ESTIMATING

Pearson Edexcel - Tuesday 19 May 2020 - Paper 1 (Non-Calculator) Higher Tier

1.

16 Shirley wants to find an estimate for the number of bees in her hive.

On Monday she catches 90 of the bees.
She puts a mark on each bee and returns them to her hive.

On Tuesday she catches 120 of the bees.
She finds that 20 of these bees have been marked.

(a) Work out an estimate for the total number of bees in her hive.

.....

(3)

Shirley assumes that none of the marks had rubbed off between Monday and Tuesday.

(b) If Shirley's assumption is wrong, explain what effect this would have on your answer to part (a).

.....

.....

.....

(1)

(Total for Question 16 is 4 marks)

Pearson Edexcel – Monday 8 June 2020 - Paper 3 (Calculator) Higher Tier

2.

10 A person's heart beats approximately 10^5 times each day.
A person lives for approximately 81 years.

(a) Work out an estimate for the number of times a person's heart beats in their lifetime.
Give your answer in standard form correct to 2 significant figures.

.....
(2)

2×10^{12} red blood cells have a total mass of 90 grams.

(b) Work out the average mass of 1 red blood cell.
Give your answer in standard form.

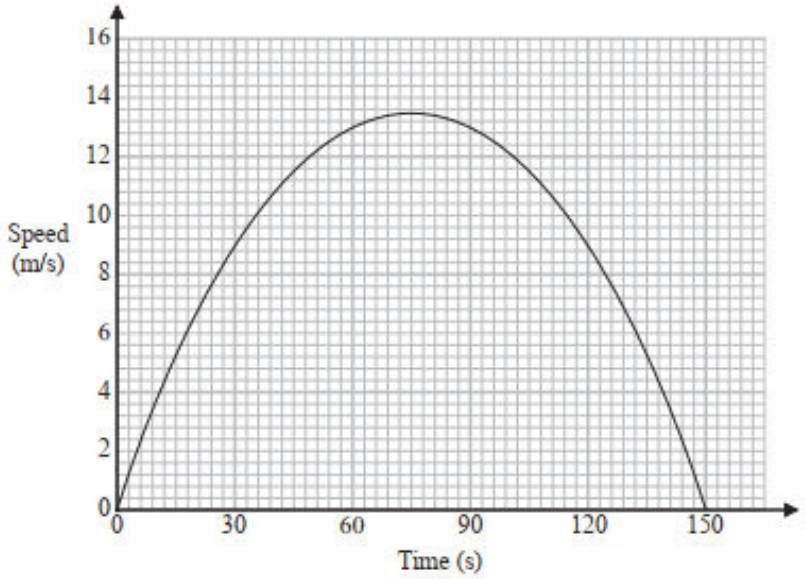
..... grams
(2)

(Total for Question 10 is 4 marks)

Pearson Edexcel – Monday 8 June 2020 - Paper 3 (Calculator) Higher Tier

3.

16 Here is a speed-time graph for a car.



(a) Work out an estimate for the distance the car travelled in the first 30 seconds.

..... m

(2)

(b) Is your answer to part (a) an underestimate or an overestimate of the actual distance the car travelled in the first 30 seconds?
Give a reason for your answer.

.....

.....

.....

(1)

Julian used the graph to answer this question.

Work out an estimate for the acceleration of the car at time 60 seconds.

Here is Julian's working.

$$\text{acceleration} = \text{speed} \div \text{time}$$

$$= 13 \div 60$$

$$= 0.21\dot{6} \text{ m/s}^2$$

Julian's method does not give a good estimate of the acceleration at time 60 seconds.

(c) Explain why.

.....

.....

.....

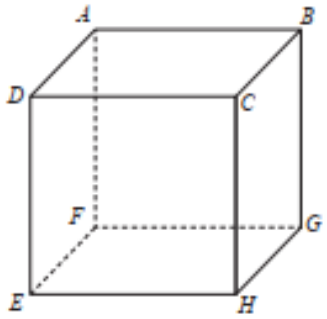
(1)

(Total for Question 16 is 4 marks)

Pearson Edexcel – Monday 8 June 2020 - Paper 3 (Calculator) Higher Tier

4.

18 The diagram shows a cube.



$AH = 11.3$ cm correct to the nearest mm.

Calculate the lower bound for the length of an edge of the cube.
You must show all your working.

..... cm

(Total for Question 18 is 4 marks)

Pearson Edexcel - Tuesday 21 May 2019 - Paper 1 (Non-Calculator) Higher Tier

5.

8 (a) Work out an estimate for the value of $\sqrt{63.5 \times 101.7}$

.....

(2)

$(2.3)^6 = 148$ correct to 3 significant figures.

(b) Find the value of $(0.23)^6$ correct to 3 significant figures.

.....

(1)

(c) Find the value of 5^{-2}

.....

(1)

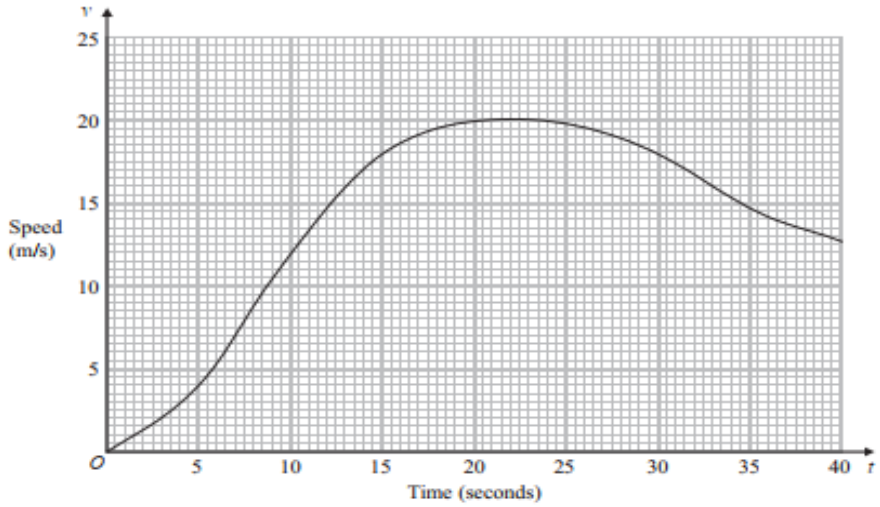
(Total for Question 8 is 4 marks)

Pearson Edexcel - Thursday 6 June 2019 - Paper 2 (Calculator) Higher Tier

6.

14 A car moves from rest.

The graph gives information about the speed, v metres per second, of the car t seconds after it starts to move.



(a) (i) Calculate an estimate of the gradient of the graph at $t = 15$

.....

(3)

(ii) Describe what your answer to part (i) represents.

.....

(1)

(b) Work out an estimate for the distance the car travels in the first 20 seconds of its journey. Use 4 strips of equal width.

.....m

(3)

(Total for Question 14 is 7 marks)

Pearson Edexcel - Tuesday 6 November 2018 - Paper 1 (Non-Calculator) Higher Tier

7.

5 A plane travels at a speed of 213 miles per hour.

(a) Work out an estimate for the number of seconds the plane takes to travel 1 mile.

..... seconds

(3)

(b) Is your answer to part (a) an underestimate or an overestimate?
Give a reason for your answer.

.....

.....

(1)

(Total for Question 5 is 4 marks)

Pearson Edexcel - Thursday 24 May 2018 - Paper 1 (Non-Calculator) Higher Tier

8.

4 A cycle race across America is 3069.25 miles in length.

Juan knows his average speed for his previous races is 15.12 miles per hour.
For the next race across America he will cycle for 8 hours per day.

(a) Estimate how many days Juan will take to complete the race.

.....

(3)

Juan trains for the race.
The average speed he can cycle at increases.
It is now 16.27 miles per hour.

(b) How does this affect your answer to part (a)?

.....

.....

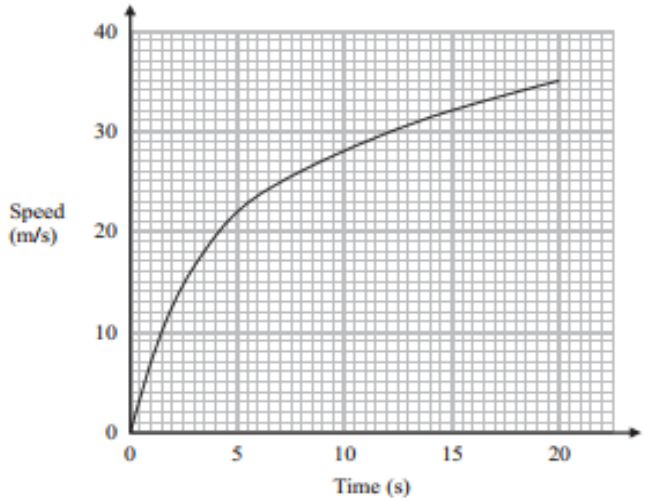
(1)

(Total for Question 4 is 4 marks)

Pearson Edexcel - Tuesday 12 June 2018 - Paper 3 (Calculator) Higher Tier

9.

15 The graph shows the speed of a car, in metres per second, during the first 20 seconds of a journey.



(a) Work out an estimate for the distance the car travelled in the first 20 seconds.
Use 4 strips of equal width.

..... metres
(3)

(b) Is your answer to part (a) an underestimate or an overestimate of the actual distance the car travelled in the first 20 seconds?
Give a reason for your answer.

.....

.....

(1)

(Total for Question 15 is 4 marks)

Pearson Edexcel - Tuesday 12 June 2018 - Paper 3 (Calculator) Higher Tier

10.

18 (a) Show that the equation $x^3 + x = 7$ has a solution between 1 and 2

(2)

(b) Show that the equation $x^3 + x = 7$ can be rearranged to give $x = \sqrt[3]{7 - x}$

(1)

(c) Starting with $x_0 = 2$,
use the iteration formula $x_{n+1} = \sqrt[3]{7 - x_n}$ three times to find an estimate for a solution of $x^3 + x = 7$

.....

(3)

(Total for Question 18 is 6 marks)

Pearson Edexcel - Thursday 2 November 2017 - Paper 1 (Non-Calculator) Higher Tier

11.

5 The table shows information about the weekly earnings of 20 people who work in a shop.

Weekly earnings (£x)	Frequency
$150 < x \leqslant 250$	1
$250 < x \leqslant 350$	11
$350 < x \leqslant 450$	5
$450 < x \leqslant 550$	0
$550 < x \leqslant 650$	3

(a) Work out an estimate for the mean of the weekly earnings.

£.....

(3)

Nadiya says,

"The mean may **not** be the best average to use to represent this information."

(b) Do you agree with Nadiya?
You must justify your answer.

.....

.....

(1)

(Total for Question 5 is 4 marks)

Pearson Edexcel - Wednesday 8 November 2017 - Paper 3 (Calculator) Higher Tier

12.

8 When a drawing pin is dropped it can land point down or point up.

Lucy, Mel and Tom each dropped the drawing pin a number of times.

The table shows the number of times the drawing pin landed point down and the number of times the drawing pin landed point up for each person.

	Lucy	Mel	Tom
point down	31	53	16
point up	14	27	9

Rachael is going to drop the drawing pin once.

(a) Whose results will give the best estimate for the probability that the drawing pin will land point up?
Give a reason for your answer.

.....

.....

(1)

Stuart is going to drop the drawing pin twice.

(b) Use all the results in the table to work out an estimate for the probability that the drawing pin will land point up the first time and point down the second time.

.....

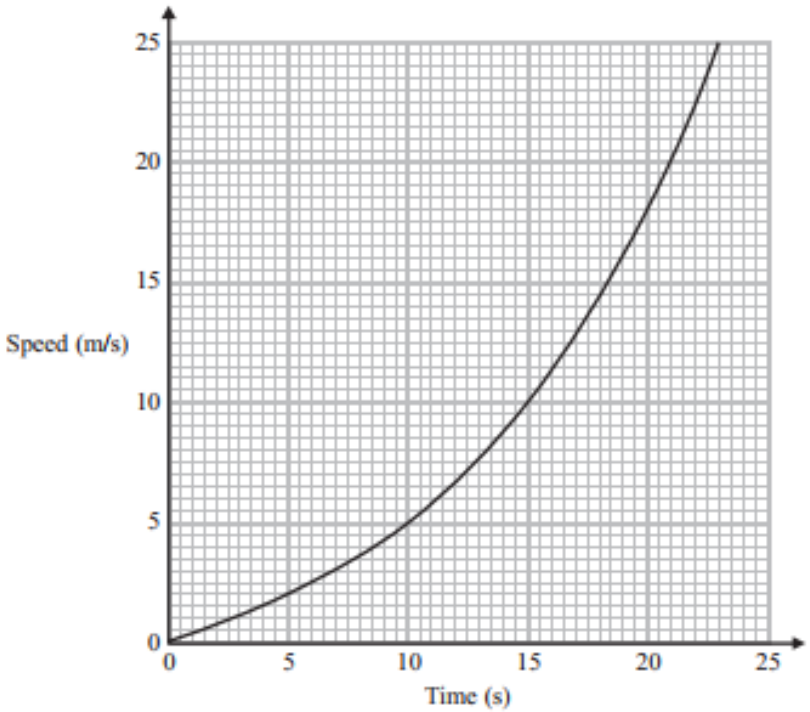
(2)

(Total for Question 8 is 3 marks)

Pearson Edexcel - Wednesday 8 November 2017 - Paper 3 (Calculator) Higher Tier

13.

18 Here is a speed-time graph for a train.



(a) Work out an estimate for the distance the train travelled in the first 20 seconds.
Use 4 strips of equal width.

..... m

(3)

(b) Is your answer to (a) an underestimate or an overestimate of the actual distance the train travelled?
Give a reason for your answer.

.....

.....

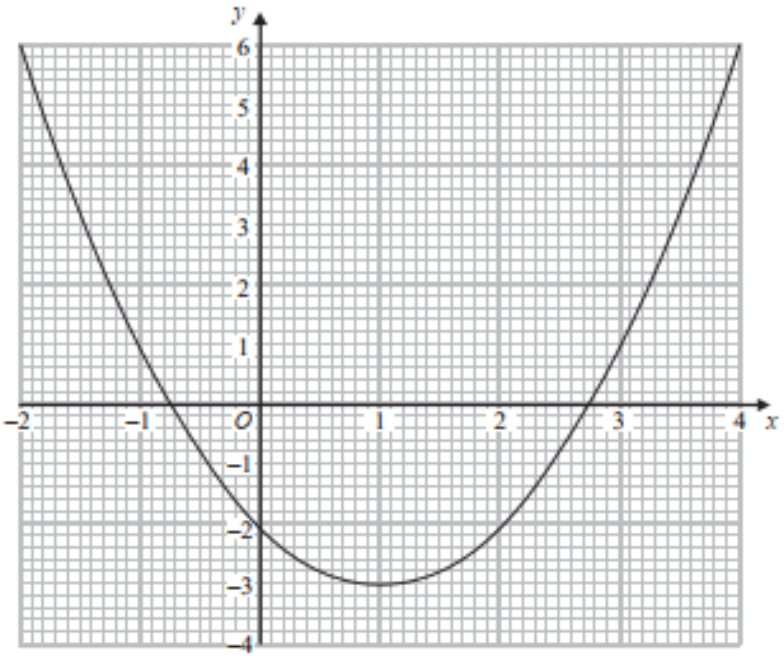
(1)

(Total for Question 18 is 4 marks)

Pearson Edexcel - Thursday 25 May 2017 - Paper 1 (Non-Calculator) Higher Tier

14.

11 The graph of $y = f(x)$ is drawn on the grid.



(a) Write down the coordinates of the turning point of the graph.

(..... , ...)

(1)

(b) Write down estimates for the roots of $f(x) = 0$

.....

(1)

(c) Use the graph to find an estimate for $f(1.5)$

.....

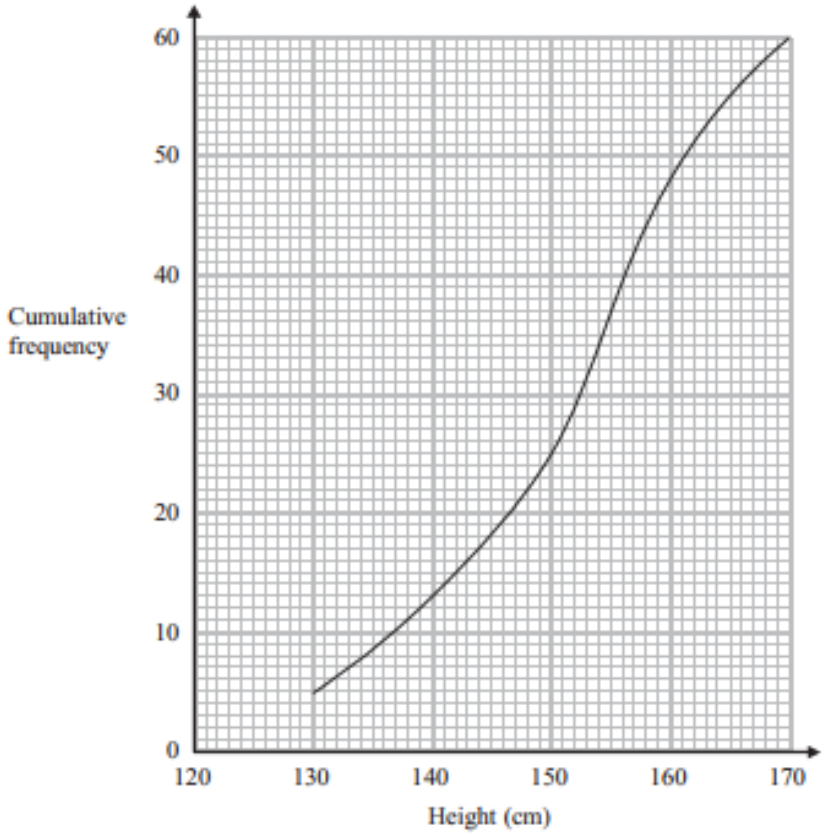
(1)

(Total for Question 11 is 3 marks)

Pearson Edexcel - Thursday 8 June 2017 - Paper 2 (Calculator) Higher Tier

15.

8 The cumulative frequency graph shows some information about the heights, in cm, of 60 students.



Work out an estimate for the number of these students with a height greater than 160 cm.

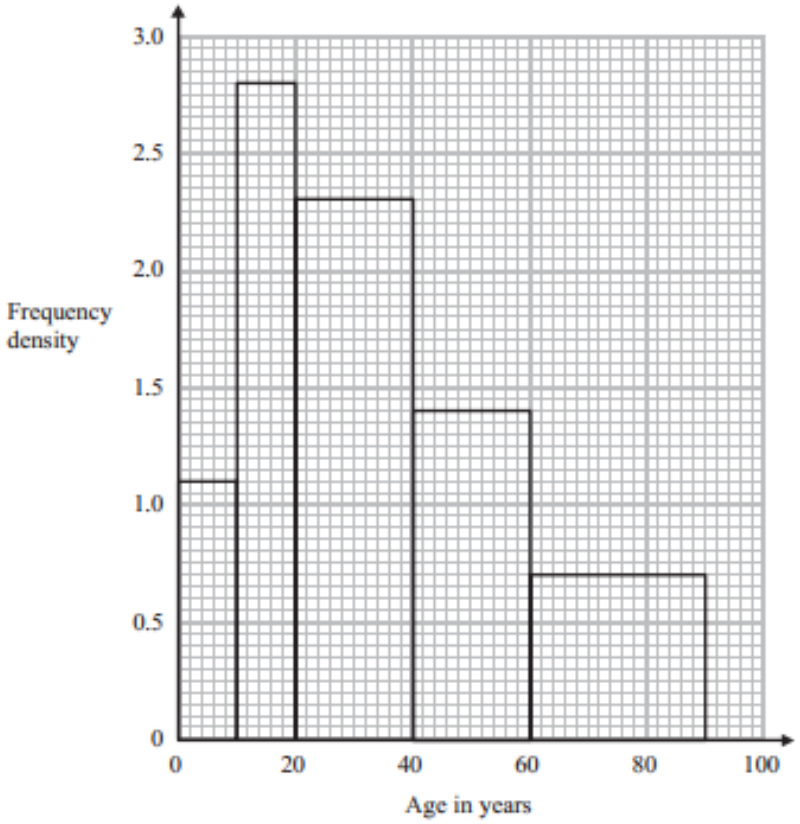
.....

(Total for Question 8 is 2 marks)

Pearson Edexcel - Thursday 8 June 2017 - Paper 2 (Calculator) Higher Tier

16.

13 The histogram shows some information about the ages of the 134 members of a sports club.



20% of the members of the sports club who are over 50 years of age are female.

Work out an estimate for the number of female members who are over 50 years of age.

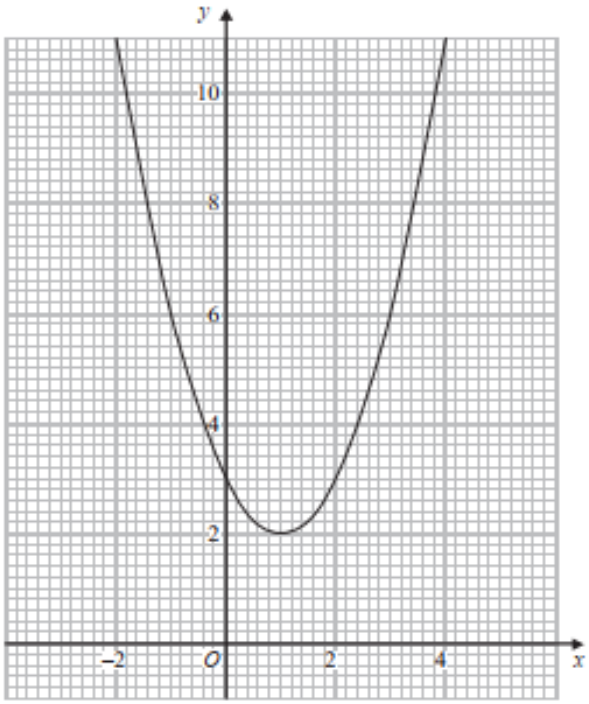
.....

(Total for Question 13 is 3 marks)

Pearson Edexcel - Thursday 8 June 2017 - Paper 2 (Calculator) Higher Tier

17.

20 The diagram shows part of the graph of $y = x^2 - 2x + 3$



(a) By drawing a suitable straight line, use your graph to find estimates for the solutions of $x^2 - 3x - 1 = 0$

.....

(2)

P is the point on the graph of $y = x^2 - 2x + 3$ where $x = 2$

(b) Calculate an estimate for the gradient of the graph at the point P.

.....

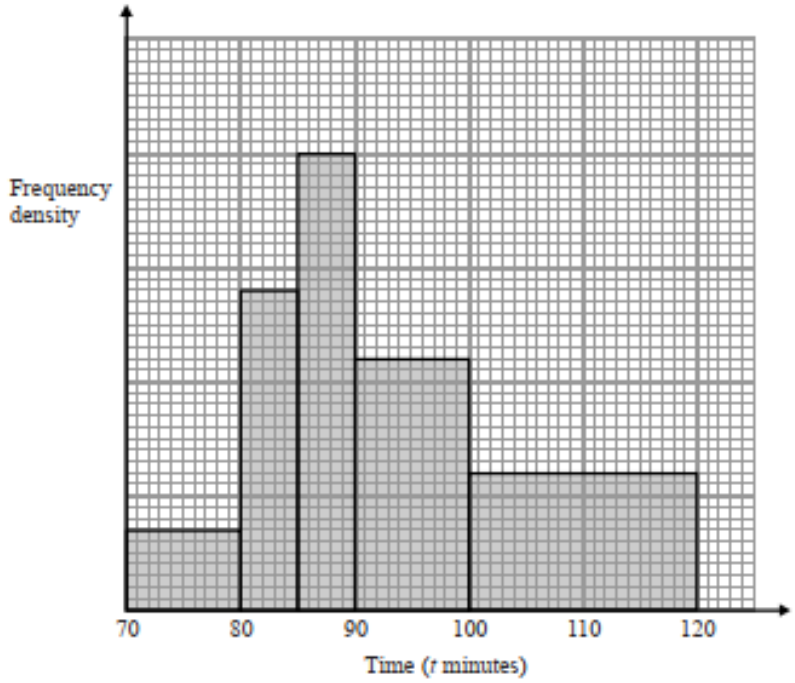
(3)

(Total for Question 20 is 5 marks)

Pearson Edexcel - Specimen Papers Set 2 - Paper 1 (Non-Calculator) Higher Tier

18.

19 The histogram shows information about the time taken by cyclists to finish a cycle race.



7 cyclists took 80 minutes or less to finish the race.

(i) Work out an estimate for the number of cyclists who took more than 105 minutes to finish the race.

.....

(ii) Explain why your answer to part (i) is only an estimate.

.....

.....

(Total for Question 19 is 4 marks)

Pearson Edexcel - Specimen Papers Set 2 - Paper 2 (Calculator) Higher Tier

19.

10 The population of a city increased by 5.2% for the year 2014

At the beginning of 2015 the population of the city was 1 560 000

Lin assumes that the population will continue to increase at a constant rate of 5.2% each year.

(a) Use Lin's assumption to estimate the population of the city at the beginning of 2017
Give your answer correct to 3 significant figures.

.....

(3)

(b) (i) Use Lin's assumption to work out the year in which the population of the city will reach 2 000 000

.....

(ii) If Lin's assumption about the rate of increase of the population is too low, how might this affect your answer to (b)(i)?

.....

.....

.....

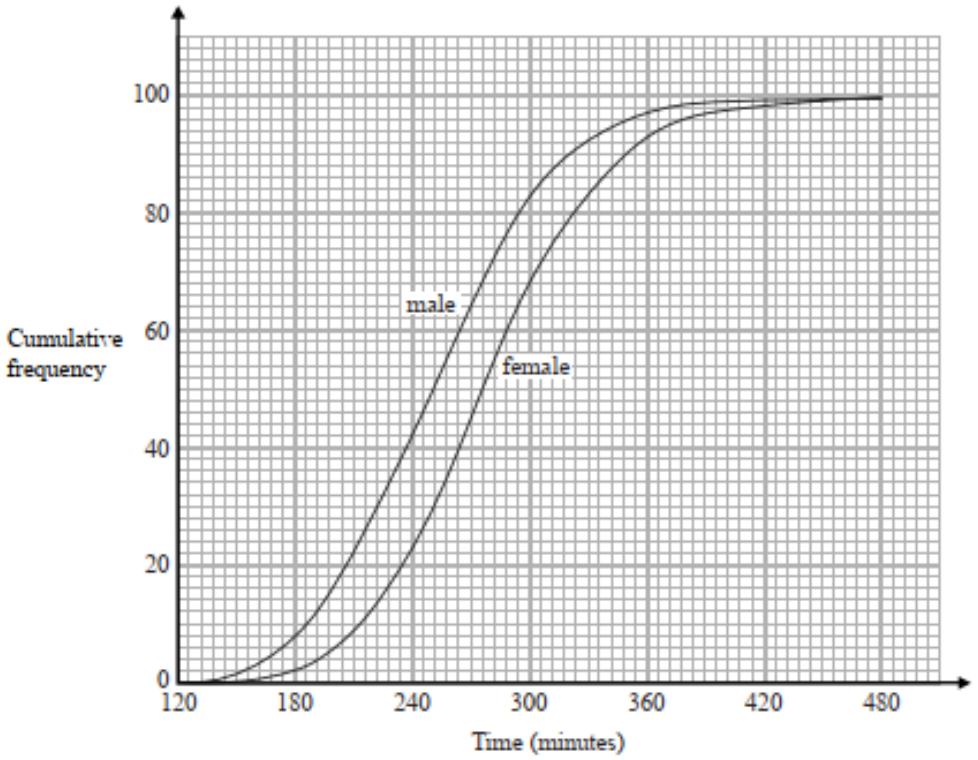
(3)

(Total for Question 10 is 6 marks)

Pearson Edexcel - Specimen Papers Set 2 - Paper 2 (Calculator) Higher Tier

20.

11 The cumulative frequency graphs show information about the times taken by 100 male runners and by 100 female runners to finish the London marathon.



A male runner is chosen at random.

(a) Find an estimate for the probability that this runner took less than 4 hours to finish the London marathon.

.....

(2)

(b) Use medians and interquartile ranges to compare the distribution of the times taken by the male runners with the distribution of the times taken by the female runners.

.....

.....

.....

.....

.....

(4)

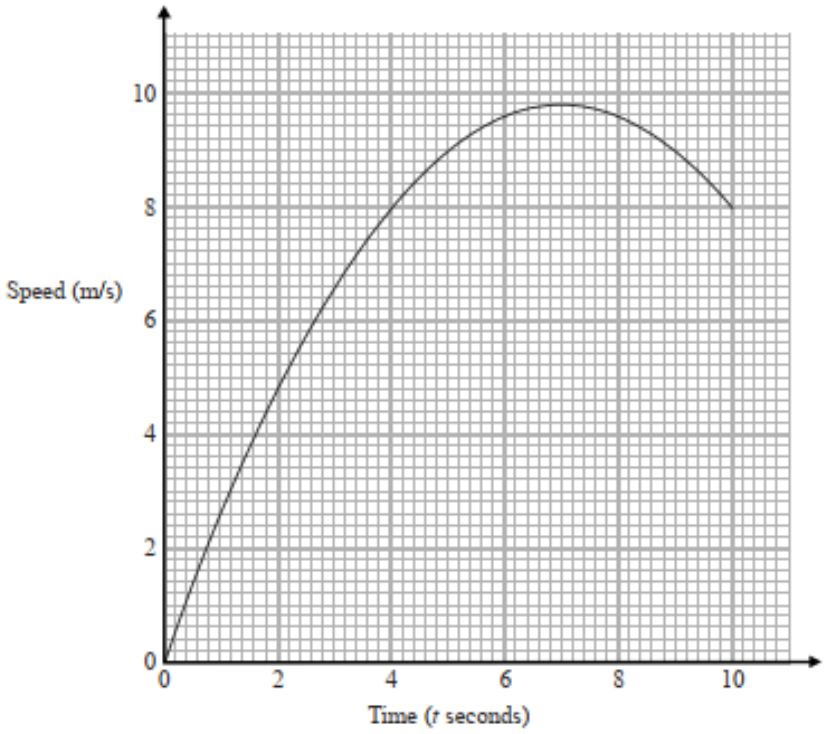
(Total for Question 11 is 6 marks)

Pearson Edexcel - Specimen Papers Set 2 - Paper 2 (Calculator) Higher Tier

21.

15 Karol runs in a race.

The graph shows her speed, in metres per second, t seconds after the start of the race.



(a) Calculate an estimate for the gradient of the graph when $t = 4$
You must show how you get your answer.

.....

(3)

(b) Describe fully what your answer to part (a) represents.

.....

.....

(2)

(c) Explain why your answer to part (a) is only an estimate.

.....

.....

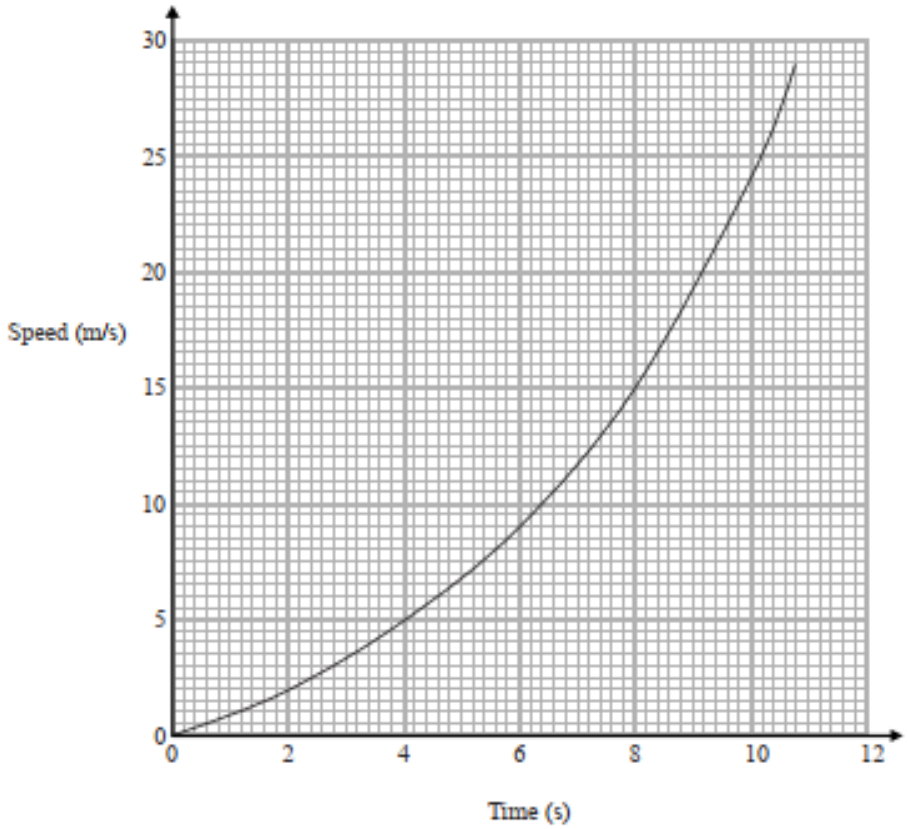
(1)

(Total for Question 15 is 6 marks)

Pearson Edexcel - Specimen Papers Set 2 - Paper 3 (Calculator) Higher Tier

22.

18 Here is a speed-time graph for a car.



(a) Work out an estimate for the distance the car travelled in the first 10 seconds.
Use 5 strips of equal width.

.....m
(3)

(b) Is your answer to (a) an underestimate or an overestimate of the actual distance?
Give a reason for your answer.

.....

.....

(1)

(Total for Question 18 is 4 marks)

Pearson Edexcel - Specimen Papers Set 1 - Paper 1 (Non-Calculator) Higher Tier

23.

8 The mass of Jupiter is 1.899×10^{27} kg.
The mass of Saturn is 0.3 times the mass of Jupiter.

(a) Work out an estimate for the mass of Saturn.
Give your answer in standard form.

..... kg
(3)

(b) Give evidence to show whether your answer to (a) is an underestimate or an overestimate.

.....

.....

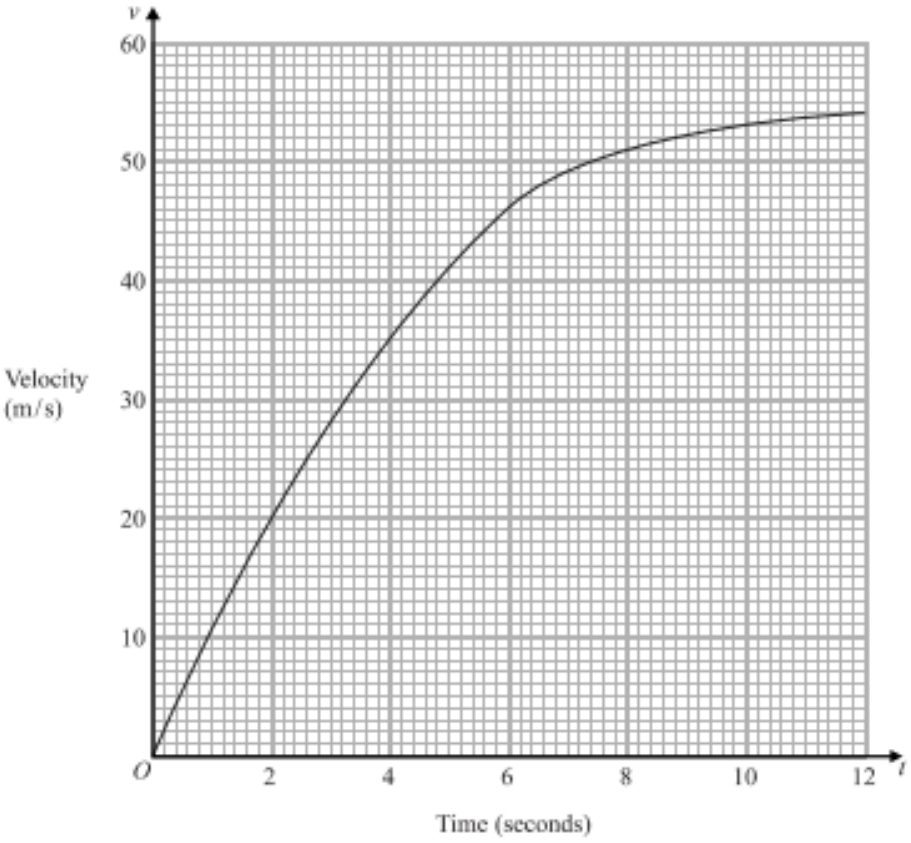
(1)

(Total for Question 8 is 4 marks)

Pearson Edexcel - Specimen Papers Set 1 - Paper 2 (Calculator) Higher Tier

24.

20 The graph shows information about the velocity, v m/s, of a parachutist t seconds after leaving a plane.



(a) Work out an estimate for the acceleration of the parachutist at $t = 6$

..... m/s^2

(2)

(b) Work out an estimate for the distance fallen by the parachutist in the first 12 seconds after leaving the plane.
Use 3 strips of equal width.

..... m

(3)

(Total for Question 20 is 5 marks)

Pearson Edexcel - Specimen Papers Set 1 - Paper 3 (Calculator) Higher Tier

25.

4 Jenny works in a shop that sells belts.

The table shows information about the waist sizes of 50 customers who bought belts from the shop in May.

Belt size	Waist (w inches)	Frequency
Small	$28 < w \leqslant 32$	24
Medium	$32 < w \leqslant 36$	12
Large	$36 < w \leqslant 40$	8
Extra Large	$40 < w \leqslant 44$	6

(a) Calculate an estimate for the mean waist size.

.....inches

(3)

Belts are made in sizes Small, Medium, Large and Extra Large.

Jenny needs to order more belts in June.
The modal size of belts sold is Small.

Jenny is going to order $\frac{3}{4}$ of the belts in size Small.

The manager of the shop tells Jenny she should **not** order so many Small belts.

(b) Who is correct, Jenny or the manager?
You must give a reason for your answer.

.....

.....

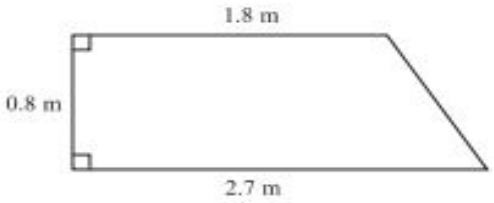
(2)

(Total for Question 4 is 5 marks)

Pearson Edexcel - Specimen Papers Set 1 - Paper 3 (Calculator) Higher Tier

26.

5 The diagram shows a wall in the shape of a trapezium.



Karen is going to cover this part of the wall with tiles.
Each tile is rectangular, 15 cm by 7.5 cm

Tiles are sold in packs.
There are 9 tiles in each pack.

Karen divides the area of this wall by the area of a tile to work out an estimate for the number of tiles she needs to buy.

(a) Use Karen's method to work out the estimate for the number of packs of tiles she needs to buy.

.....

(5)

Karen is advised to buy 10% more tiles than she estimated.
Buying 10% more tiles will affect the number of the tiles Karen needs to buy.

She assumes she will need to buy 10% more packs of tiles.

(b) Is Karen's assumption correct?
You must show your working.

(2)

(Total for Question 5 is 7 marks)

Pearson Edexcel - Specimen Papers Set 1 - Paper 3 (Calculator) Higher Tier

27.

15 A virus on a computer is causing errors.
An antivirus program is run to remove these errors.

An estimate for the number of errors at the end of t hours is $10^6 \times 2^{-t}$

(a) Work out an estimate for the number of errors on the computer at the end of 8 hours.

.....

(2)

(b) Explain whether the number of errors on this computer ever reaches zero.

.....

.....

.....

(1)

(Total for Question 15 is 3 marks)

Pearson Edexcel - Sample Paper 1 - (Non-Calculator) Higher Tier

28.

11 One uranium atom has a mass of 3.95×10^{-22} grams.

(a) Work out an estimate for the number of uranium atoms in 1 kg of uranium.

.....

(3)

(b) Is your answer to (a) an underestimate or an overestimate?
Give a reason for your answer.

.....

.....

(1)

(Total for Question 11 is 4 marks)

Pearson Edexcel - Sample Paper 2 - (Calculator) Higher Tier

29.

5 The table shows some information about the foot lengths of 40 adults.

Foot length (f cm)	Number of adults
$16 \leqslant f < 18$	3
$18 \leqslant f < 20$	6
$20 \leqslant f < 22$	10
$22 \leqslant f < 24$	12
$24 \leqslant f < 26$	9

(a) Write down the modal class interval.

.....

(1)

(b) Calculate an estimate for the mean foot length.

..... cm

(3)

(Total for Question 5 is 4 marks)

Pearson Edexcel - Thursday 26 May 2016 - Paper 1 (Non-Calculator) Higher Tier

30.

5 There are 892 litres of oil in Mr Aston's oil tank.
He uses 18.7 litres of oil each day.

Estimate the number of days it will take him to use all the oil in the tank.

.....

(Total for Question 5 is 2 marks)

Pearson Edexcel - Thursday 26 May 2016 - Paper 1 (Non-Calculator) Higher Tier

31.

8 Carol spins a spinner 80 times.

The table shows information about her results.

Outcome	Frequency
J	39
K	25
L	16

Dan spins this spinner 300 times.

Work out an estimate for the number of times that Dan will get an L.

.....

(Total for Question 8 is 3 marks)

Pearson Edexcel - Thursday 9 June 2016 - Paper 2 (Calculator) Higher Tier

32.

10 The table gives information about the heights of 50 trees.

Height (h metres)	Frequency
$0 < h \leqslant 4$	8
$4 < h \leqslant 8$	21
$8 < h \leqslant 12$	12
$12 < h \leqslant 16$	7
$16 < h \leqslant 20$	2

Work out an estimate for the mean height of the trees.

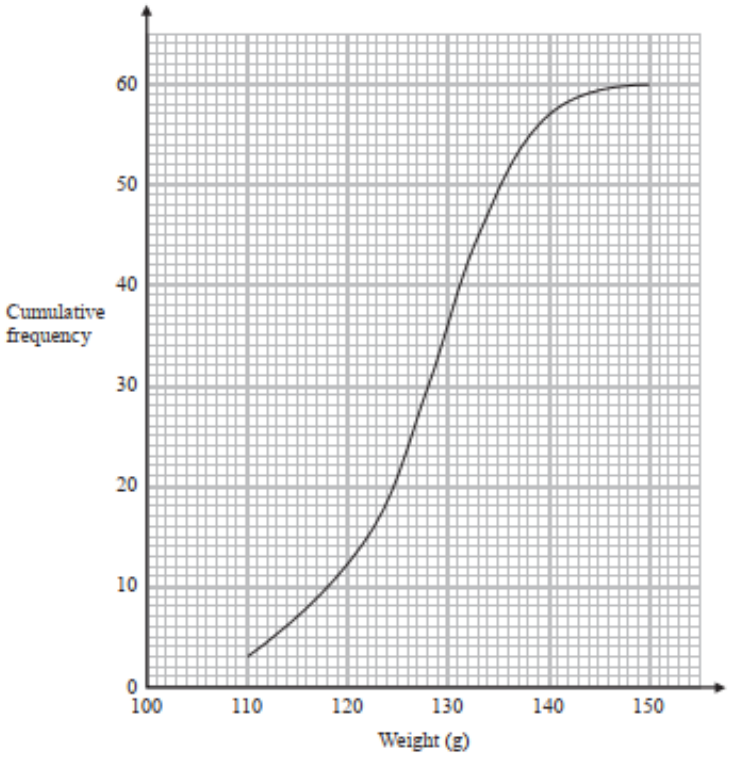
..... m

(Total for Question 10 is 4 marks)

Pearson Edexcel - Thursday 9 June 2016 - Paper 2 (Calculator) Higher Tier

33.

16 The cumulative frequency graph shows information about the weights of 60 apples.



(a) Use the graph to find an estimate for the median weight.

.....g

(1)

(b) Use the graph to find an estimate for the interquartile range of the weights.

.....g

(2)

(Total for Question 16 is 3 marks)

Pearson Edexcel - Thursday 4 June 2015 - Paper 1 (Non-Calculator) Higher Tier

34.

11 Karl wants to raise money for charity.
He designs a game for people to play.

Karl uses a fair 10-sided dice for the game.
The dice is numbered from 1 to 10

Each person will roll the dice once.
A person wins the game if the dice lands on a multiple of 4

Ali plays the game once.

(a) Work out the probability that Ali will win the game.

.....

(2)

Each person pays 30p to play the game once.
The prize for a win is £1

Karl thinks that the game will be played 100 times.

(b) Work out an estimate for how much money Karl will raise for charity.

.....

(3)

(Total for Question 11 is 5 marks)

Pearson Edexcel - Monday 8 June 2015 - Paper 2 (Calculator) Higher Tier

35.

14 Suneet records the times, in minutes, for 40 runners to finish a half marathon.

Information about these times is shown in the table.

Time (t minutes)	Frequency
$60 < t \leqslant 90$	10
$90 < t \leqslant 120$	14
$120 < t \leqslant 150$	9
$150 < t \leqslant 180$	5
$180 < t \leqslant 210$	2

Calculate an estimate for the mean time.

..... minutes

(Total for Question 14 is 4 marks)

Pearson Edexcel - Monday 9 June 2014 - Paper 1 (Non-Calculator) Higher Tier

36.

*13

Competition
a prize every 2014 seconds

In a competition, a prize is won every 2014 seconds.

Work out an estimate for the number of prizes won in 24 hours.
You must show your working.

(Total for Question 13 is 4 marks)

Pearson Edexcel - Tuesday 11 June 2013 - Paper 1 (Non-Calculator) Higher Tier

37.

8 Margaret has some goats.
The goats produce an average total of 21.7 litres of milk per day for 280 days.
Margaret sells the milk in $\frac{1}{2}$ litre bottles.

Work out an estimate for the total number of bottles that Margaret will be able to fill with the milk.

You must show clearly how you got your estimate.

.....

(Total for Question 8 is 3 marks)

Pearson Edexcel - Tuesday 6 November 2012 - Paper 1 (Non-Calculator) Higher Tier

38.

5 Work out an estimate for $\frac{31 \times 9.87}{0.509}$

.....

(Total for Question 5 is 3 marks)

Pearson Edexcel - Monday 5 March 2012 - Paper 4 (Calculator) Higher Tier

39.

10. Caleb measured the heights of 30 plants.

The table gives some information about the heights, h cm, of the plants.

Height (h cm) of plants	Frequency		
$0 < h \leqslant 10$	2		
$10 < h \leqslant 20$	8		
$20 < h \leqslant 30$	9		
$30 < h \leqslant 40$	7		
$40 < h \leqslant 50$	4		

Work out an estimate for the mean height of a plant.

..... cm

(Total 4 marks)

Pearson Edexcel - Wednesday 9 November 2011 - Paper 3 (Non-Calculator) Higher Tier

40.

8. Work out an estimate for the value of

$$(0.49 \times 0.61)^2$$

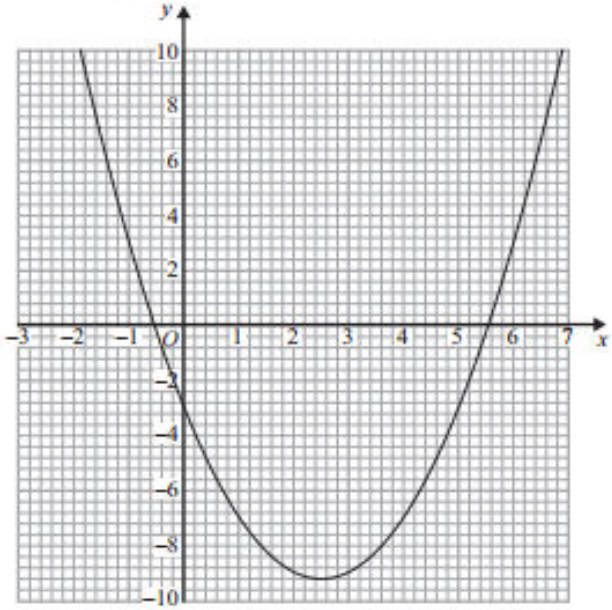
.....

(Total 2 marks)

Pearson Edexcel - Wednesday 9 November 2011 - Paper 3 (Non-Calculator) Higher Tier

41.

14. The diagram shows the graph of $y = x^2 - 5x - 3$



(a) Use the graph to find estimates for the solutions of

(i) $x^2 - 5x - 3 = 0$

.....

(ii) $x^2 - 5x - 3 = 6$

.....

(3)

(b) Use the graph to find estimates for the solutions of the simultaneous equations

$y = x^2 - 5x - 3$

$y = x - 4$

.....

(3)

(Total 6 marks)

Pearson Edexcel - Monday 14 November 2011 - Paper 4 (Calculator) Higher Tier

42.

10. The temperature (T°C) at noon at a seaside resort was recorded for a period of 60 days. The table shows some of this information.

Temperature (T°C)	Number of days
$10 < T \leqslant 14$	2
$14 < T \leqslant 18$	8
$18 < T \leqslant 22$	14
$22 < T \leqslant 26$	23
$26 < T \leqslant 30$	9
$30 < T \leqslant 34$	4

Calculate an estimate for the mean temperature at noon during these 60 days.
Give your answer correct to 3 significant figures.

.....°C

(Total 4 marks)

Pearson Edexcel - Monday 6 June 2011 - Paper 3 (Non-Calculator) Higher Tier

43.

4. Work out an estimate for $\frac{7.19 \times 19.7}{0.46}$

.....

(Total 3 marks)

Pearson Edexcel - Tuesday 9 November 2010 - Paper 3 (Non-Calculator) Higher Tier

44.

6. Work out an estimate for $\frac{3870}{236 \times 4.85}$

.....

(Total 2 marks)

Pearson Edexcel - Friday 11 June 2010 - Paper 4 (Calculator) Higher Tier

45.

14. The table gives information about the number of CDs sold in a shop during each of the last 30 weeks.

Number of CDs (n)	Frequency		
$0 < n \leqslant 40$	3		
$40 < n \leqslant 80$	5		
$80 < n \leqslant 120$	12		
$120 < n \leqslant 160$	7		
$160 < n \leqslant 200$	3		

Calculate an estimate for the mean number of CDs sold each week.
Give your answer correct to 1 decimal place.

.....

(Total 4 marks)

Pearson Edexcel - Thursday 5 November 2009 - Paper 3 (Non-Calculator) Higher Tier

46.

2. Work out an estimate for the value of $\dfrac{31 \times 4.92}{0.21}$

.....

(Total 3 marks)

OCR GSCE – Thursday 7 November 2019 – Paper 5 (Non-Calculator) Higher Tier

47.

1 **(a)** Work out.

$$\frac{3}{4}+\frac{1}{6}$$

Give your answer in its simplest form.

(a) ..... **[2]**

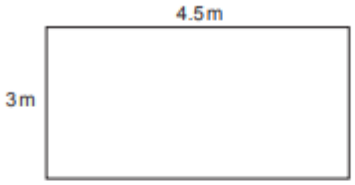
(b) By writing each number correct to 1 significant figure, use estimation to show that

$$\frac{39.6\times 20.2}{\sqrt{99.2}}\approx 80.$$ **[3]**

OCR GSCE – Thursday 7 June 2018 – Paper 5 (Non - Calculator) Higher Tier

48.

7 Here is the floor plan of a rectangular room.



Not to scale

Tim buys carpet tiles for this room.

Each tile is a square measuring 50 cm by 50 cm.
The tiles are only sold in packs of ten.
Each pack costs £20.
Tim pays for fitting at a rate of £7.50 per square metre, with any fraction of a square metre rounded up.

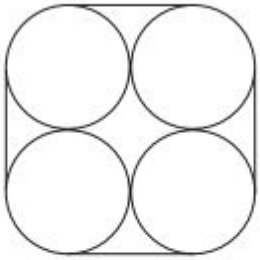
Work out the **total** cost of the tiles and fitting.

£ ..... **[6]**

OCR GSCE – Sample Papers – Paper 4 (Calculator) Higher Tier

49.

18 Four pencils are held together with a band.
The figure below shows the bottom end of the pencils and the band.



Each of the pencils has diameter 9 mm.

Find the length of the band in this position.

..... mm **[4]**

OCR GSCE – Sample Papers – Paper 6 (Calculator) Higher Tier

50.

5 Lei is in a class of 28 students, 3 of whom are left-handed.
There are 1250 students in the school.

(a) Use this information to estimate how many students in the school are left-handed.

(a) ..... **[3]**

(b) Is your solution to **(a)** likely to be an overestimate or an underestimate?
Explain your reasoning.

.....

..... **[1]**

(c) Vid is at a different school.
He is in a class of 26 students, 6 of whom are left-handed.

Vid says to Lei

> In our two classes there are 54 students, 9 of whom are left-handed.
> We can use this bigger sample to improve the estimate for your school.

What assumption has Vid made?
Explain whether you think that his argument is correct.

.....

..... **[2]**

AQA GSCE – Thursday 8 June 2020 – Paper 3 (Calculator) Higher Tier

51.

30 $f(x) = \frac{1}{2}x$ $g(x) = x - x^2$

Solve $f^{-1}(x) = gf(x)$

[4 marks]

Answer _____

AQA GSCE – Thursday 6 June 2019 – Paper 2 (Calculator) Higher Tier

52.

13 The amounts spent on clothes by 40 boys and 40 girls in one month were recorded.
The table shows information about the amounts spent by the boys.

Amount, x (£)	**Midpoint**	**Number of boys**	
$0 \leqslant x < 20$		22	
$20 \leqslant x < 40$		9	
$40 \leqslant x < 60$		6	
$60 \leqslant x < 80$		3	
		Total = 40	

The mean for the girls was £35

Estimate the mean for the girls as a percentage of the mean for the boys.

[5 marks]

Answer _____ %

AQA GSCE – Tuesday 11 June 2019 – Paper 3 (Calculator) Higher Tier

53.

21 Hanif makes green paint by mixing blue paint and yellow paint in the ratio

blue : yellow = 7 : 3

He buys blue paint in 50-litre containers, each costing £225

He buys yellow paint in 20-litre containers, each costing £80

He wants to

sell the green paint in 5-litre tins

make 40% profit on each tin.

How much should he sell each tin for?

[5 marks]

Answer £ _____

AQA GSCE – Thursday 8 November 2018 – Paper 2 (Calculator) Higher Tier

54.

6 Here is some information about 20 trains leaving a station.

Number of minutes late, t	Number of trains	Midpoint	
$0 \leqslant t < 5$	12		
$5 \leqslant t < 10$	7		
$10 \leqslant t < 15$	1		
$t \geqslant 15$	0		

6 (a) Work out an estimate of the mean number of minutes late.

[3 marks]

Answer _____ minutes

6 (b) The station manager looks at the information in more detail.

Number of minutes late, t	Number of trains
$0 \leqslant t < 2$	12
$2 \leqslant t < 4$	0
$4 \leqslant t < 6$	7
$6 \leqslant t < 8$	0
$8 \leqslant t < 10$	0
$10 \leqslant t < 12$	1

He works out an estimate of the mean using this information.

How does his estimate compare with the answer to part (a)?

Tick **one** box.

[1 mark]

- ☐ Higher than part (a)
- ☐ Same as part (a)
- ☐ Lower than part (a)
- ☐ Not possible to tell

AQA GSCE – Thursday 8 November 2018 – Paper 2 (Calculator) Higher Tier

55.

9 The diagrams show the position of a tap when off and fully on.
The tap is fully on when the angle of turn is 180°

When fully on, water flows out of the tap at 14 litres per minute.
The rate at which water flows out is in direct proportion to the angle of turn.
The tap is turned 135°

The water flows into a tank with a capacity of 79.8 litres.

Will it take **less than** $7\frac{1}{2}$ minutes to fill the tank?

You **must** show your working.

[4 marks]

AQA GSCE – Monday 12 November 2018 – Paper 3 (Calculator) Higher Tier

56.

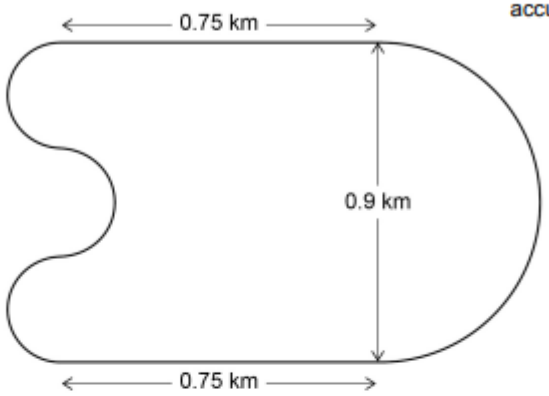
9 A motor racing circuit consists of

two parallel straight sections, each of length 0.75 km

a semicircle of diameter 0.9 km

three equal, smaller semicircles.

Not drawn accurately



The length of a motor race must be greater than 305 km

What is the lowest number of **full** laps needed at this circuit?

You **must** show your working.

[5 marks]

Answer _____

AQA GSCE – Thursday 2 November 2017 – Paper 1 (Non - Calculator) Higher Tier

57.

12 Use approximations to 1 significant figure to estimate the value of

$$\frac{0.526 \times 39.6^2}{\sqrt{97.65}}$$

You **must** show your working.

[3 marks]

Answer _____

AQA GSCE – Sample Paper 3 (Calculator) Higher Tier

58.

26 An approximate solution to an equation is found using this iterative process.

$$x_{n+1} = \frac{(x_n)^3 - 3}{8} \quad \text{and} \quad x_1 = -1$$

26 (a) Work out the values of x_2 and x_3

[2 marks]

$x_2 =$ _____

$x_3 =$ _____

26 (b) Work out the solution to 6 decimal places.

[1 mark]

$x =$ _____