Hautlieu Mathematics

Applications and Interpretations
Summer Task

Name _____

Instructions

- Complete all questions in full. If you are not sure how to do something, use the link provided to watch a video on how to do it.
- Show all your workings, including anything you type in to your calculator.
- Mark your work clearly in a different colour using the answer sheet at the end.
- If you have got something incorrect, go back and watch the related video and have another go at the question to see if you can get the correct answer.
- Bring your completed task to your first lesson in September and hand it to your teacher.
- There will be a test on this content at the beginning of the term.

Statistics

Part A: Averages and measures of spread

https://corbettmaths.com/2012/08/02/the-median/
https://corbettmaths.com/2021/11/18/quartiles-video/
https://corbettmaths.com/2012/08/02/the-mean/

Question 1
Miss Jones gives her class a test. The test is out of 4 marks.
Here are the scores.
31 29 20 35 32 38 32

a. Find the mode

b. Find the median

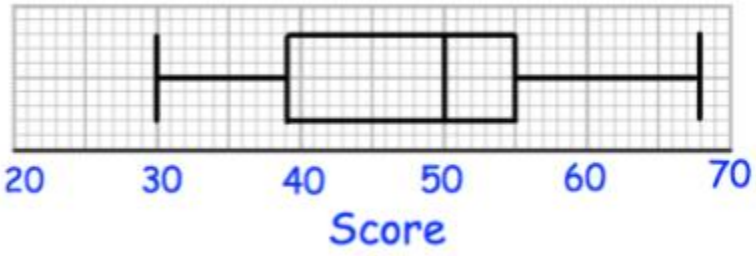
c. Find the mean

d. Find the range

e. Find the interquartile range

Part B: Box and Whisker diagrams

If you are having problems with these questions watch the following videos:
https://corbettmaths.com/2013/05/15/drawing-and-reading-box-plots/
Question 1
The box plot below shows the distribution of scores in a maths test for a class of 24 students.



a. State the median score

b. State the lower quartile

c. Work out the interquartile range

d. How many students scored more than 55?

Question 2

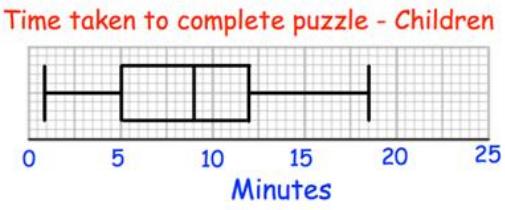
The data below represents the time in minutes that staff at a local shop take to get to work.

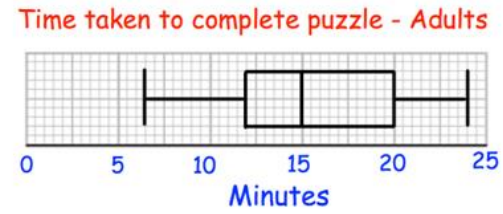
8, 10, 13, 14, 14, 15, 15, 16, 18, 19, 21, 22, 24, 29, 35

On the graph paper below, draw a box plot to represent this data. Mark your scale clearly.

Question 3

The box plots below show the distribution of times that adults and students take to complete a puzzle.





Compare the distributions of adults and children.

Part C: Scatter diagrams

https://corbettmaths.com/2012/08/10/scatter-graphs/

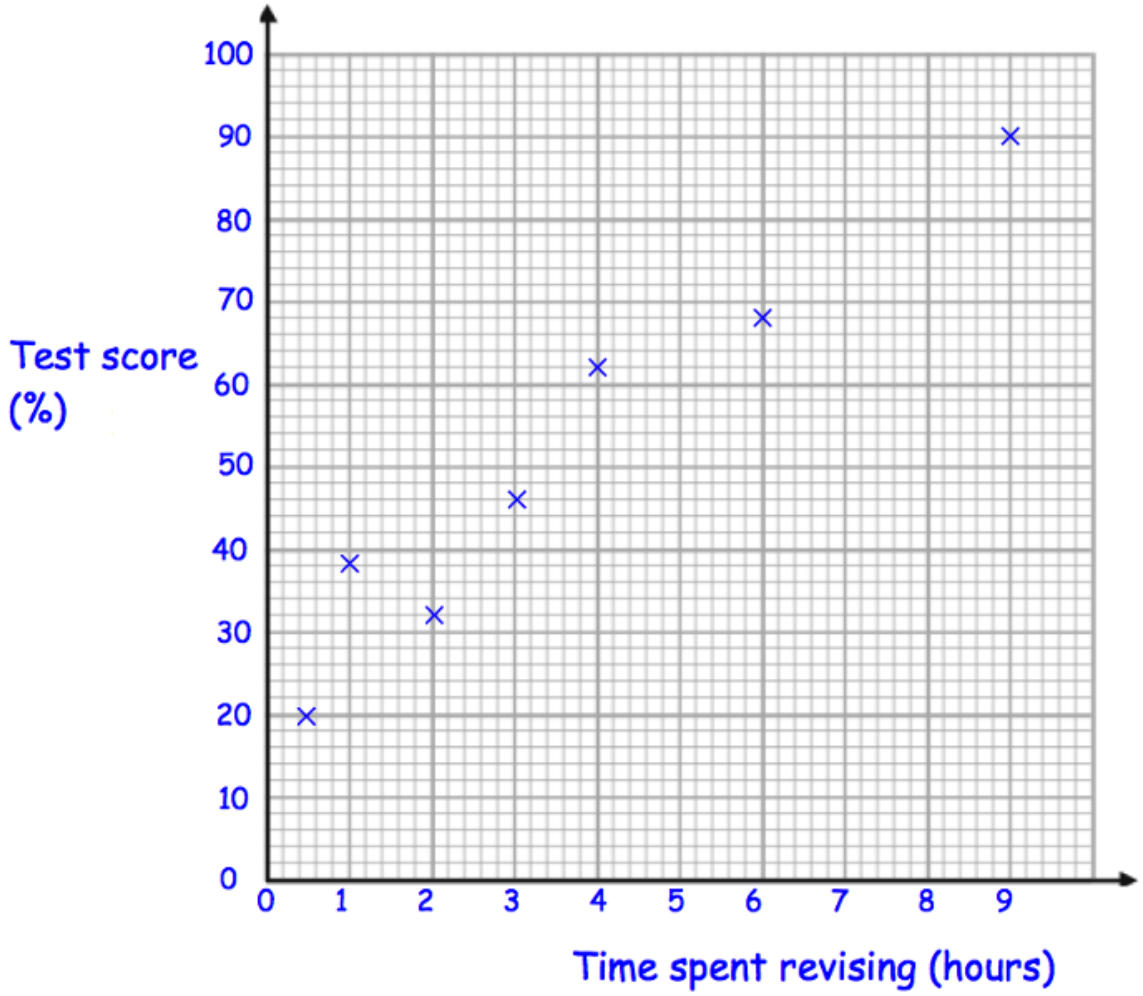
https://corbettmaths.com/2012/08/10/scatter-graphs-correlation/

Question 1

The table shows the time spent revising and the test scores of ten students.

Time spent revising (hours)	9	0.5	1	4	6	2	3	7	5	8
Test result (%)	90	20	38	62	68	32	46	70	60	86

The first seven points have been plotted on this scatter diagram.



a. Complete the scatter diagram

b. Describe the relationship shown in the scatter diagram.

_____

_____

c. Draw a line of best fit on your scatter diagram.

d. Another student has spent 4.5 hours revising. Use your line of best fit to estimate their test result.

_____

Part D: Probability

https://corbettmaths.com/2018/11/30/probability-videos/
https://corbettmaths.com/2013/06/18/sample-space-diagrams/
https://corbettmaths.com/2013/05/07/tree-diagrams/

Question 1

A bag contains 10 discs. Each disc is labelled with a different number from 1 to 10. A disc is chosen from the bag at random.

Write down the probability that the chosen disc is

a. The number 3 _____

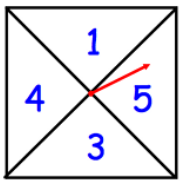
b. a number less than four _____

c. a square number _____

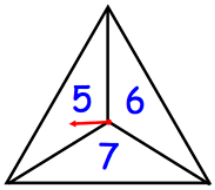
d. a prime number _____

Question 2

Two fair spinners are spun. Spinner 1 has four equal sections labelled 1, 3, 4 and 5. Spinner 2 has three equal sections labelled 5, 6 and 7.



Spinner 1



Spinner 2

Each spinner is spun once. The numbers are added together to get a score.

a. Complete the table to show all possible scores.

b. Find the probability of scoring a 8 _____

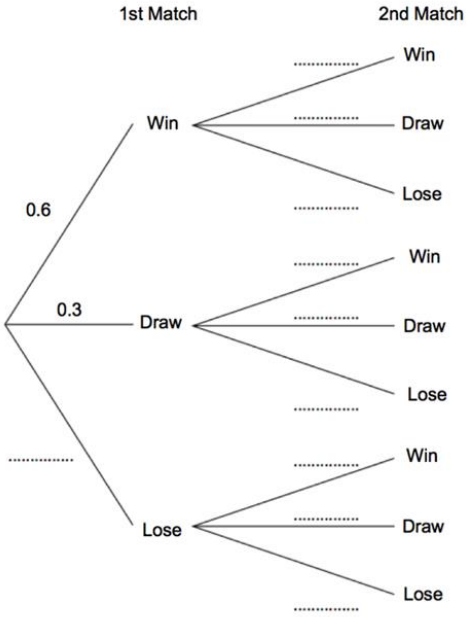
c. Find the probability of scoring an odd number _____

Spinner 1

Spinner 2	1	3	4	5
5				
6				
7				

Question 3

A football team has two matches to play. The probability that the team wins is 0.6. The probability that the team draws is 0.3.



a. Complete the tree diagram.

b. Work out the probability that the team will win both matches.

_____

c. Work out the probability that the team will win exactly one match.

_____

Number

Part A: Standard Form

https://corbettmaths.com/2013/04/28/standard-form/

Question 1: Write each of the following numbers in standard form.

a. 8000000 _____
b. 900 _____
c. 540000000 _____
d. 43500 _____
e. 804000 _____
f. 0.002 _____
g. 0.00065(f) _____
h. 0.00407 _____
i. 0.000000024 _____

Question 2: Write each of the following as ordinary numbers

a. 3×10^{4} _____
b. 5×10^{7} _____
c. 8.4×10^{8} _____
d. 4.05×10^{6} _____
e. 2.0651×10^{3} _____
f. 2×10^{-3} _____
g. 4.8×10^{-7} _____
h. 9.2×10^{-8} _____
i. 5.71×10^{-5} _____

Part B: Calculating a percentage change

https://corbettmaths.com/2013/03/31/percentage-change/

Question 1

The value of a painting rises from £24000 to £27120. Work out the percentage increase in the value of the painting.

_____

Question 2

Christy buys a book for £17.40 A year later she sells the book for £9.57 Calculate the percentage decrease in the value of the book.

_____

Question 3

A shop sells holidays. The table shows the number of holidays sold each month from August to December.

Aug	Sept	Oct	Nov	Dec
28	40	54	80	111

Between which two consecutive months was the greatest percentage increase in the number of holidays sold?

_____

Geometry and Measure

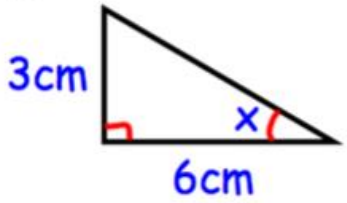
Part A: Trigonometry

https://www.youtube.com/watch?v=GtpplO7xdqM
https://corbettmaths.com/2019/12/31/sine-rule-videos/
https://corbettmaths.com/2018/09/17/cosine-rule/
https://corbettmaths.com/2012/08/02/area-of-a-triangle-sinetrigonometry/

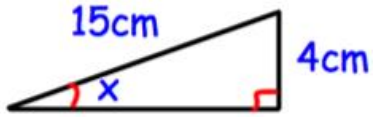
Question 1

Find the size of the missing angles in the triangles below.

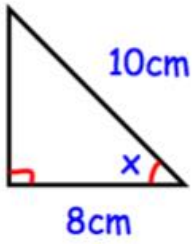
(a)



(b)



(c)

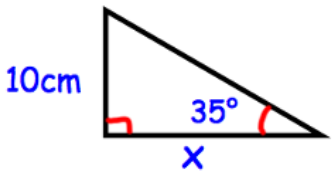


a. _____ b. _____ c. _____

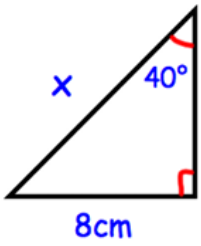
Question 2

Find the lengths of the sides labelled x below.

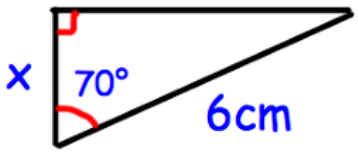
(a)



(b)



(c)



a. _____ b. _____ c. _____

Question 3

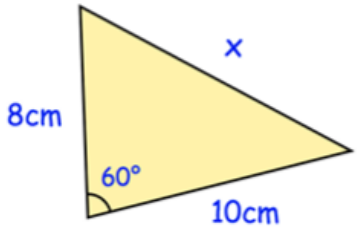
A 5 metre long ladder is placed against a wall. It reaches 4.3 metres up the wall. What is the angle between the ladder and the ground

_____

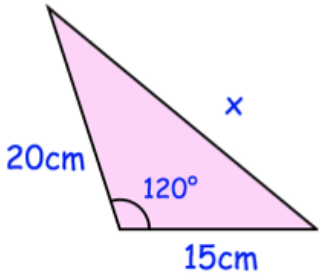
Question 4

Find x for each of the triangles below.

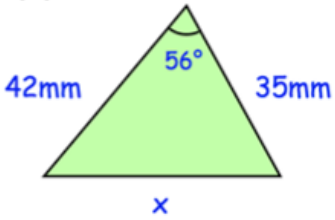
(a)



(b)



(c)

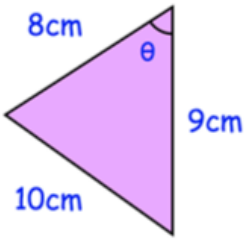


a. _____ b. _____ c. _____

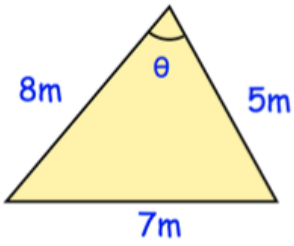
Question 5

Find the size of θ for each of these triangles

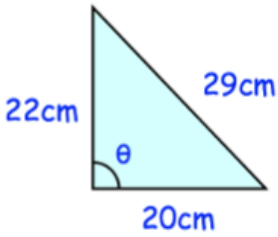
(a)



(b)



(c)



a. _____ b. _____ c. _____

Question 6

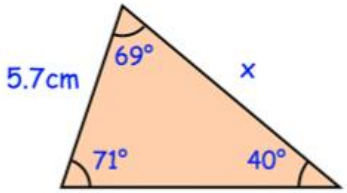
In triangle ABC, the side AB=6cm, the side BC=8cm and angle ABC=100°. Find the length of side AC. Give your answer to 1 decimal place.

_____

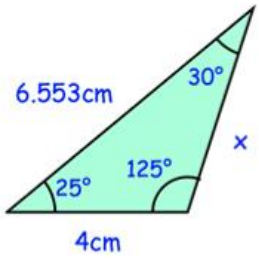
Question 7

Find x for each of the triangles below.

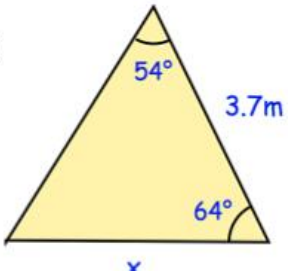
(a)



(b)



(c)

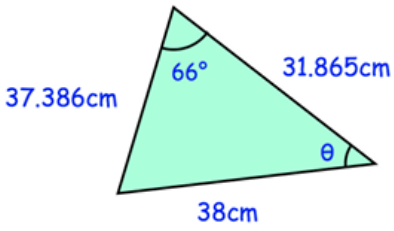


a. _____ b. _____ c. _____

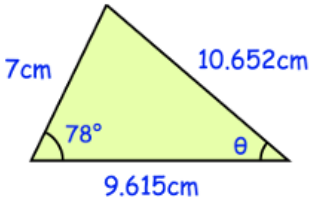
Question 8

Find the size of θ for each of these triangles.

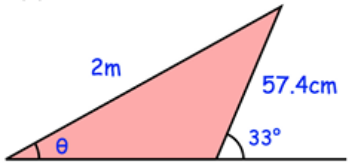
(a)



(b)



(c)



a. _____ b. _____ c. _____

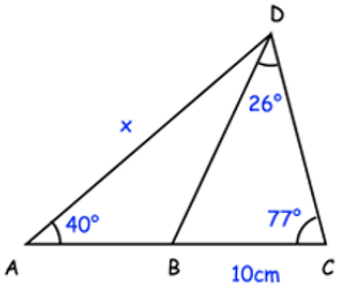
Question 9

ACD is a triangle and B is a point on AC.
BC = 10cm
Angle ACD = 77° Angle BDC = 26° Angle DAC = 40°

(a) Find the length of BD

(b) Find the size of angle ABD

(c) Find the length of AD



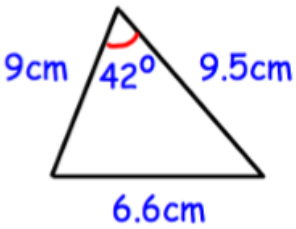
a. _____ b. _____ c. _____

Question 10

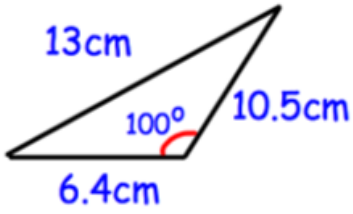
Find the area of each of these triangles.

(a)

(b)



(c)



a. _____ b. _____ c. _____

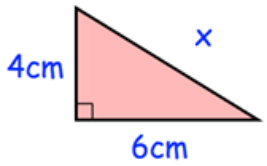
Part B: Pythagoras' Theorem

https://corbettmaths.com/2012/08/19/pythagoras-video/

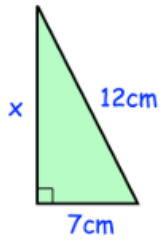
Question 1

Calculate x for each right-angle triangle. Give each answer to 2 decimal places.

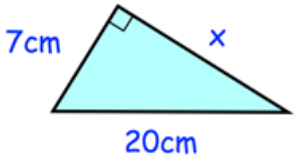
(a)



(b)



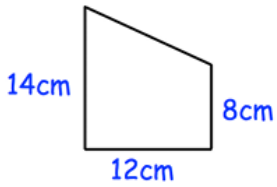
(c)



a. _____ b. _____ c. _____

Question 2

A frame is made from wire. The frame is a trapezium Calculate the total amount of wire needed to make the frame. Give your answer to 1 decimal place.



_____

Part C: Volume

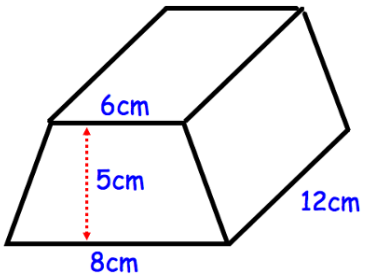
https://corbettmaths.com/2012/08/09/volume-of-cuboids-and-cubes/
https://corbettmaths.com/2013/02/15/volume-of-a-cylinder/
https://corbettmaths.com/2013/03/03/volume-of-a-cone/
https://corbettmaths.com/2013/03/03/volume-of-a-sphere/
https://corbettmaths.com/2013/04/20/volume-of-a-prism/

Question 1

Find the volume of a cylinder of height 11 cm and diameter 7 cm.

_____

Question 2:



Shown below is a trapezoid prism.
Find the volume of the prism

_____

Question 3

A cone has base diameter 18cm. The height of the cone is 20cm. Calculate the volume of the cone. Leave your answer in terms of π.

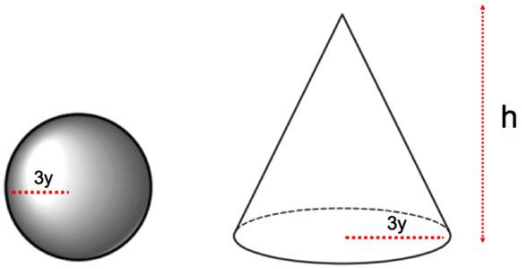
_____

Question 4

A sphere has volume 500cm³.
Calculate its radius

_____

Question 5



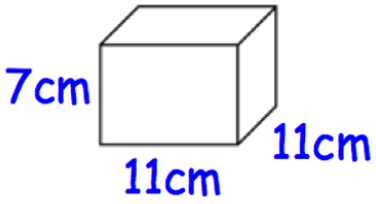
This sphere and cone have the same volume.

Find an expression for h in terms of y.

_____

Part D: Surface area
https://corbettmaths.com/2021/07/05/surface-area-videos/

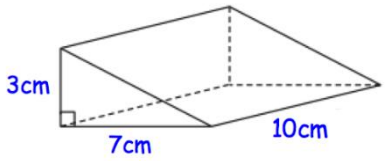
Question 1



Work out the surface area of this cuboid. State the units of your answer.

_____

Question 2



Calculate the surface area of the prism shown.

_____

Question 3

A cylinder has a surface area of 170π cm² and a radius of 5cm. Calculate the height of the cylinder.

_____

Answers

Statistics

Part A: Averages and Measures of spread

Question 1

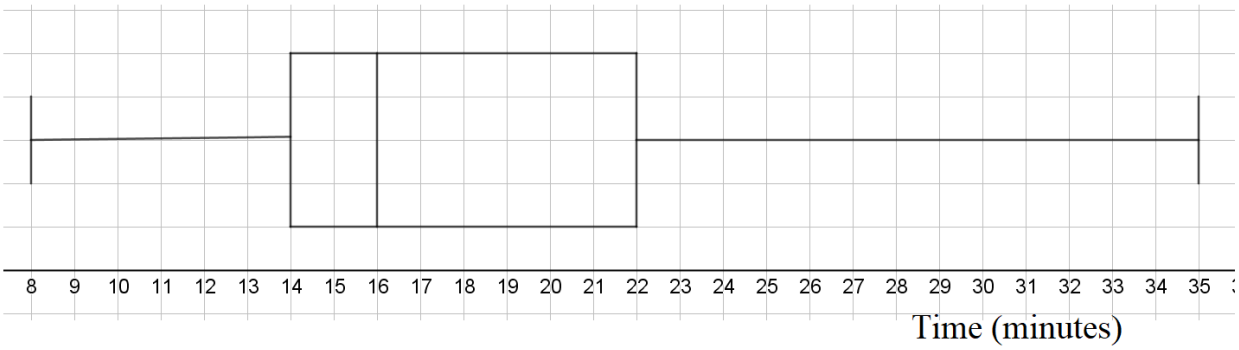
a. 32, b. 32, c. 31, d. 18, e. 6

Part B: Box and Whisker Diagrams

Question 1

a. 50, b. 39, c. 16, d. 6

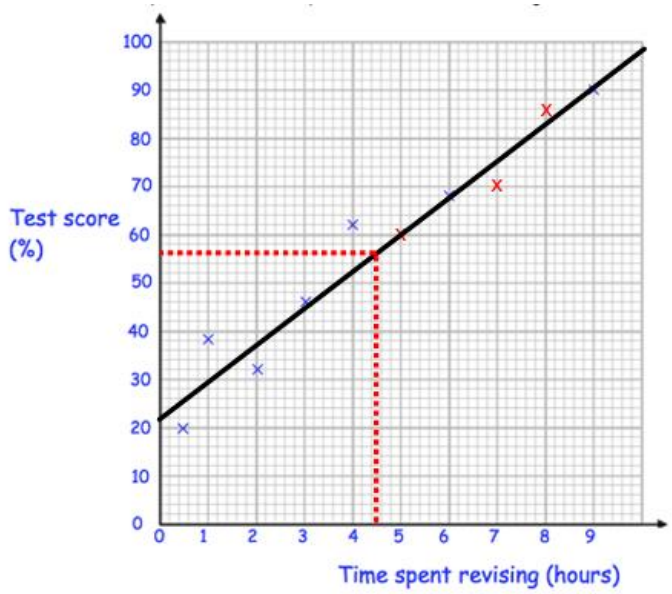
Question 2



Question 3

On average children completed the puzzle more quickly as their median time was lower. The children were also more consistent in the time taken as the IQR for children is lower than that of adults.

Part C: Scatter diagrams



a. see graph
b. As the time spent revising increased, so did the test score
c. See graph
d. See graph (56%) may vary depending on your line of best fit.

Part D: Probability

Question 1

a. $\frac{1}{10}$ b. $\frac{3}{10}$ c. $\frac{3}{10}$ d. $\frac{4}{10}$

Question 2

Spinner 1

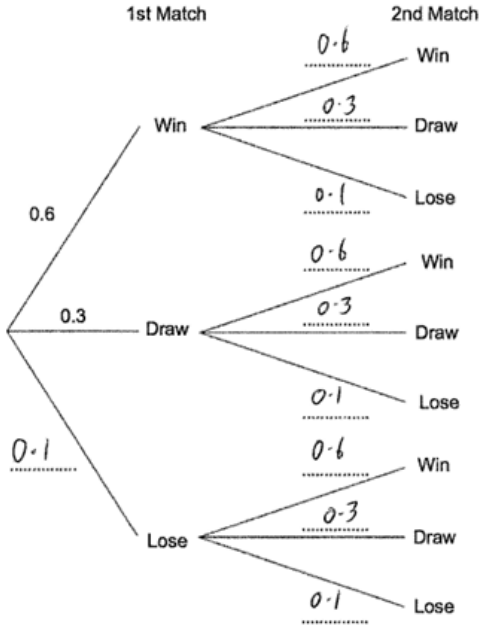
Spinner 2	1	3	4	5
5	6	8	9	10
6	7	9	10	11
7	8	10	11	12

a.

b. $\frac{1}{6}$ c. $\frac{5}{12}$

Question 3

a.



b. 0.36 c. 0.48

Number

Part A: Standard form

Question 1

a. $8x10^{6}$, b. $9x10^{2}$, c. $5.4x10^{8}$, d. $4.35x10^{4}$
e. $8.04x10^{5}$, f. $2x10^{-3}$, g. $6.5x10^{-4}$, h. $4.07x10^{-3}$
i. $2.4x10^{-8}$.

Question 2

a. 30,000 b. 50 000 000 c. 840 000 000
d. 4 050 000 e. 2065.1 f. 0.002
g. 0.00000048 h. 0.000000092 i. 0.0000571

Part B: Percentage change

Question 1: 13% Question 2: 45% Question 3: October and November (48.15%)

Geometry and Measure

Part A: Trigonometry

Question 1:

a. 26.57° b. 15.47° c. 36.87°

Question 2:

a. 14.28 cm b. 12.45 cm c. 2.05 cm

Question 3: 59.32°

Question 4

a. 9.165 cm b. 30.414 cm c. 36.674 mm

Question 5

a. 71.8° b. 60° c. 87.2°

Question 6: 55.3°

Question 7

a. 8.385 cm b. 3.381 cm c. 3.39 m

Question 8

a. 64° b. 40° c. 8.993°

Question 9

a. BD = 22.227 cm b. 103° c. 33.693 cm

Question 10

a. 72.32 cm^2 b. 28.6 cm^2 c. 33.1 cm^2

Part B: Pythagoras' Theorem

Question 1

a. 7.21 cm b. 9.75 cm c. 18.73 cm

Question 2: 47.4 cm

Part C: Volume

Question 1: 423.3 cm^3

Question 2: 420 cm^3

Question 3: 540π cm^3

Question 4: 4.924 cm

Question 5: h = 12y

Part D: Surface area

Question 1: 550 cm^2

Question 2: 192.7 cm^2

Question 3: 12 cm