums**.

25. Properties of 2D Shapes (MTH 3-17a)

1. List the properties of a **square**.

2. List the properties of a **rectangle**.

3. List the properties of a **rhombus**.
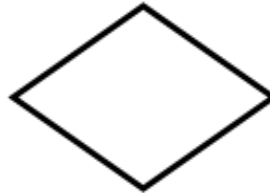
4. List the properties of a **parallelogram**.

5. List the properties of a **kite**.
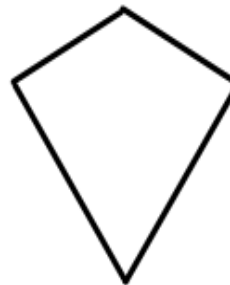
6. List the properties of a **trapezium**.
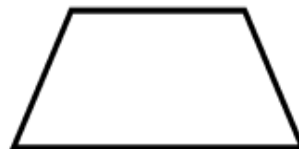
7. Which of the following are **trapeziums**?

A

B

C
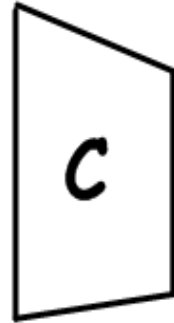
8. Name the various 2-Dimensional shapes underneath:

A

B

C

D

E

F

G
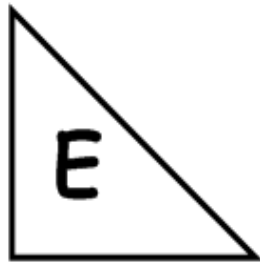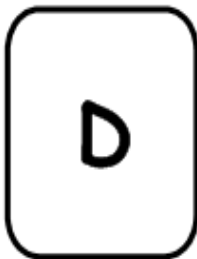
26. Naming Angles (MTH 3-17a)

1. **Name** and identify the **angle type** of the following:
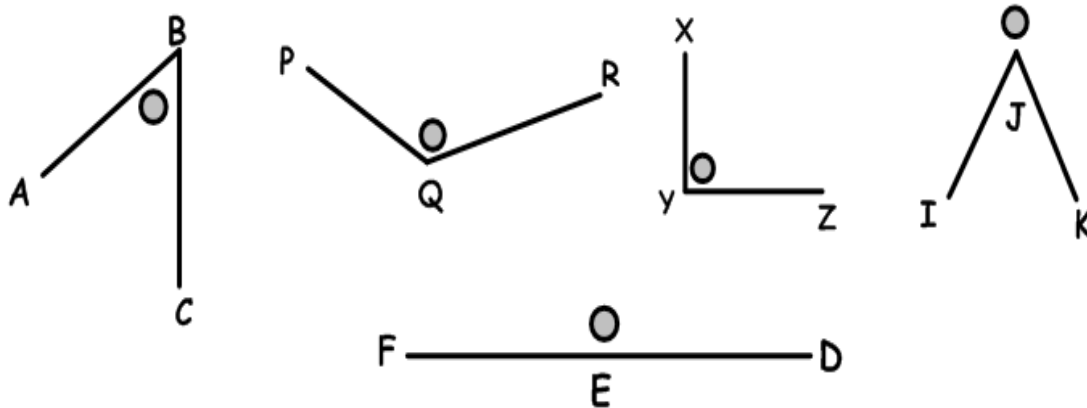
2. **Name** the angles in the triangle denoted by:
    (a) ⭐ ,
    (b) 🙂 ,
    (c) ❀ .
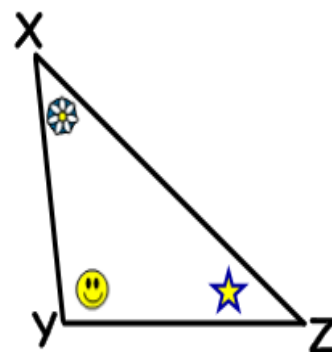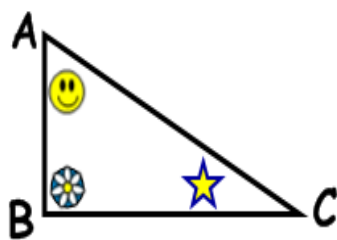
27. Finding Missing Angles (MTH 3-17a)

1.   Calculate missing angle $x°$ in each example:

(a)

71°
$x°$

(b)

$x°$
50°

(c)

85°
$x°$

(d)

$x°$
35°

(e)

120°
$x°$

(f)

30°
$x°$

(g)

$x°$
110°
135°

(h)

170°
$x°$

(i)

22°
$x°$

(j)

30°
$x°$

(k)

50°
100°
$x°$

(l)

26°
$x°$
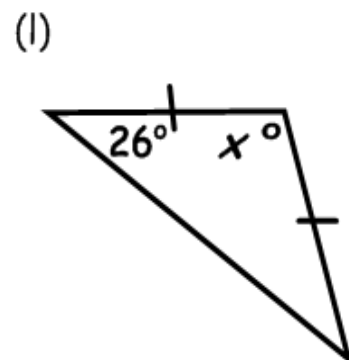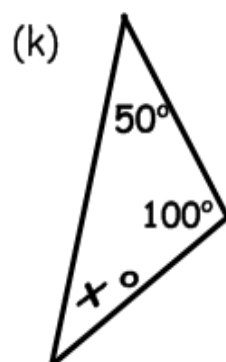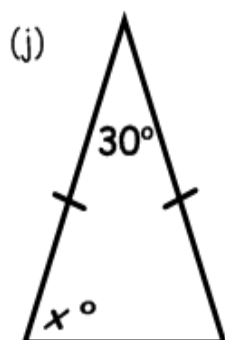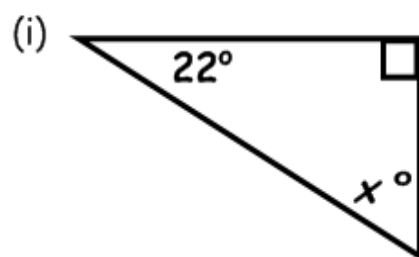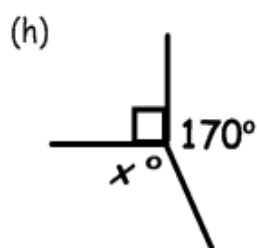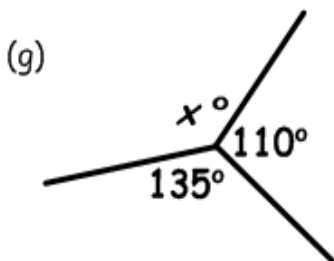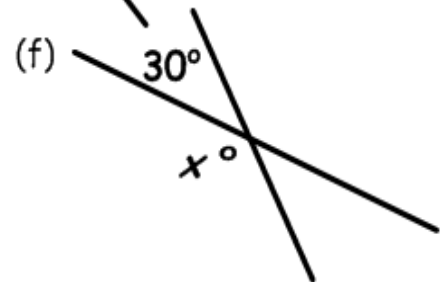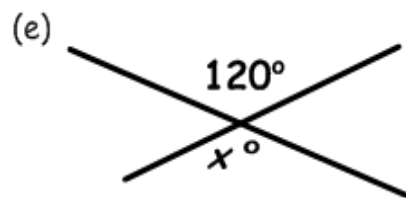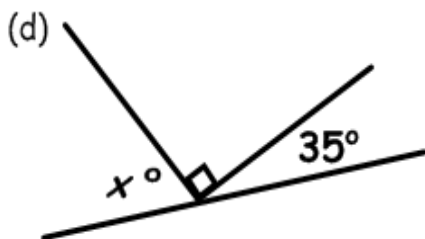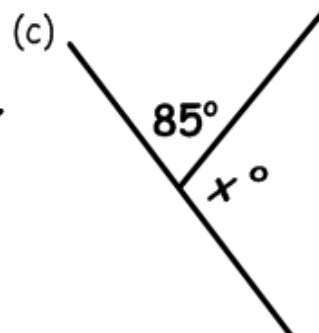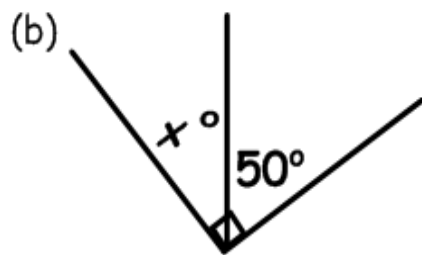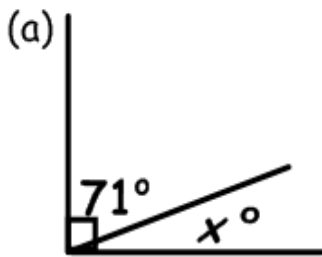
2.   Use your knowledge of **corresponding** and **alternate** angles to calculate missing angle $x°$ in each example:

(a) 108°
     $x°$

(b) 99°
     $x°$

(c) $x°$ 67°

(d) 20°
     $x°$

(e) $x°$
     100°

(f) 77°
     $x°$
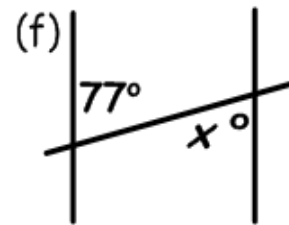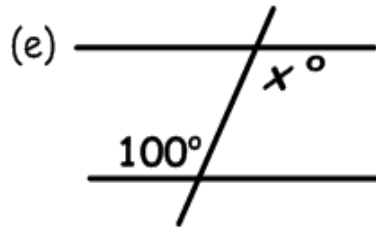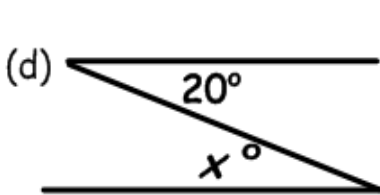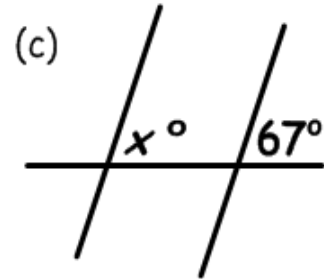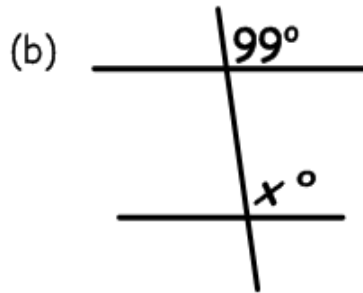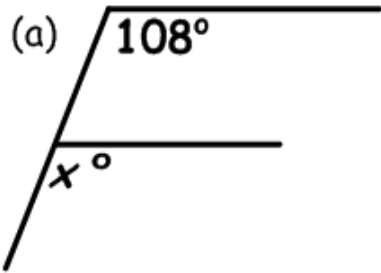
3.   Copy the following shape and use your knowledge of angle properties to fill in **ALL** the missing angles.

52°
126°
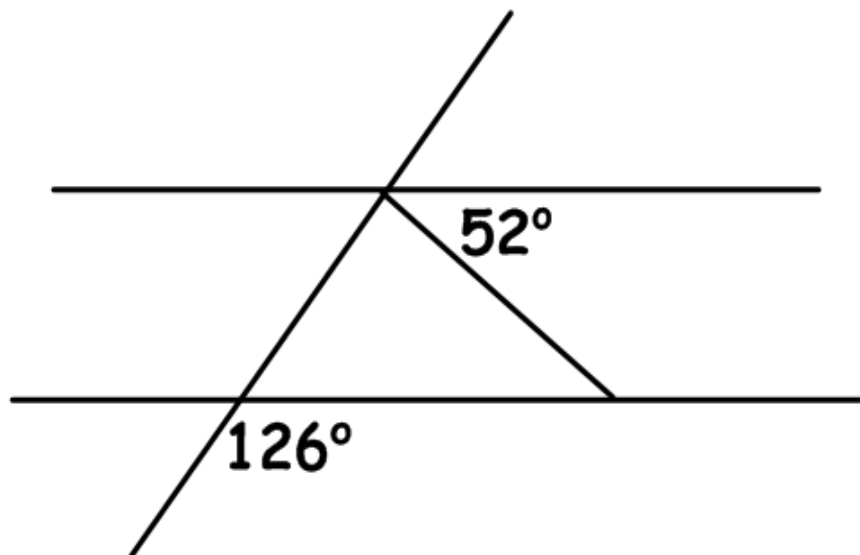
28. Bearings and Scale Drawings (MTH 3-17b)

1.   A rectangular garden measures 15 metres by 9 metres.
      Make a scale drawing of the garden where **1 centimetre
   represents 3 metres**.

2.   El Plaza Mayor in Madrid is rectangular and measures 250 metres by
      200 metres.
      Make a scale drawing of the garden where **2 centimetres represents
      50 metres**.

3.   The Empire State building in New York has a height of
      approximately 400 metres and the width of its base is
      approximately 120 metres.
      Make a scale drawing of the garden where **1 centimetre
      represents 40 metres**.

Now try   Skyscrapers to scale!

4.   Measure the following bearings:

(a) N   (b) N   (c) N   (d) N

(e) N   (f) N   (g) N   (h) N
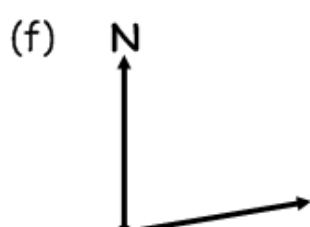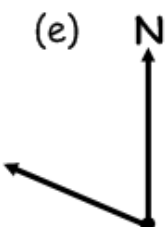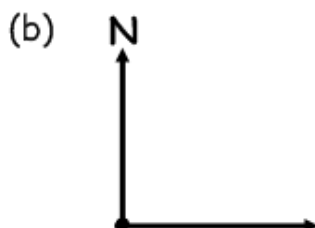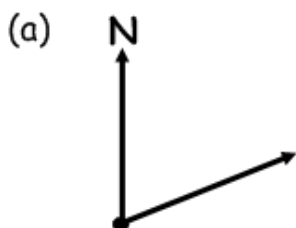
5.   Make the following scale drawings:

(a)   Bearing: 025°, Length 14 metres, where 1 centimetre ≡ 2 metres.

(b)   Bearing: 082°, Length 28 metres, where 1 centimetre ≡ 7 metres.

(c)   Bearing: 136°, Length 500 metres, where 1 centimetre ≡ 50 metres.

(d)   Bearing: 190°, Length 2 km, where 1 centimetres ≡ 500 metres.

(e)   Bearing: 300°, Length 750 metres, where 2 centimetres ≡ 75 metres.

Now try SPIDER-MAN Bearings and Scale Drawing Challenge!

29.   Enlargement and Reduction (MTH 3-17c)

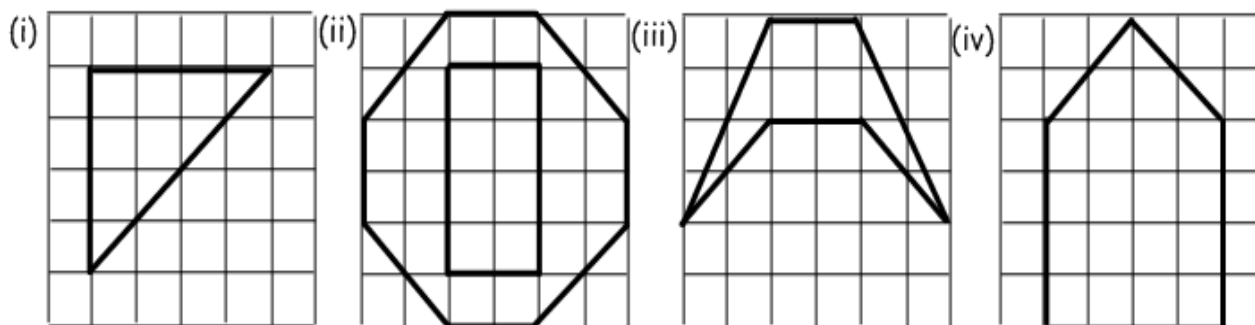1.   Enlarge the following shapes by a factor of:
        (a)   2
        (b)   5

(i)   (ii)   (iii)   (iv)
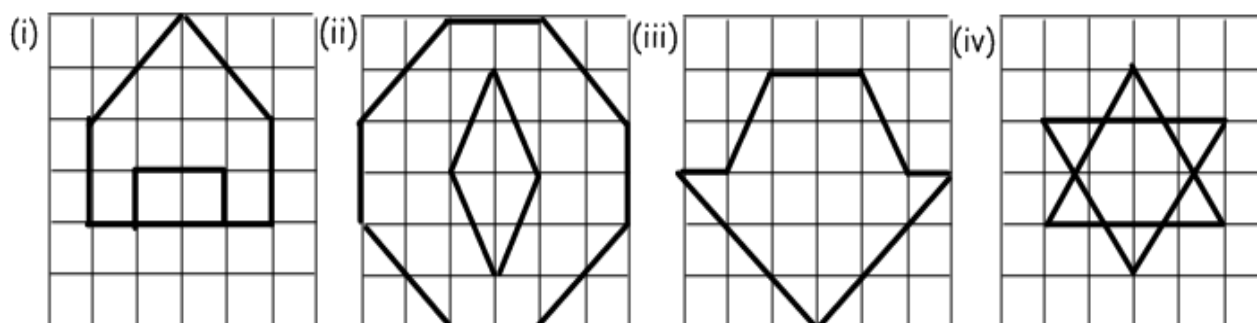
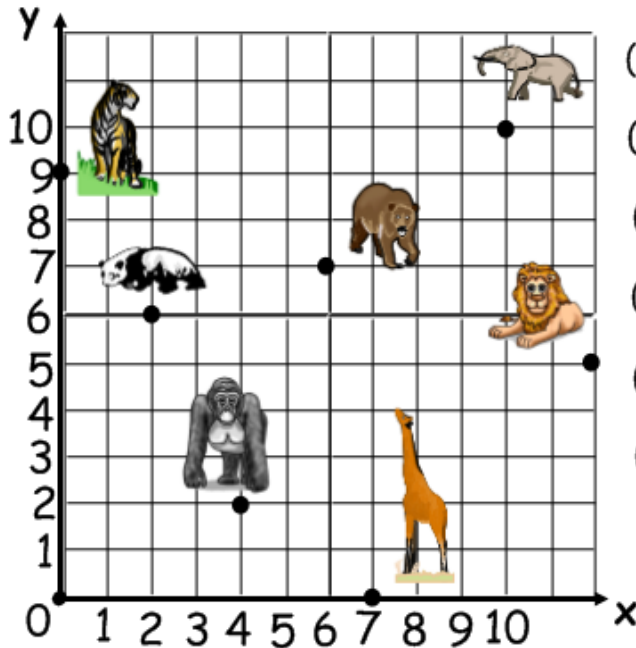2.   Reduce the following shapes by a factor of:
        (a) $^1/_2$
        (b) $^1/_4$

(i)   (ii)   (iii)   (iv)

30. Coordinates (MTH 3-18a)

1. Use the grid of this zoo to identify the coordinates each of the animals lie on:

(a)	Lion
(b)	Tiger
(c)	Bear
(d)	Panda
(e)	Gorilla
(f)	Elephant
(g)	Giraffe

2.   Draw your own coordinate grid with values of x between 0 and 10 and values of y between 0 and 10.
Now plot the following points on the grid:
A(1, 7); B(5, 3); C(2, 2); D(0, 10); E(9, 1); F(6, 8); G(4, 0).

4 quadrant extension: learningupgrade.com Math Demo Coordinate song
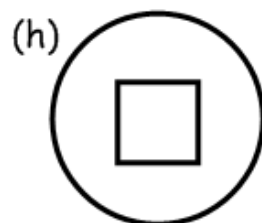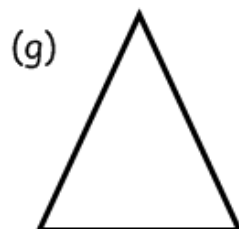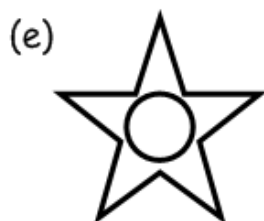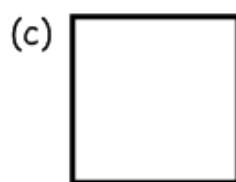
or try   **THE SIMPSONS**™   Coordinates!

31. Line Symmetry (MTH 3-19a)

1.   Copy the following shapes and draw in **ALL** lines of symmetry:

(a)   (b)   (c)   (d)

(e)   (f)   (g)   (h)
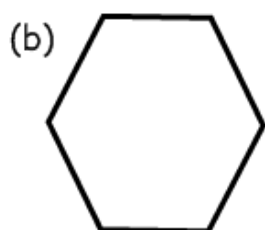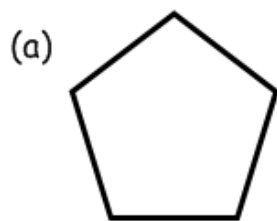
2.   Use the line of symmetry to complete each shape:

(a)   (b)   (c)   (d)

Level 3: Information Handling

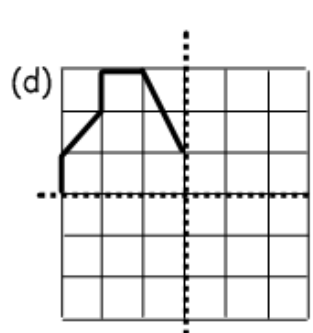Does the social Web help or hinder critical thinking skills? And does information overload lead to us blindly follow others?
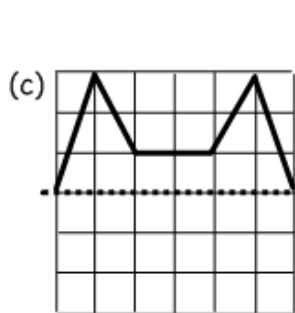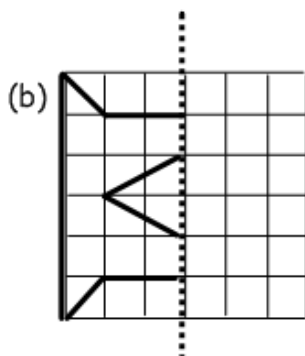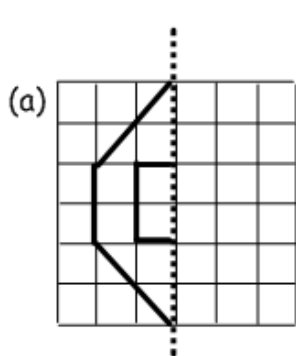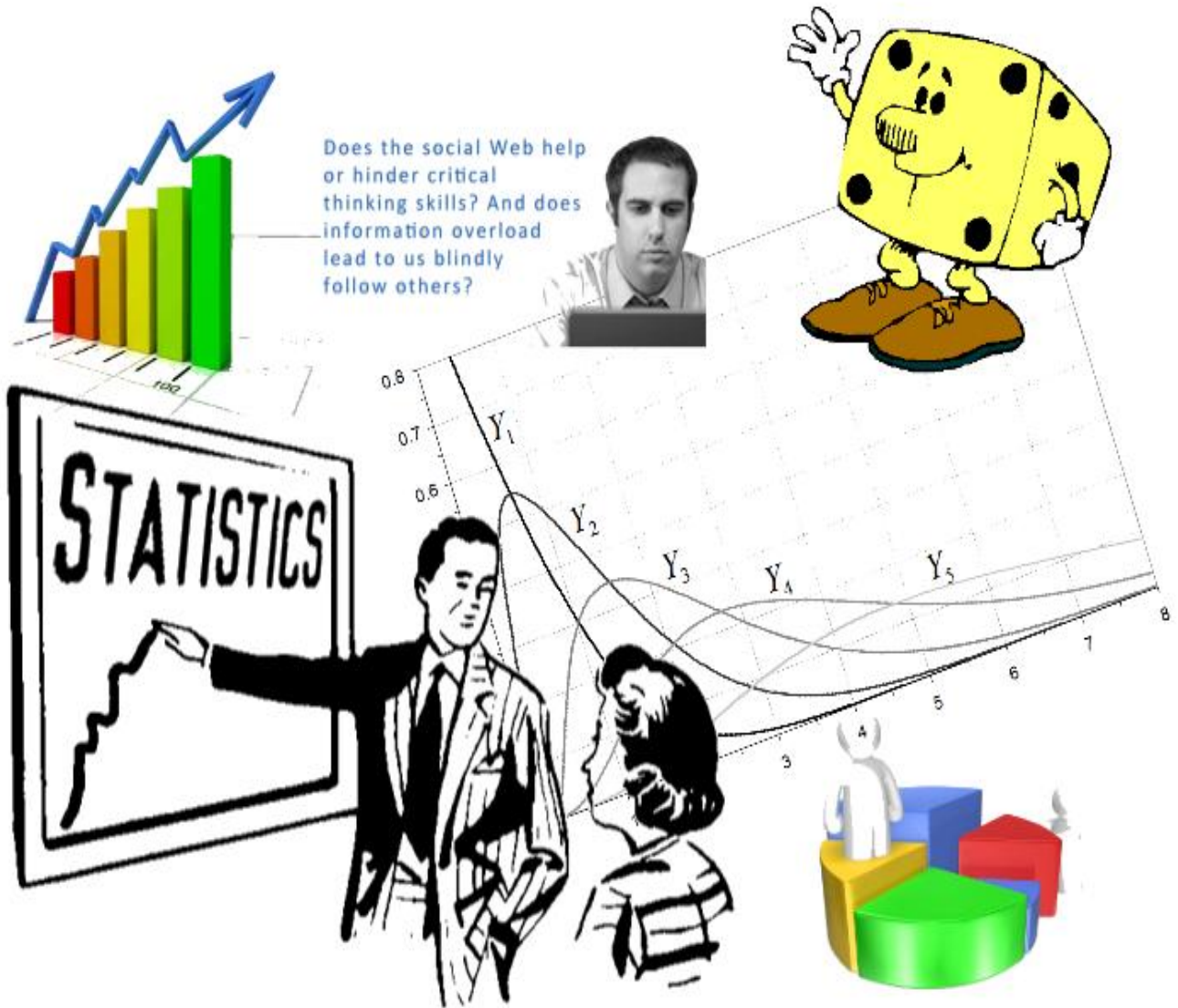
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Contents

32. Robust, Vague and Misleading Statistics (MNU 3-20a)

1. For each of the following data displays, state what makes them either misleading, vague or robust:

(a)

(b)

(c)

(d)

(e)

(f)

(g)

(h)

(i)
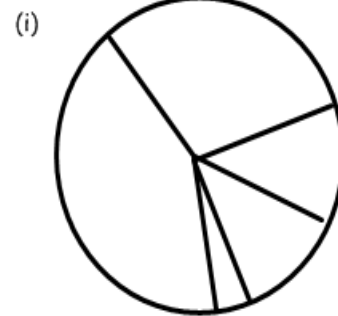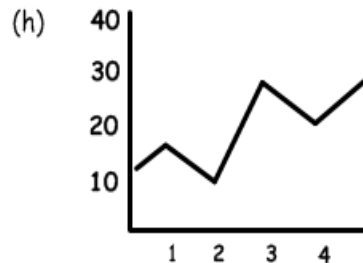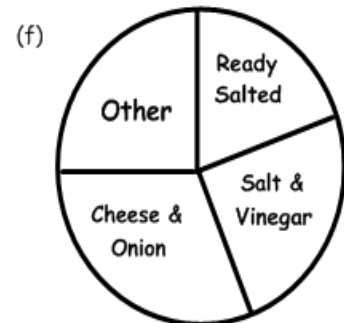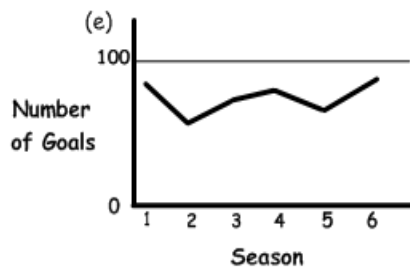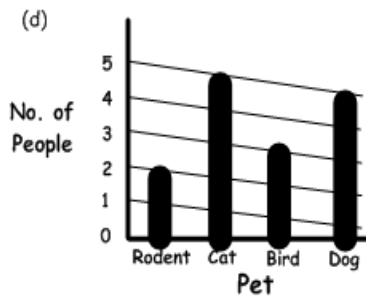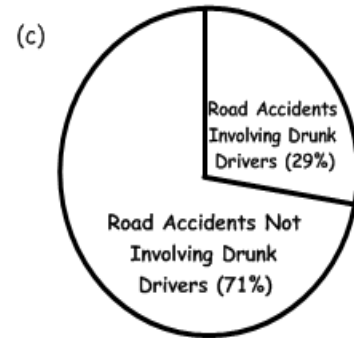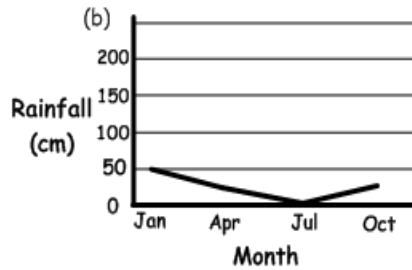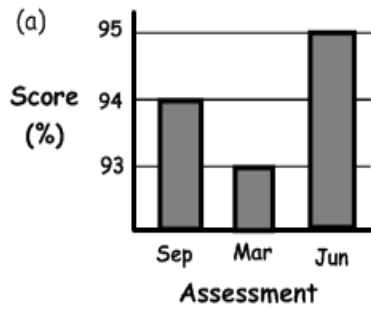
2. For homework, look through newspapers, magazines, the Internet, etc. to find misleading, vague or robust statistics from the real world.

33. Bias and Sample Size (MTH 3-20b)

1. Shane asked 8 of his closest friends what their favourite sport was. Here are his results:
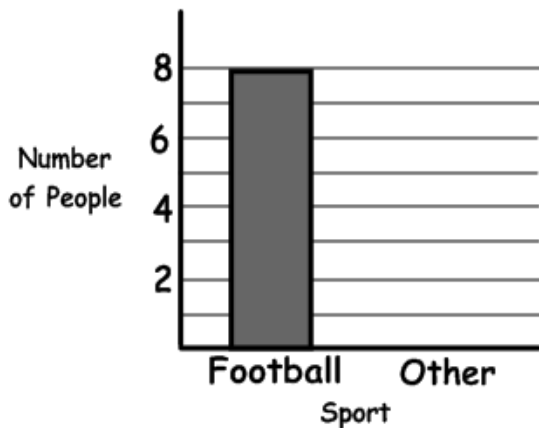
(a) How did bias and sample size affect his data?
(b) What would your suggestions be for improving Shane's survey.

2. A group of business men and women who earn over £150,000 a year were asked their opinions on paying 50% tax on all earnings over £150,000. The pie chart shows the results of the survey:

(a) How could bias have affected this survey?
(b) What would your suggestions be for carrying out a fairer survey?

3. You must now carry out a survey full of bias, where sample size may also be a factor. Use these biased statistics to write a speech which promotes a certain agenda. (e.g. Lunchtime should be 2 hours long.)
   Think about who you will survey to give you the most biased results.

34. Displaying Data (MTH 3-21a)

1. At a Sci-fi convention, attendees were surveyed about their favourite Science Fiction films. The results are shown:

(a) Collect this information in a frequency table.
(b) Display this information in a bar graph.
(c) Write a conclusion on the data you have collected and displayed.
   It should include how many attendees were asked, what was most popular and what was least popular.

2. A number of primary school pupils were asked to choose their favourite Pixar film.
   The results are shown below:

(a) Collect this information in a frequency table.
(b) Display this information in a bar graph.
(c) Write a conclusion on the data you have collected and displayed.
   It should include how many pupils were asked, what was most popular and what was least popular.

3. The number of bumblebees spotted in a certain area of Glasgow is recorded each month:

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Number of Bees	0	1	4	8	22	35	34	42	20	6	0	0

(a) Display this information in a line graph.

The number of bumblebees spotted in a certain area of Edinburgh is recorded each month:

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Number of Bees	0	0	1	5	12	22	30	28	24	10	1	0

(b) Display this information on the same line graph, making it a **comparative line graph**.
(c) Write a conclusion on the data you have displayed.
   What can you say about the difference in the number of bumblebees in Edinburgh and Glasgow.

4. The temperature each day of a particular week during the month of June is recorded:

Day	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Temperature (°C)	20	21	23	23	22	26	28

(a) Display this information in a line graph.
The temperature each day of a particular week during the month of November is recorded.

Day	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Temperature (°C)	1	0	2	-2	-5	-1	-8

(b) Display this information in a **comparative line graph**.
(c) Write a conclusion on the data you have displayed.
   Do your findings seem logical?

5. As part of a school's healthy eating campaign, 400 pupils were asked to name their favourite fruit:

Fruit	Number of Pupils
Apple	60
Banana	80
Orange	100
Grapes	100
Cherries	20
Pineapple	40

Display this information accurately in a pie chart.
You may use a protractor.

6. A TV company wishes to display the viewing figures for various events at the Olympic Games in a pie chart. The figures are shown in the table below:

Event	Frequency of Viewers (to nearest thousand)
Track	300
Field	120
Gymnastics	200
Cycling	200
Swimming	180

Display this information accurately in a pie chart.
You may use a protractor.

Now try   Statistics!

35. Calculating Probability (MNU 3-22a)

1.   Calculate the probability of:
   (a) P(6)
   (b) P(> 4)
   (c) P(odd)

2.   Calculate the probability of rolling two sixes simultaneously.

3.   Calculate the probability of:
   (a) P(heads)
   (b) P(tails)

4.   Calculate the probability of:
   (a) P(ace)
   (b) P(clubs)
   (c) P(7 of diamonds)

5.   A bag contains 16 buttons: 6 red, 5 green, 4 blue and 1 yellow. Calculate:
   (a) P(red)
   (b) P(green)
   (c) P(blue)
   2 blue buttons are now removed. Calculate:
   (d) P(yellow)