Maths Predicted Paper

Foundation Paper 2 Calculator

MARK SCHEME

Mark schemes

**Q1.**

18

**B1**

**[1]**

**Q2.**



**B1**

**[1]**

**Q3.**

97

**B1**

**[1]**

**Q4.**

0.049

**B1**

**[1]**

**Q5.**

× 900



or 900 ÷ 5  or  180

*oe*

**M1**

540

**A1**

**[2]**

**Q6.**

3.6

**B1**

**[1]**

**Q7.**

**Alternative method 1**

19 × 28 or 532

**M1**

their 532 − 379

**M1dep**

153

**A1**

**Alternative method 2**

379 ÷ 19 or 19.9...

*implied by [8.05, 8.1]*

**M1**

(28 − their 19.9...) × 19

*implied by [152.95, 153.9]*

**M1dep**

153

**A1**

**Additional Guidance**

152.95 from (28 − 19.95) × 19

**M1M1A0**

**[3]**

**Q8.**

**Alternative method 1 of 4**

Identifies any 3-digit cube number

*125 or 216 or 343 or 512 or 729*

**M1**

125 and 216 and 343 and 512 and 729

**M1dep**

125 and 216 and 343 and 512 and 729

and 64 and 1000

**A1**

**Alternative method 2 of 4**

Identifies any 3-digit cube number

*125 or 216 or 343 or 512 or 729*

**M1**

53 = 125 and 93 = 729 and 5, 6, 7, 8, 9 or 9 – 4 = 5

**M1dep**

53 = 125 and 93 = 729 and 5, 6, 7, 8, 9 or 9 – 4 = 5 and (43 =) 64 and (103 =) 1000

**A1**

**Alternative method 3 of 4**



**M1**



**M1**



and 5, 6, 7, 8, 9 or 9 – 4 = 5

**A1**

**Alternative method 4 of 4**

53 = 125

**M1**



**M1**

43 = 64 and 53 = 125



and 5, 6, 7, 8, 9 or 9 – 4 = 5

**A1**

**[3]**

**Q9.**

(a)  26.47640(…)

**B1**

(b)  26.5

*Correct or ft provided their answer to (a) is given to more than 1 dp*

**B1ft**

**Additional Guidance**

8.88326612 in (a) and 8.9 in (b)

**B1ft**

8.88326612 in (a) and 26.5 in (b)

**B1**

26.50

**B0**

**[2]**

**Q10.**

(a)     62

**B1**

(b)     8

**B1**

(c)     50

**B1**

**[3]**

**Q11.**

**Alternative method 1**



or 7 : 13

**M1**

13

*must be selected as the answer*

**A1**

**Alternative method 2**

(100 – 35) ÷ 35 × 7

or

7 ÷ 35 × 100 – 7 or 20 – 7

*oe e.g. 35 ÷ 7 = 5 and 65 ÷ 5*

**M1**

13

*must be selected as the answer*

**A1**

**Alternative method 3**



or 5*n* = 65

*oe equation*

*e.g.*



*or 35n = 455*

**M1**

13

*must be selected as the answer*

**A1**

**Additional Guidance**

35 : 65 with no other valid working

**M0**

Condone answer £13

**M1A1**

Answer 13% or 13*n*

**M1A0**

65% = 0.65

**M0**

Alt 2 65 ÷ 35 = 1.9

1.9 × 7 = 13.3 (evidence of premature approximation)

**M1**

Answer 13

**A0**

Alt 2 65 ÷ 35 = 1.9

**M1**

1.9 × 7 = 13 (assume full calculator value used)

**A1**

**[2]**

**Q12.**

|  |  |  |  |
| --- | --- | --- | --- |
| (a) | (3, 3.5) or (3,3 |  | ) |

**B1**

**Additional Guidance**

A comma used as a decimal point ie (3, 3,5)

**B1**

(03, 03.5)

**B1**

(0,3, 0,3.5)

**B0**

(b)  (4, 4)

**B1**

**Additional Guidance**

(04, 04)

**B1**

(0,4, 0,4)

**B0**

(c)  Line from (0, 0) to (4, 2)

*B1 line from (0, 0) to (4, 2) with slight inaccuracy*

*or*

*line parallel to AB from any point which extends across at least two horizontal squares*

**B2**

**Additional Guidance**

Parallel line that extends beyond the grid

**B1**

Line drawn that is completely off the grid

**B0**

Use the full length of the line to judge accuracy – there should be no gap between their line and the relevant integer points

Mark intention for straightness

Ignore other lines that could be working for parts (a) and (b)

**[4]**

**Q13.**

1 km = 1000 m

or 1m = 100 cm

or 1 km = 100 000 cm

seen or implied

*eg   1200 m*

*120 000 (cm)*

*0.06 m*

*0. 000 06 (km)*

**M1**

6 : 120 000

or 120 000 ÷ 6

*oe*

**M1dep**

1 : 20 000

**A1**

**[3]**

**Q14.**

315

**B1**

**[1]**

**Q15.**

(a)  120 ÷ (1 + 4) or 120 ÷ 5 or 24 or 96

*oe*

**M1**

24 : 96

*in order*

**A1**

**Additional Guidance**

96 : 24

**M1A0**

*120 ÷ 5 and 120 ÷ 4 is choice unless intention is clear*

**M0A0**

*Further cancelling after 24 : 96 seen e.g. 1 : 4*

**M1A0**

(b)  1.75 : 1 or : 1 or : 1



**B1**

**[3]**

**Q16.**

1.04 × 53 (000 000)

or 55.12 (million)

or 55.1 (million)

or 55 (million)

*oe*

*57.24 (million) or 57.2 (million)*

**M1**

1.04 × 1.04 × 53 (000 000)

or 1.04 × their 55.12 (million)

*oe*

*M2 for (1.04)2 × 53 seen*

**M1dep**

57 324 800 or 57 325 000

or 57 320 000

or 57 300 000 or 57.3 million

*oe*

*Accept 57 million if working shown*

*Ignore further rounding of correct answer*

**A1**

**[3]**

**Q17.**

**Alternative method 1**



or 7.47

49.8(0) ÷ 5

or 9.96

*oe*

*0.85 seen*

**M1**

49.8(0) – their 7.47

or 42.33



or 1.49(4)

*oe*

*49.8(0) × 0.85*

*or 42.33*

**M1dep**

their 42.33 ÷ 5

or their 9.96 – their 1.49

or 8.466 or 8.46 or 8.47

**M1dep**

8.466 or 8.46 or 8.47

and 5 litres

*Strand (iii)*

*ft only for M1M1M0*

**Q1ft**

**Alternative method 2**



or 7.47

49.8(0) ÷ 5

or 9.96

*oe*

*8.75 × 5 or 43.75*

*or 1 ÷ 8.75 or 0.114... or 0.11*

**M1**

49.8(0) – their 7.47

or 42.33



or 1.49(4)

*oe*

**M1dep**

49.8(0) – their 7.47

or 42.33

and 43.75

8.75 + their 1.49(4)

or 10.24(4)

*1 ÷ 8.75 or 0.114... or 0.11*

*and 5 ÷ their 42.33 or 0.118... or 0.12*

**M1dep**

42.33 and 43.75

and 5 litres

9.96 and 10.24(4)

and 5 litres

*0.114... and 0.118... and 5 litres*

*or 0.11 and 0.12 and 5 litres*

*Strand (iii)*

*ft only for M1M1M0*

**Q1ft**

**Additional Guidance**

Allow £49.80 or £42.33 or large can or second can or B for Q mark

Do not accept £50 for £49.80 unless recovered

**[4]**

**Q18.**

9

**B1**

6

**B1**

**[2]**

**Q19.**

(a)  8

**B1**

**Additional Guidance**

Ignore mention of bulls or cows eg condone 8 cows

**B1**

Condone an answer of 8 : 240

**B1**

8 : 240 followed by 1 : 30

**B0**

8 : 30

**B0**

Do not accept 8 from an incorrect method

eg 240 ÷ 31 = 7.7... and answer 8

**B0**

(b)  **Alternative method 1**

[28, 31] × 10 or [280, 310]

*appropriate days in 10-month year*

**M1**

their [280, 310] × 25

or [7000, 7750]

or

their [280, 310] × 240

or [67 200, 74 400]

*litres per year per cow*

*milkings per year for 240 cows*

**M1dep**

their [7000, 7750] × 240

or

their [67 200, 74 400] × 25

**M1dep**

[1 680 000, 1 860 000] with correct working

*accept to 1 or 2 sf with correct working*

*SC2 answer of [2 016 000, 2 232 000] with the only error using 12 months and working shown*

**A1**

**Alternative method 2**

25 × 240 or 6000

*litres per day for 240 cows*

*may be seen embedded in a* ***product*** *eg 25 × 10 × 240*

**M1**

their 6000 × [28, 31]

or [168 000, 186 000]

or

25 × 240 or 6000 **and**

[28, 31] × 10 or [280, 310]

*litres per month for 240 cows*

*litres per day for 240 cows* ***and*** *appropriate days in 10-month year*

**M1dep**

their [168 000, 186 000] × 10

or

25 × 240 × [28, 31] × 10

or

their 6000 × their [280, 310]

**M1dep**

[1 680 000, 1 860 000] with correct working

*accept to 1 or 2 sf with correct working*

*SC2 answer of [2 016 000, 2 232 000] with the only error using 12 months and working shown*

**A1**

**Alternative method 3**

[28, 31] × 25 or [700, 775]

*litres per month per cow*

**M1**

their [700, 775] × 10

or [7000, 7750]

or

their [700, 775] × 240

or [168 000, 186 000]

*litres per year per cow*

*litres per month for 240 cows*

**M1dep**

their [7000, 7750] × 240

or

their [168 000, 186 000] × 10

**M1dep**

[1 680 000, 1 860 000] with correct working

*accept to 1 or 2 sf with correct working*

*SC2 answer of [2 016 000, 2 232 000] with the only error using 12 months and working shown*

**A1**

**Alternative method 4**

[28, 31] × 240 or [6720, 7440]

*milkings per month for 240 cows*

**M1**

their [6720, 7440] × 10

or [67 200, 74 400]

or

their [6720, 7440] × 25

or [168 000, 186 000]

*milkings per year for 240 cows*

*litres per month for 240 cows*

**M1dep**

their [67 200, 74 400] × 25

or

their [168 000, 186 000] × 10

**M1dep**

[1 680 000, 1 860 000] with correct working

*accept to 1 or 2 sf with correct working*

*SC2 answer of [2 016 000, 2 232 000] with the only error using 12 months and working shown*

**A1**

**Additional Guidance**

Use the scheme that awards the most marks and ignore choice

A value in the range [280, 310] may come from subtracting two months from a year

eg uses 303 (may come from 365 − 31 − 31)

**M1**

The special case allows 2 marks for those using 12 months or using [336, 372] days

Allow **consistent** use of approximations to 1 sf throughout (this leads to an answer in the given range)

ie 30 × 10 × 30 × 200 = 1 800 000

**M3A1**

Mark inconsistent use of approximations to 1sf as the scheme

Their final answer must be in range and correct for their product but may be given to 1 or 2 sf

eg

280 days: 28 × 10 × 25 × 240 = 1 680 000

300 days: 30 × 10 × 25 × 240 = 1 800 000

310 days: 31 × 10 × 25 × 240 = 1 860 000

303 days: 303 × 25 × 240 = 1 818 000

304 days: 304 × 25 × 240 = 1 824 000

305 days: 305 × 25 × 240 = 1 830 000

**M3A1**

eg

12 months of 28 days: 28 × 12 × 25 × 240 = 2 016 000

12 months of 30 days: 30 × 12 × 25 × 240 = 2 160 000

12 months of 31 days: 31 × 12 × 25 × 240 = 2 232 000

365 days: 365 × 25 × 240 = 2 190 000

366 days: 366 × 25 × 240 = 2 196 000

**SC2**

**[5]**

**Q20.**

π × 6.52

*Accept [132.6, 132.75]*

**M1**

π × 6.52 ÷ 4 or 33.18...

*oe*

**M1dep**

[33.16, 33.19] or 33.2 or 33

*Accept π*



**B1ft**

**Additional Guidance**

33 with no incorrect working

**M1M1A1**

**[3]**

**Q21.**

(a)     0.4 (relative frequency of white) or

1 (pink)  *oe*

**B1**

their 5 ÷ 10 (= 0.5)

or

1 − their 0.4 − 0.1 = (0.5) *oe*

**M1**

Fully correct table ie

|  |  |  |
| --- | --- | --- |
| (4) | 1 | 5 |
| 0.4 | (0.1) | 0.5 |

*oe  accept equivalent fractions or percentages for relative frequencies throughout*

**A1**

(b)     Comment about increasing the sample size

*eg  she should repeat it more times or sample more balls  oe*

**B1**

**[4]**

**Q22.**

70 × 5  or  350

**M1**

their 350 – (65 + 80 + 76 + 69)

**M1dep**

*their 350 – 290*

60

**A1**

**Additional Guidance**

Embedded answer of 60 is 2 marks

**[3]**

**Q23.**

(a)     Either correct rectangle drawn

*A*, *B*, (7, 2) and (3, 2)

or *A*, *B*, (7, 8) and (3, 8)

(ignore labels)

*B1 for (7, 2) and (3, 2) plotted*

*or for (7, 8) and (3, 8) plotted*

*B1 for any rectangle with area 12 cm2*

*B1 for any rectangle with vertices A and B.*

**B2**

(b)     *C*(7, 2) and *D*(3, 2)

or *C*(7, 8) and *D*(3, 8)

*B1 for correct coordinates with incorrect order ie D and C reversed*

*ft their rectangle  or  square ABCD  
for up to B2*

*ft their rectangle  or  square ABDC  
for up to B1*

**B2ft**

**[4]**

**Q24.**

140 − 110

90 ÷ 3

or 30

or 1800 is 90°

or 1800 × 4

or 7200 seen

or 1800 ÷ 90

or 7200 ÷ 360

or 20

*oe*

*90 ÷ 1800 or 0.05°*

*1800 may be in sector D but must see 90*

**M1**

1800 ÷ 90 × 140 or 2800

or 1800 ÷ 90 × 110 or 2200

or 1800 ÷ 90 × 20 or 400

or 1800 ÷ 90 × 30

or 1800 ÷ 3

*oe*

*140 ÷ 0.05 or 2800*

*or 110 ÷ 0.05 or 2200*

*or 20 ÷ 0.05 or 400*

*or 30 ÷ 0.05*

**M1dep**

600

*SC1 for 150*

**A1**

**Additional Guidance**

1800 is ¼, 7200 is the whole circle

**M1**

1800 is ¼

**M0**

**[3]**

**Q25.**

**Alternative method 1**

10 × 12 or 120



*oe*

**M1**

10 × 12 or 120



*oe*

**M1**

150

**A1**

**Alternative method 2**

10 × 18 or 180



*oe*

**M1**

10 × 18 or 180



*oe*

**M1**

150

**A1**

**Alternative method 3**



*oe*

**M1**



*oe*

**M1**

150

**A1**

**[3]**

**Q26.**

**Alternative method 1**

12*x* − 8

*May be seen in a grid*

**M1**

their 12*x* − 2*x* = −5 + their 8

or 10*x* = 3

or their − 8 + 5 = 2*x* − their 12*x*

or −3 = −10*x*

*Collecting two terms in x and two constant terms correctly*

*oe e.g. 10x − 3 = 0*

**M1**

0.3 or



*ft M1M0 or M0M1 with exactly one error*

**A1ft**

**Alternative method 2**



**M1**

3*x* − their = their + 2



or *x* =



or −2 + their = their − 3*x*



or =



*Collecting two terms in x and two constant terms correctly*

*oe e.g. = 0*



**M1**

0.3 or



*ft M1M0 or M0M1 with exactly one error*

**A1ft**

**Additional Guidance**

12*x* − 2 = 2*x* − 5

**M0**

10*x* = −3

**M1**

*x* = −0.3

**A1ft**

12*x* − 8 = 2*x* − 5

**M1**

10*x* = −5

**M0**



**A1ft**

12*x* − 8 = 2*x* − 5

**M1**

14*x* = 3

**M0**



**A1ft**

12*x* − 8 = 2*x* − 5

**M1**

14*x* = −13

**M0**

(two errors)



**A0ft**

12*x* − 8 = 8*x* − 20

**M1M0A0**

Any ft answer must be exact or rounded or truncated to at least 2 dp

The last two marks can be implied without the collection of terms seen e.g. 12*x* − 6 = 2*x* − 5 and answer 0.1

**M0M1A1ft**

Collecting terms before the bracket has been expanded

**Zero**

**[3]**

**Q27.**

4(*x* + 3)

**B1**

**[1]**

**Q28.**

*a* + 20*a*²

**B1**

**[1]**

**Q29.**

6*x*2 − 16*xy* + 15*xy* − 40*y*2

*Allow one error*

**M1**

6*x*2 − 16*xy* + 15*xy* − 40*y*2

*Fully correct*

**A1**

6*x*2 − *xy* − 40*y*2

*ft their four terms*

**A1ft**

**Q30.**

(a)     3*a*(3*a* − 2)

*B1 a(9a − 6) or 3(3a2 − 2a)*

**B2**

(b)     (*x* + *a*)(*x* + *b*)

*where ab = 20*

*or a + b = −12*

**M1**

(*x* − 2)(*x* − 10)

**A1**

2 and 10

*ft their pair of brackets*

**B1ft**

**[5]**

**Q31.**

**Alternative method 1**

4 × 5 + *c* = 23

*oe 20 + c = 23*

**M1**

*c* = 3

*implied by (0, 3)*

*or 3 shown as y-axis intercept*

**A1**

*y* = 4*x* + 3

*SC1 y = 4x + c c ≠ 3*

**A1**

**Alternative method 2**

*y* – 23 = 4(*x* – 5)

*oe*

**M1**

*y* – 23 = 4*x* – 20

**M1dep**

*y* = 4*x* + 3

*SC1 y = 4x + c c ≠ 3*

**A1**

**Additional Guidance**

If 3 is clearly linked to *c* in *y* = *mx* + *c* condone M1A1

4*x* + 3 on answer line, *y* = 4*x* + 3 seen in working

**M1A1A1**

4*x* + 3 on answer line, *y* = 4*x* + 3 not seen in working

**M1A1A0**

*m* = 4, c = 3 on answer line, *y* = 4*x* + 3 seen in working

**M1A1A1**

*m* = 4, *c* = 3

**M1A1A0**

*y* = *mx* + 3

**M1A1A0**

23 = 4 × 5 + 3 embedded value for c

**M1A0A0**

4*x* + *c* on answer line with *c* ≠ 3

**M0A0A0**

**[3]**

**Q32.**

–1 0 1 2

*B2 three correct values with no incorrect values*

*or*

*–3 –2 –1 0 1 2 and –1 0 1 2 3 4 5*

*or*

*interval that contains only the integers –1 0 1 2*

*B1 –3 –2 –1 0 1 2*

*or –1 0 1 2 3 4 5*

*SC2 answer 2 3 4 5*

**B3**

**Additional Guidance**

Examples of intervals that contain only the integers –1 0 1 2

–1 ≤ *x* ≤ 2 or [–1, 2] or –2 < *x* < 3 or (–2, 3)

–1 0 1 2 3 4 5 may be shown as an interval that contains only these integers e.g. –1 ≤ *x* < 6 or [–1, 6)

Intervals can be shown on a number line

–3 –2 –1 0 1 2 can **not** be shown as an interval or on a number line

Lists may be in any order e.g. 1 2 3 4 5 –1 0

**B1**

Condone repeats in lists e.g. –1 0 1 1 2

**B3**

Ignore commas/and/or between numbers in lists

–3 –2 –1 0 1 2 3 4 5 with no other valid working

**B0**

**[3]**

**Q33.**

**Alternative method 1**

7.22 + 9.62 (= 51.84 + 92.16) = 144

and

= 12 or 122 = 144



*B1 7.22 and 9.62 oe*

**B2**

**Alternative method 2**

122 − 7.22 (= 144 − 51.84) = 92.16

and

= 9.6 or 9.62 = 92.16



*B1 122 and 7.22 oe*

**B2**

**Alternative method 3**

122 − 9.62 (= 144 − 92.16) = 51.84

and

= 7.2 or 7.22 = 51.84



*B1 122 and 9.62 oe*

**B2**

**Alternative method 4**

= 12



or

= 9.6



or

= 7.2



*condone 7.22 + 9.62 = 122*

*or 122 − 7.22 = 9.62*

*or 122 − 9.62 = 7.22*

*B1 any two of*

*7.22, 9.62 and 122 oe*

**B2**

**Additional Guidance**

7.22 + 9.62 = 144,

*x*2 = 144, *x* = 12

**B2**

Do not accept 144 ÷ 12 = 12 for = 12



Do not accept incorrect statements for B2 eg 7.22 + 9.62 = = 12



**B1**

Do not accept scale drawing

For eg 122 accept 12 × 12

**[2]**

**Q34.**

  × 65.5  or  6.55



*oe*

*0.9  or  90% seen*

**M1**

58.95

**A1**

**[2]**

**Q35.**

All correct  *oe*

ie each head =   and each tail =



*B2  all pairs of probabilities add to 1 and at least one pair correct*

*B1  two correct probabilities in correct positions*

**B3**

**[3]**