Maths Predicted Paper

Foundation Paper 3 Calculator

MARK SCHEME

Mark schemes

**Q1.**



**B1**

**[1]**

**Q2.**

8

**B1**

**[1]**

**Q3.**

2049

**B1**

**[1]**

**Q4.**

(a)     5

**B1**

(b)     **Alternative method 1**

Lists multiples of

6 to at least 18

and

8 to at least 16

**M1**

24

*SC1 any other common multiple*

*48, 72 …*

**A1**

**Alternative method 2**

(6 =) 2 × 3

and

(8 =) 2 × 2 × 2

**M1**

24

**A1**

**[3]**

**Q5.**

(a)  **Alternative method 1**

× 7 in first box

and

–2 in second box

and

*q* in Output

*B1 for any two correct*

*accept q = 7r – 2 in Output*

**B2**

**Alternative method 2**

in first box



and

× 7 in second box

and

*q* in Output

*B1 for any two correct*

*accept q = 7r – 2 in Output*

**B2**

**Additional Guidance**

Do not accept 7*r* – 2 alone in Output

Accept = *q* in Output

Condone 7 × in first box

(b)  3(*x* + 5)

*oe 3x + 15*

*Accept y = 3(x + 5) or y = 3x + 15*

**B1**

**Additional Guidance**

Ignore further work if attempting to solve e.g. 3*x* + 15 = 0, *x* = –5

**B1**

Do not ignore further work if attempting to simplify e.g. 3*x* + 15 = 18*x*

**B0**

(*y* =) *x* + 5 × 3

**B0**

Do not accept (*x* + 5)3 or 3 × (*x* + 5) or (*x* + 5) × 3 or *x*3 + 15

**B0**

**[3]**

**Q6.**

14*x* − 3

**B1**

**[1]**

**Q7.**

(a)  *a*3 + 2*b*

*B1 for a3 (+) or (+) 2b*

**B2**

**Additional Guidance**

Do not accept 2 × *b* or *b*2 for 2*b*

Do not accept 3*a* for *a*3

Do not accept further working for B2

eg *a*3 + 2*b* = *a*32*b*

**B1**

Do not accept further working for B1

eg 3*a* + 2*b* = 5*ab* or *a*3 *b*2 = *a*3*b*2

**B0**

*a*3 + *b*2

**B1**

3*a* + 2*b*

**B1**

*a*3 2*b*

**B1**

*a*3 2*b* = *a*32*b*

**B1**

*a*3 × 2*b* or *a*32*b* without working for B1

**B0**

*a*3 × *b*2 or *a*3*b*2

**B0**

3*a* × 2*b*

**B0**

3*a* − 2*b*

**B0**

(b)  5*x* (+) 15

*Implied by correct answer*

**B1**

4*x* + 17

*B2ft their 5x + 15 in the form 5x + b or ax + 15, both their terms with correct ft in final answer*

*B1ft 4x or (+)17*

*B1ft their 5x + 15 in the form 5x + b or ax + 15, one of their terms with correct ft in final answer*

**B2ft**

**Additional Guidance**

ft 4*x* or (+)17 or must use 5*x* + *b* − *x* + 2 or *ax* + 15 − *x* + 2

4*x* + 17 with no expansion seen

**B1B2**

Ignore further working with an attempt to solve after their 4*x* + 17

e.g. 4*x* + 17 = 0 followed by *x* = −4.25

**B1B2**

Do not ignore further working with an attempt to simplify after their 4*x* + 17

eg 4*x* + 17 followed by 21*x*

**B1B1**

5*x* + 15 − *x* + 2 followed by 4*x* + 15 = −2

**B1B1**

5*x* + 3 followed by 4*x* + 5 also 5*x* − 15 followed by 4*x* − 13

**B0B2ft**

Ignore further working after 5*x* + 15 for first B1

eg 5*x* + 15 followed by 20*x* and 20*x* − *x* + 2 followed by 19*x* + 2

**B1B0**

5*x* 15

**B1**

4*x* + *k*, *k* ≠ 17, with no expansion seen

**B0B1ft**

*kx* + 17, *k* ≠ 4, with no expansion seen

**B0B1ft**

5*x* + 15 − 5*x* + 10 followed by 25

**B1B0**

5*x* + 3 followed by 4*x* + 1

**B0B1ft**

5*x*2 + 15 followed by 5*x*2 − *x* + 17

**B0B1ft**

5*x* + 3 followed by 4*x* + 1 followed by 5*x*

**B0B0ft**

5*x* + 3 followed by 6*x* + 1

**B0B0ft**

5*x*2 + 3 followed by 5*x*2 − *x* + 5

**B0B0ft**

**[5]**

**Q8.**

(a)     315 ÷ 37.5 or 8.4

*oe*

**M1**

8.40

**A1**

(b)     No, her yearly pay is more

and 4 × 12 = 48

and not 52

*oe*

*B1 for partial working*

*eg No, her yearly pay is more*

*and 4 × 12 = 48*

*or 52 weeks = in a year*

*or More than 4 weeks in a month*

**B2**

**[4]**

**Q9.**

(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]**

**Q10.**

**Alternative method 1**

192 ÷ (7 + 6 + 11) or 192 ÷ 24 or 8

*May be implied*

**M1**

7 × their 8 or 56

and 6 × their 8 or 48

and 11 × their 8 or 88

*56 : 48 : 88 is M2*

**M1dep**

Their 56 (× 1) + their 48 × 2 + their 88 × 3

or 56 + 96 + 264 or 416

*May use x, 2x and 3x (any letter)*

**M1dep**

532.48 ÷ their 416

*Allow working in pence*

**M1dep**

1.28

**A1**

**Alternative method 2**

7 (× 1) + 6 × 2 + 11 × 3

or 7 + 12 + 33 or 52

*May use x, 2x and 3x (any letter)*

**M1**

532.48 ÷ their 52 or 10.24

*Allow working in pence*

**M1dep**

192 ÷ (7 + 6 + 11) or 192 ÷ 24 or 8

*May be implied*

**M1**

Their 10.24 ÷ their 8

*Dep on M3*

*oe eg their 10.24 × 7 or 71.68 and their 71.68 ÷ (7 × their 8)*

**M1dep**

1.28

**A1**

**Additional Guidance**

(Alt 1) 56 : 96 : 264 with no subsequent addition

**M1M1M0M0A0**

532.48 ÷ 24 (= 22.18... or 22.19) with no further valid working

**Zero**

532.48 ÷ 192 (= 2.77...) with no further valid working

**Zero**

(Alt 1) 56 and 48 and 88 (or correct method leading to them) but not subsequently used

**M2**

(Alt 1) 8 (or correct method leading to it) but not subsequently used

**M1**

(Alt 2) 10.24 (or correct method leading to it)

**M2**

1.28 in working with Answer 71.68 (from 1.28 × 56)

**M4A0**

**[5]**

**Q11.**

(a)     147

*May be seen on diagram*

**B1**

Corresponding

*oe   eg (y is) alternate and x is opposite*

*Check part (b)*

*Strand (i)*

**Q1**

(b)     147

*May be seen on diagram*

*ft their (a)*

**B1 ft**

Alternate or (vertically) opposite

*oe   eg x is corresponding and y is opposite*

*Strand (i)*

**Q1**

**[4]**

**Q11.**

**Alternative method 1**

192 ÷ (7 + 6 + 11) or 192 ÷ 24 or 8

*May be implied*

**M1**

7 × their 8 or 56

and 6 × their 8 or 48

and 11 × their 8 or 88

*56 : 48 : 88 is M2*

**M1dep**

Their 56 (× 1) + their 48 × 2 + their 88 × 3

or 56 + 96 + 264 or 416

*May use x, 2x and 3x (any letter)*

**M1dep**

532.48 ÷ their 416

*Allow working in pence*

**M1dep**

1.28

**A1**

**Alternative method 2**

7 (× 1) + 6 × 2 + 11 × 3

or 7 + 12 + 33 or 52

*May use x, 2x and 3x (any letter)*

**M1**

532.48 ÷ their 52 or 10.24

*Allow working in pence*

**M1dep**

192 ÷ (7 + 6 + 11) or 192 ÷ 24 or 8

*May be implied*

**M1**

Their 10.24 ÷ their 8

*Dep on M3*

*oe eg their 10.24 × 7 or 71.68 and their 71.68 ÷ (7 × their 8)*

**M1dep**

1.28

**A1**

**Additional Guidance**

(Alt 1) 56 : 96 : 264 with no subsequent addition

**M1M1M0M0A0**

532.48 ÷ 24 (= 22.18... or 22.19) with no further valid working

**Zero**

532.48 ÷ 192 (= 2.77...) with no further valid working

**Zero**

(Alt 1) 56 and 48 and 88 (or correct method leading to them) but not subsequently used

**M2**

(Alt 1) 8 (or correct method leading to it) but not subsequently used

**M1**

(Alt 2) 10.24 (or correct method leading to it)

**M2**

1.28 in working with Answer 71.68 (from 1.28 × 56)

**M4A0**

**[5]**

**Q12.**

(a)     Vertical scale correctly marked up to 15

**B1**

At least two correct points plotted

**M1**

Straight line from (0, 0) to (10, 15)

**A1**

(b)     13.5

*ft their line square tolerance*



**B1ft**

**[4]**

**Q13.**

(a)     1 hour 40 minutes

or 100 (minutes)

or 1.66... (hours) seen

*oe*

*eg 1:40*

**B1**

450 ÷ 1.66(…) or 450 ÷ 1.67

or 450 ÷ 1



*their distance ÷ their time*

**M1**

270

**A1**

(b)     Faster

**B1**

Valid reason

*eg*

*Travels further (distance)*

*More distance (so faster)*

**B1dep**

**[5]**

**Q14.**

segment

**B1**

**[1]**

**Q15.**

Any two of these criticisms

Letters are used instead of words

Gaps are different

Bar heights do not add up to 30

*B1 for any one correct criticism*

*Ignore non-contradictory statements*

**B2**

**Additional Guidance**

There’s no key

**B1**

It’s not clear what C stands for / what type of vehicle it is

**B1**

She’s only used first letters

**B1**

Labels are wrong (insufficient – needs to specify which labels)

**B0**

The bars aren’t evenly / equally spaced or are spread unevenly

**B1**

The Van bar is too far away from the Car bar

**B1**

The second gap is smaller

**B1**

The Van bar is out of place

**B1 bod**

The *x*-axis is not evenly spread / spaced

**B1**

The positioning of the bars is wrong

**B1**

The bars should be 1 cm apart

**B0**

Not distributed evenly

**B0**

There are only 28 vehicles

**B1**

14 + 4 + 10 = 28 (not 30)

**B1**

It doesn’t / they don’t add up to 30

**B1**

She is 2 vehicles short

**B1**

She hasn’t drawn all 30 **cars** on the chart

**B0**

14 should be 16

**B0**

Number of vehicles should go up to 30 not 14

**B0**

Number of vehicles is wrong (doesn’t mention 30 or 28 or 2)

**B0**

14 + 4 + 10 = 26 not 30 (error seen)

**B0**

Three criticisms, two correct and one non-contradictory

**B2**

Three criticisms, two correct and one incorrect

**B1**

Non-contradictory statements can be ignored e.g. The chart is too small and the vehicles don’t add up to 30

**B1**

The title is incorrect

**B0**

The *y*-axis isn’t tall enough

**B0**

She doesn’t give a time-frame / She should record colours

**B0**

Both criticisms may be seen in one sentence e.g. The bars don’t add up to 30 and are spread unevenly

**B2**

**[2]**

**Q16.**

(a)     30

**B1**

(b)     Hexagon

**B1**

**[2]**

**Q17.**

parallelogram

**B1**

**[1]**

**Q18.**

A

**B1**

**[1]**

**Q19.**

(a)     Hexagon ➔ 6 sides

**B1**

Quadrilateral ➔ 4 sides

**B1**

Pentagon ➔ 5 sides

**B1**

(b)     C or (square based) pyramid

**B1**

**[4]**

**Q20.**

24 cm

**B1**

**[1]**

**Q21.**

(a)     14

**B1**

(b)     3 (+) 1 (+) 5 (+) 2 (+) 8 (+) 1

*Allow one error or omission*

*Accept clear indication on the diagram*

**M1**

20

**A1**

**[3]**

**Q22.**

**Alternative method 1**



*oe sin x = 0.8125*

54(.3…)

**A1**

**Alternative method 2**



and

90 – their [35.6, 36]

*oe*

**M1**

54(.3…)

**A1**

**Alternative method 3**



or



**M1**

*oe*

54(.3…)

**A1**

**Additional Guidance**

unless recovered



**M0**

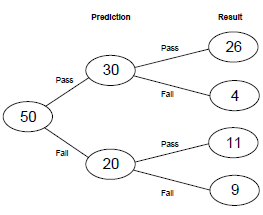
Answer 54 from scale drawing with no trigonometry

**M0A0**

**[2]**

**Q23.**

Fully correct



*B1 20 and 11 in correct positions*

**B2**

**[2]**

**Q24.**

**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]**

**Q25.**

10*n* + 1 or 1 + 10*n*

*B1 10n (…)*

**B2**

**Additional Guidance**

Ignore LHS of formula given e.g. T*n* = 10*n* + 1

**B2**

Condone *n* = 10*n* + 1 or *n*th term = 10*n* + 1

**B2**

Allow other variables e.g. 10*x* + 1

**B2**

Allow a multiplication sign e.g. 10 × *n* + 1 or *n* × 10 + 1

**B2**

*n*10...

**B1**

*n*10 + 1

**B1**

*n*10 + 1*n*

**B0**

Choice e.g. 10*n* + 1 and 1*n* + 10

**B0**

**[2]**

**Q26.**

1 3 9 27 81

**B1**

**[1]**

**Q27.**

13 20 27 and Add 7

or 15 27 39 and Add 12

or 20 15 10 and Subtract 5

or 27 20 13 and Subtract 7

or 39 27 15 and Subtract 12

*oe rule*

*B1 one correct arithmetic progression (using numbers from the list) with no or incorrect rule ie*

*13 20 27*

*or 15 27 39*

*or 20 15 10*

*or 27 20 13*

*or 39 27 15*

**B2**

**Additional Guidance**

Accept the expression for the *n*th term as the rule

13 20 27 and 7*n* + 6 or e.g. × 7 + 6

or 15 27 39 and 12*n* + 3

or 20 15 10 and 25 – 5*n*

or 27 20 13 and 34 – 7*n*

or 39 27 15 and 51 – 12*n*

**B2**

Ignore incorrect expression for the *n*th term alongside a correct rule

eg 13 20 27 and Add 7 so *n* + 7

**B2**

13 20 27 and +7 or 7 more or going up in 7s

**B2**

20 15 10 and five times table (scores for the arithmetic progression)

**B1**

13 20 27 and *n* + 7 (scores for the arithmetic progression)

**B1**

Using number(s) not on the list

**B0**

10 15 20 and Add 5

**B0**

**[2]**

**Q28.**

(a)  8.35 and 8.45 in the correct order

*B1 8.35 on the left or 8.45 on the right*

*or 8.45 and 8.35 in the wrong order*

*accept for 8.45*



**B2**

**Additional Guidance**

Do not accept 8.449... for



(b)  41.75 and 42.25

*correct or ft their two different values from (a)*

*their 8.35 must be in the range (8.3, 8.4]*

*their 8.45 must be in the range (8.4, 8.5]*

*correct order or ft order*

*accept for 42.25*



**B1ft**

**Additional Guidance**

(8.3, 8.4] does not include 8.3 but does include 8.4

(8.4, 8.5] does not include 8.4 but does include 8.5

Answer of 8.35 and 8.44 in part (a) leading to 41.75 and 42.2

**B1ft**

Answer of 8 and 9 in part (a) leading to 40 and 45

**B0ft**

**[3]**

**Q29.**



or 8 × sin 72



or 8 × cos (90 – 72)



*oe*

*eg 8 cos 72 or 2.47… or 2.5*



**M1**

[7.6, 7.61]

**A1**

**Additional Guidance**

If trigonometry and Pythagoras are used it must be a fully correct method that would lead to the correct value of x

Accept sin 72 × 8

**M1**

Accept opp or o for *x* eg



**M1**



**M0**

Answer coming from scale drawing

**M0A0**

Answer in range seen followed by 7 or 8

**M1A1**

**[2]**

**Q30.**

11.5 m ≤ height < 12.5 m

**B1**

**[1]**

**Q31.**

(a)     (2, 16)

**B1**

(b)     12

**B1**

(c)     −2 and 6

**B1**

**[3]**

**Q32.**

(a)

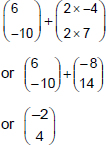


*B1 for 1 correct value in correct position*

*Condone a divisor line*

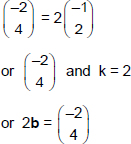
**B2**

(b)



*oe*

**M1**



*oe*

**A1**

**Additional Guidance**

Condone vectors written as coordinates, eg (–1, 2) is half of (–2, 4)

Must see or (–2, 4) to award the A mark



Condone missing brackets and divisor lines

seen and **a** + 2**c** is 2**b**



**M1A1**



**M1A1**



**M0**

**[4]**