GCSE Bitesize examinations
General Certificate of Secondary Education

MATHEMATICS
Higher Tier

Paper 2 Calculator

Marking scheme

Unless otherwise stated, correct answers only should be accepted.

Answer **all** questions in the spaces provided.

1. 19.9 **(3 marks)**

2 marks for showing 19.87 or 19.870

2 marks for 16.27026787 + 3.6

1 mark for showing $\frac{41.421736 + 2.507987241 + 3.6}{2.7}$

2. 245g **(2 marks)**

(1 mark for $\frac{140}{12} \times 21$)

3. (a)

(i) $156700000 = 1.567 \times 10^{8}$

(ii) $0.000341 = 3.41 \times 10^{-4}$ **(1 mark)**

(b)

(i) $2.6 \times 10^{5} = 260000$

(ii) $9.02 \times 10^{-3} = 0.00902$ **(1 mark)**

(c) $\frac{2.76 \times 10^{3}}{6.9 \times 10^{-2}} = 4 \times 10^{4}$ **(2 marks)**

1 mark for showing $6.81122449 \text{ x } 10^{7}$ or $0.681122449 \text{ x } 10^{8}$

4. $c = 2a - b$ **(3 marks)**

1 mark for showing $3c + b = 2c + 2a$

5. 1.05 km **(3 marks)**

2 marks for showing an un-rounded number

1 mark for correct diagram, and 1 mark for showing 3.4 × cos72° or 3.4 sin 18

6. (a) 0.004 km **(1 mark)**

(b) 30 000 ml **(1 mark)**

(c) 800 mm^2 **(2 marks)**

7. £194.05 **(3 marks)**

2 marks for showing £1793.05, or 1 mark for showing £267.05

8. (a) $27x^6y^9$ **(2 marks)**

1 mark if 27 or x^6 or y^9 seen

(b) $\frac{x}{x-1}$ **(3 marks)**

1 mark for x(x + 4)
1 mark for (x + 4)(x – 1)

9. Fast Coach is better. **(2 marks)**

(i) It has a lower average journey time, so the trains get to Manchester quicker. **(1 mark)**

(ii) It has a lower inter-quartile range of journey times, so it is more reliable. **(1 mark)**

10. (a) 58.8816 **(2 marks)**

(b) 57.4425 **(2 marks)**

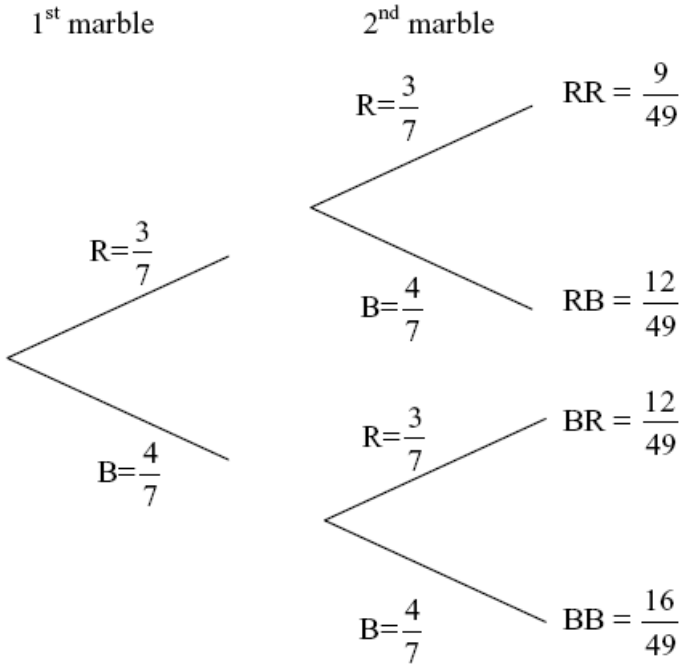
1 mark if 2 of 10.35, 10.44, 5.55, 5.64 seen
2 marks if 3 or 4 of 10.35, 10.44, 5.55, 5.64 seen

11. 3.8 **(4 marks)**

2 marks for working shown but incorrect conclusion.
If no working shown, then **only** award 1 mark for answer)

12. (a) **(3 marks)**

3 marks for all correct, 2 marks for one error, and 1 mark for two errors.



(b) $\frac{25}{49}$ **(2 marks)**

1 mark for showing $\frac{9}{49}+\frac{16}{49}$

13. Midpoint $\left(\frac{3}{2},2\right)$ **(2 marks)**

1 mark for showing $\left(\frac{-2+5}{2},\frac{1+3}{2}\right)$

Length 7.28 **(2 marks)**

1 mark for showing $\sqrt{7^2+2^2}$

14. 22.3° **(4 marks)**

1 mark each for showing correct substitution into cosine rule and/or correct simplification of cosine rule and/or $\cos A$ = 0.8

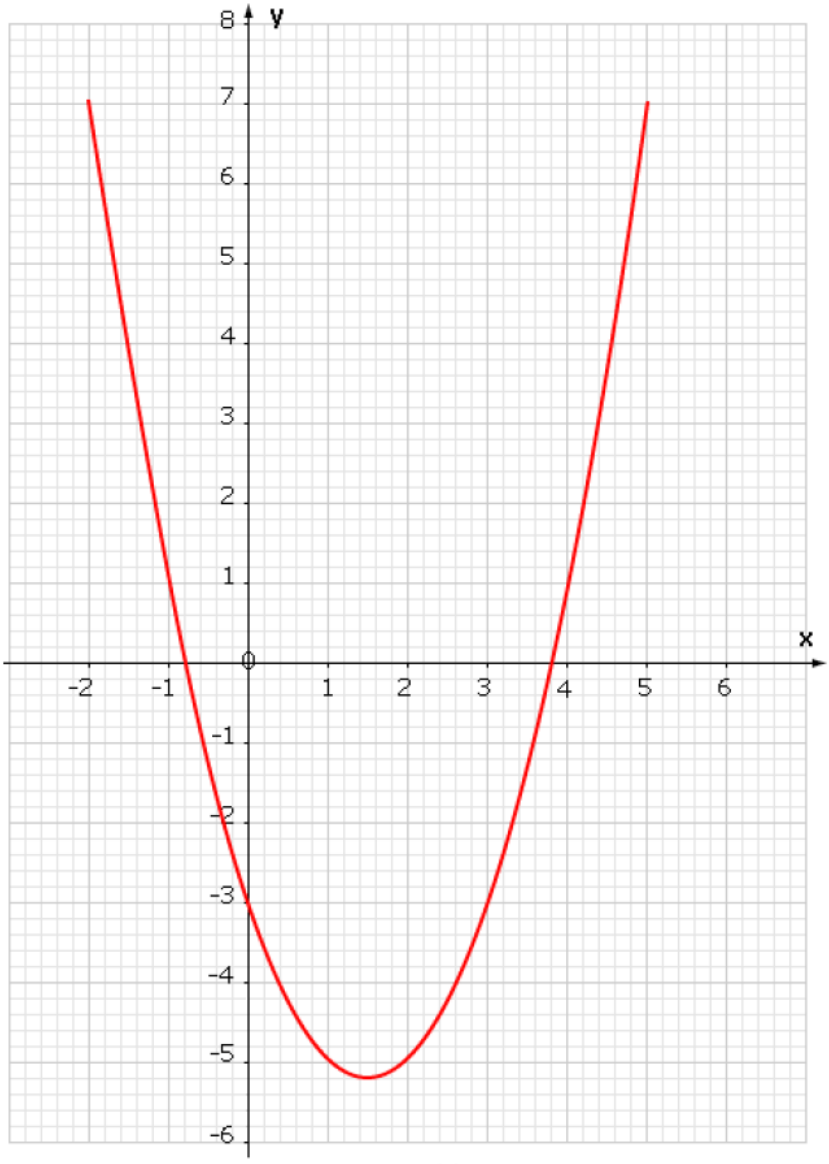
1 mark for $\cos A = \frac{80^2+100^2-60^2}{2\times 80\times 100}$

1 mark for $\cos A$ = 0.8

15. (a) Fill in the following table for the function: $y=x_2-3x-3$ **(3 marks)**

x	–2	–1	0	1	2	3	4	5
y	7	1	–3	–5	–5	–3	1	7

(b) Plot the graph **(2 marks)**
1 mark for one error, 0 marks for more errors.



(c) 3.8, –0.8 **(3 marks)**
Accept answers ±0.2

(d) –1.4, 4.4 **(3 marks)**
Accept answers ±0.2

16.

Ice-Cream Stall		**Weather**	
Profit	0.78	Sunny	0.32
Break even	0.07	Dull	0.5
Loss	0.15	Raining	0.18

(2 marks)

(b) No. They are not independent. The profit on ice-cream depends on good weather. **(2 marks)**
For 2 marks must show 'No' and 'not independent'

17. (a)

	No. of those to survey
Management	66
Administrative	120
Clerical	180
Semi-skilled	72
Un-skilled	162

(4 marks)

4 marks for showing actual number of those to be surveyed (column 1)
3 marks for showing these not rounded to a whole number
1 mark for showing the worked out percentages (column 2) or
1 mark for showing 12628 x $^{11}/_{100}$ x $^{5}/_{100}$

(b) Conduct the survey on-the-job to ensure that responses are in the context of the work. **(1 mark)**
1 mark for any sensible equivalent e.g. question people off-the-job so people are not scared of being overheard.

18. (a) $\frac{2x^2+8x+3}{3x}$ **(2 marks)**

1 mark for showing :

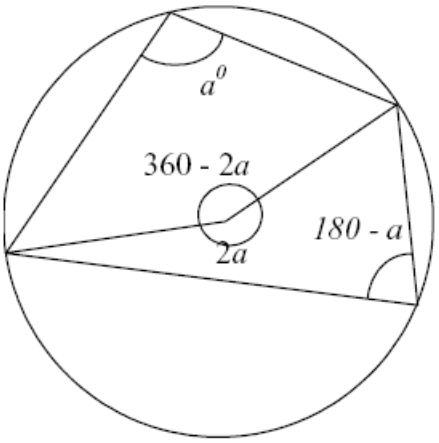
$$\frac{9x+3}{3x}+\frac{2x^2-x}{3x}$$

b) x = -8.32 and x = -0.18 **(3 marks)**
1 mark for substitution into formula

$$x=\frac{-b\pm\sqrt{(b^2-4ac)}}{2a}$$

and showing a = 2 b = 17 and c = 3
1 mark for - 8.3197 AND – 0.1803

19. 2a **(1 mark)**



If the top angle is a then x = 2a
If x = 2a then y = 360 – 2a because they make a full turn. **(1 mark)**

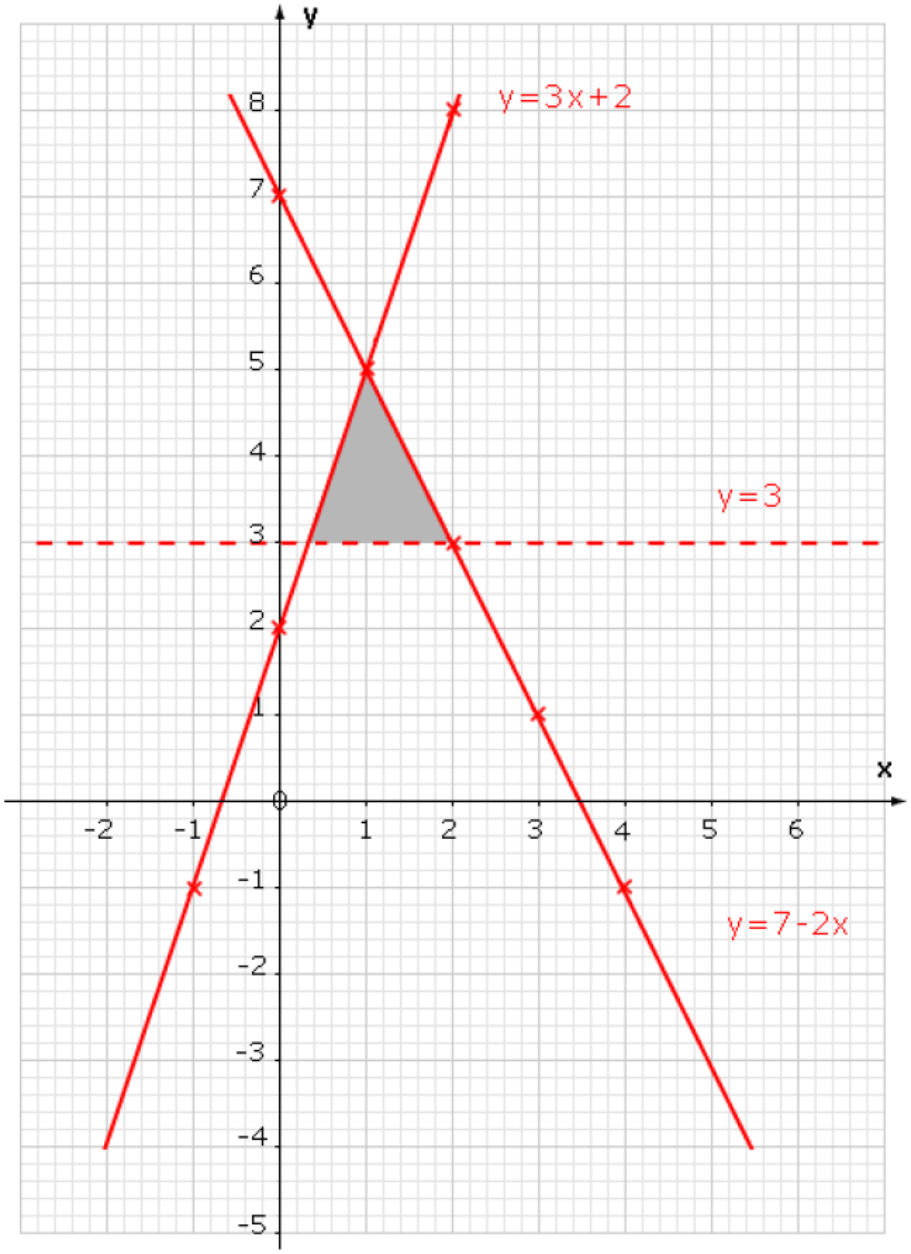
Then z = half of this so 180 – a **(1 mark)**
So, a + z = a +180 – a = 180.
So opposite angles add up to 180^0 **(1 mark)**

20.

(a) Mid-price game: £ 12.49 **(2 marks)**

(b) Full-price game: £ 27.99 **(2 marks)**
1 mark for showing 3m + 2f = £93.45 AND 5m + 3f = £146.42
1 mark for showing successful setting out to add or subtract.

21. **(5 marks)**



1 mark for each correct line
1 mark for shading
1 mark for complete accuracy

22. $A = \frac{35.4}{s^2}$ **(3 marks)**

2 marks for not rounding the answer.

1 mark for showing $6.7 = \frac{k}{2.3^2}$ and/or 1 mark for showing k = 35.4

(b) s = 2.61cm **(3 marks)**
2 marks if not rounded to 2 significant figures.

1 mark for showing $5.2 = \frac{35.4}{s^2}$ and/or 1 mark for $s^2 = \frac{35.4}{5.2}$

23. (a) 600 **(1 mark)**

(b) 160 < h ≤ 170 **(1 mark)**

(c) 160 < h ≤ 170 **(2 marks)**

(d) 160.5 cm **(3 marks)**
1 mark for using midpoints (135, 145, 155, etc)

(e)

Cumulative frequency
40
100
280
480
570
600

1 mark if 3 correct **(2 marks)**

(f) Definite points should be plotted at (130, 0), (140, 40), (150, 100), (160, 280), (170, (480), (180, 570) and (190, 600) and joined with a **smooth** curve.
(2 marks)

(g) 400 (380 – 420 acceptable) **(1 mark)**