

Maths

30 - 4 = 10



Answers

30 - 4 - 10 Starter Solutions

All questions are
NON Calculator



Day 1

- $3x + y$
- $4m - 4$
- $25x + 70y$
- $x(x + 5)$
- $x = 32$
- (a) 169
(b) 2
(c) $2 \times 2 \times 2 \times 2 \times 2 = 32$
(d) $-4 \times -4 = 16$
(e) 8
(f) 4

Day 2

- $p^2 + 3p$
- $(3 \times 2) + (4 \times 5)$
 $6 + 20 = 26$
- Supplementary angles total 180
So $x = 180 - 137$
 $x = 43$
- $2x = 3 - 5$
 $2x = -2$
 $x = -1$
- 27 and 125

Day 3

- $(3 \times 6) + (4 \times -3)$
 $18 + -12$
6
- $x = 98$ because alternate angles are equal
- (a) Volume

(b) Length

(c) Area

- (a) $n \div 3 = 3 \div 3 = 1$
 $n + 3 = 3 + 3 = 6$
 $n^2 = 3 \times 3 = 9$
 $3 \div n = 3 \div 3 = 1$
Answer = n^2
- (b) $n \div 3 = 0.3 \div 3 = 0.1$
 $n + 3 = 0.3 + 3 = 3.3$
 $n^2 = 0.3 \times 0.3 = 0.09$
 $3 \div n = 3 \div 0.3 = 10$
Answer = $3 \div n$

Day 4

- $2^3 + 5^2 = 8 + 25 = 33$
- (a) $x + 1$ (b) $y - 2$
- $3y - 12$
- $15m = 1500\text{cm}$
Scale 1:500
So $1500 \div 500 = 3\text{cm}$
- $2^3 \times 3^2 = 8 \times 9 = 72$

Day 5

- (a) $7p + q$ (b) $4r - 12$
- (a) $180 - 44 - 44 = 180 - 88 = 92$
- $4(x + 2)$
- $60 \times 500 = 30\,000\text{ cm}$
 $30\,000\text{cm} = 300\text{m}$
- $63 + 2x + x = 180$
 $63 + 3x = 180$
 $3x = 180 - 63$
 $3x = 117$
 $x = 117 \div 3$
 $x = 39$

Day 6

- $y(y + 2)$
- (i) c and d are corresponding angles
(ii) d and e are alternate angles
- $6d - 2c$
- $x = 60$
- $10m = 1000\text{cm}$
 $1000\text{cm} \div 500 = 2\text{cm}$
- (a) $-3^2 + 5 = 9 + 5 = 14$
(b) $(4 \times -3) + 4 = -12 + 4 = -8$
(c) $2x - y = (2 \times 4) - 3$
 $= 8 + 3 = 11$
(d) $\sqrt{4} = 2$ and -2

Day 7

- $a = 180 - 100 = 80$
 $b = 60$
 $c = 130$
- $3d - 6c$
- (a) $6x$
(b) $6x + 20$
- (a) $125 - 64 = 61$
(b) $2 + 16 = 18$
(c) $1 - 5 = -4$

Day 8

- $a = 40$ $b = 120$
- (a) $x(x + 5)$
(b) $5(2a + 1)$
(c) $x(x - 4)$
- $2^3 + (3 \times -1)$
 $8 + -3$
 $8 - 3 = 5$
- $40\text{cm} \times 400 = 16000\text{cm}$
 $16000\text{cm} = 160\text{m}$

Day 9

- $1/0.5 + \frac{1}{2} = 2 + \frac{1}{2} = 2\frac{1}{2}$ OR 2.5
- (a) $5x + 4 = -1$
 $5x = -1 - 4$
 $5x = -5$
 $x = -1$
(b) $6r + 2 = 8$
 $6r = 8 - 2$
 $6r = 6$
 $r = 1$
(c) $4p - 5 = 11$
 $4p = 11 + 5$
 $4p = 16$
 $p = 4$
- (a) $16 - -18 = 16 + 18 = 34$
(b) $2 \times 4^2 = 2 \times 16 = 32$
(c) $2 \times 4 \times -9 = 8 \times -9 = -72$
- $5(3x - 4)$
- (a) 16 (b) 3 (c) 16 (d) 9 (e) -9

Day 10

- $4y - 12 = 18$
 $4y = 18 + 12$
 $4y = 30$
 $y = 30 \div 4 = 7.5$
- (a) Length
(b) Area
(c) Length
- $x = 12$
- $600 \times 70 = 42\,000\text{cm}$
 $42\,000\text{cm} = 420\text{m}$
- $2^5 - \sqrt[3]{27} = 32 - 3 = 29$
 $3^4 = 3 \times 3 \times 3 \times 3 = 9 \times 9 = 81$
 $\sqrt[3]{125} = 5$
 $-4 \times -2 = 8$
 $3^0 = 1$

Day 1 Mark Scheme: Bearings

1.	(a)	4.4×10 43 – 45 $40.3, 40.4, 40\frac{1}{2} \Rightarrow MIAO$	M1	
		<i>Allow 4.3 – 4.5</i>		
	(b)	(i) 180	B1	
		(ii) C due South	B1	
		<i>If no lines shown or point specified, letter C in approx correct place scores</i>	B1 B0	
		C on bearing of 150	B1	
		<i>Allow 148 – 152</i>		
				[5]
2.	(a)	(i) 120	B1	
		(ii) 240		B1
	(b)	Line drawn on bearing of 070° from E	B1	
		$\pm 2^\circ$ tolerance		
		Line drawn on bearing of 320° from F	B1	
		$\pm 2^\circ$ tolerance		
		<i>For both marks lines must intersect</i>		
		<i>If two dots within correct regions shown but no lines allow B1B0</i>		
				[4]
3.	(a)	9	B1	
		<i>Allow [8.9, 9.1]</i>		
	(b)	9×5	M1	
		45	A1ft	
	(c)	69	B1	
		<i>Tolerance 1°</i>		
	(d)	$69 + 180$	M1	
		249	A1	
				[6]

Day 2 Mark Scheme: Area

1.	$\frac{1}{2} \cdot 10 \times 6$		M1
	30		A1 [2]
2.	One correct area seen <i>e.g. 136, 56, 290, 221, 91, 493</i>		M1
	Complete method by adding or subtracting rectangles		M1
	402		A1 [3]
3.	(a) 7.1×3.6		M1
	<i>Accept 7×4</i>		
	25.56		A1
	25.6		A1 ft
	<i>Note: for ft answer must come from a 2 dp answer shown 21.6 on its own scores M1A0A0 25.5 on its own scores M1A0A0</i>		
	(b) Valid explanation		B1
	<i>Accept: same base/length and same height/width or same formula/equation/calculation or length 7.1, width/height 3.6 or translation of right angled triangle to make rectangle (may be indicated on diagram) Do not accept: same dimensions/lengths/sides/measurements</i>		
	(c) 4.9×11.5		M1
	<i>Accept 56.3</i>		
	56.35 or 56.4		A1
	<i>Note: 56.35 \Rightarrow 56.3 scores M1 A1</i>		
4.	$10.8 \times 9.5 (= 102.6)$ <i>or 17.5×9.5</i>		[6] M1
	$\frac{1}{2}(17.5 - 10.8) \times 9.5 (= 31.825)$		M1
	<i>or $\frac{1}{2}(6.7) \times 9.5$</i>	<i>M1</i>	
	$\frac{1}{2}(10.8 + 17.5) 9.5$ gets	<i>M2</i>	
	134(.425)		A1 [3]

Day 3 Mark Scheme: Area and Circumference

1.	$\pi \times 15$		M1
	47 to 47.124		A1 [2]
2.	$\pi \times 3 \times 3$		M1
	9π		A1 [2]
3.	$\pi \times 1.7^2$		M1
	9.07 to 9.08		A1
		<i>or 9.1 but not 9.0 or 9</i>	
		<i>No working, answer 9... M1 A0</i>	
	m^2		B1
		<i>UNITS MARK</i>	
		<i>(can be awarded if seen in working)</i>	
			[3]
4.	Attempt to find circumference of circle or semicircle		M1
		<i>Accept $2\pi \times \frac{9}{2}$, $2\pi \times 9$, $\pi \times 4.5$, $\pi \times 9$</i>	
	14.1(3...)		A1
	23.1(3...)		A1 ft [3]
5.	(a) $\pi \times 6^2$		M1
	or $3.14... \times 6^2$		
	36π		A1
		<i>Allow $\pi \times 36$</i>	
		<i>Do not accept $\pi 36$</i>	
	cm^2		B1
		<i>Award mark if units given in either part (a) or (b)(i)</i>	
	(b) (i) $36\pi + 25$		B1 ft
		<i>ft even if answer is not in terms of π</i>	
			[4]

Day 4 Mark Scheme: Constructions

- | | | |
|----|--|-----------|
| 1. | Angle of 43° drawn ($\pm 2^\circ$)
or line 6.5cm drawn (± 2 mm)
and ruled | B1 |
| | Complete correct triangle drawn within the tolerance shown on the overlay | B1
[2] |
| 2. | Arcs on PQ and RQ and equal intersecting arcs
<i>Allow if arcs drawn from P and R</i> | M1 |
| | Bisector accurate to $\pm 2^\circ$
<i>59.5 to 63.5</i> | A1
[2] |
| 3. | (a) Radius 4 ± 0.2 cm
<i>Allow if whole of circle is within tolerances</i> | B1 |
| | (b) 8 cm | B1 |
| | (c) Any line touching circle | B1 |
| | (d) Chord, Length 6 ± 0.2 cm
<i>Any chord B1; if choice of chords, no labelling, award B1</i> | B2
[5] |
| 4. | 70° drawn at P
$\pm 2^\circ$ | B1 |
| | 30° stated or drawn
<i>if drawn, Allow $\pm 2^\circ$</i> | B1 |
| | triangle correct | B1
[3] |
| 5. | Line of 10 cm (or 8 cm or 6 cm) drawn
± 2 mm | B1 |
| | Two intersecting arcs for remaining lengths
± 2 mm | M1 |
| | Fully accurate triangle
<i>SC1 for fully accurate 3, 4, 5 triangle</i> | A1 |

Day 5 Mark Scheme: Pythagoras

1. $3^2 + 1.2^2 (=10.44)$ M1
Must add two squares
- $\sqrt{\text{their } 10.44}$ M1
Dependent on first M1
- 3.2 or 3.23... A1
Note: 3.2 scores A0
Answer = 3 with no working scores M0
- [3]**
2. $17^2 - 15^2 (=64)$ M1
or $x^2 + 15^2 = 17^2$
- $\sqrt{64}$ M1 dep
For squaring, subtracting and indication of square rooting
- 8 A1
3. $160^2 + 75^2 (25600 + 5625)$ M1
or Complete trig method
- 31225 A1
 176.7... A1
Scale drawing M0
- 177 or 180 B1
Independent mark
Award for any calculated value seen or implied, greater than 3 sf, that is rounded to 3 sf or 2 sf
176 only gets M1A1A0B0
177 or 180 gets full marks **[4]**
4. (a) $15^2 - 10^2$ M1
 $225 - 100$ A1
 $\sqrt{125}$ or $5\sqrt{5}$ A1
- (b) Sight of tan M1
Can be implied from table, 1.192 or 0.839
- $\tan 50 = \frac{DE}{10}$ or $\tan 40 = \frac{10}{DE}$ M1 dep
oe
 $\frac{DE}{\sin 50} = \frac{10}{\sin 40}$ scores M2
- 11.92 or 11.9 or 12 A1 [6]

Day 6 Mark Scheme: Sequences

1. (a) $13 + 4$ or 17 or Diagram 4 drawn M1
oe
- 21 A1
- (b) $4n + 1$ B2
B1 for $4n + c$
B1 for $n4 + 1$
B0 for $n4 + c, c \neq 1$
- (c) $(201 - 1)$ or 200
 or $4n + 1 = 201$
 or their $4n + 1 = 201$ M1
Do not follow through for $n + 4$
- $\div 4$
 or $4n = 200$
 or $201 \div 4$ M1 dep
Accept reasonable attempt at complete built up method for M2
- $(n =) 50$ A1
[7]
2. (a) $3n - 1$ B2
oe
B1 for any of the following:
 $3n (+c)$
 $n = \times 3 - 1$
 $n\text{th} = \times 3 - 1$
 $n\text{th} \times 3 - 1$
 $n^3 - 1$
- (b) Complete explanation B2
 eg 2, 5, 8... not multiples of 3
 eg 98 and 101 are in the sequence
 eg $3n - 1 = 99$ does not give a whole number
 eg $n = 33.3...$
 eg 100 is not a multiple of 3
 eg 99 is a multiple of 3
Part explanation B1
eg 101 is in the sequence
eg 98 is the nearest
SC1 for correctly using their answer from (a) provided linear but not $n + 3$
- [4]
- 3.
- $5, 9, 13$ B2
- 1 each error or omission

1, 5, 9 scores B1
9, 13, 17 scores B1

[2]

Mark Scheme: Trial and Improvement

1. 3.7 M1,A1,A1,A1
- M1 for trying 1d.p.value between 3 and 4
A1 for sandwiching between 3.7 and 3.8
A1 for testing 3.75 (or other apt 2dp value) and stating answer*
- [3]
2. Trial for $x > 4$ B1
- All trials correctly evaluated to at least 1 d.p., rounded or truncated. NB Condone odd error as this may be "recovered" later.*
- Trial for $4 < x \leq 5$ B1
- 5 → 5.2, 4.5 → 4.72, 4.6 → 4.81, 4.7 → 4.91*
- Trials for $4.7 \leq x \leq 4.85$ and answer 4.8 B1
- 4.75 → 4.96, 4.76 → 4.97, 4.77 → 4.979..., 4.78 → 4.989..., 4.79 → 4.998..., 4.8 → 5.008..or 5 4.85 → 5.056*
- Trial for $4.75 \leq x < 4.8$ and answer 4.8 B1
- NB. Minimum for full marks. e.g. test 4.75, test 4.8, state 4.8 as answer.*
- [4]

Day 7 Mark Scheme: Transformations

1.	(a)	Reflection	B1
		$x = 3$	B1
	(b)	Fully correct (2, 2) (2, 4) (8, 2) <i>B2 Enlargement scale factor 2</i> <i>B1 Any enlargement or 2 points correct</i>	B3
			[5]
2.		Enlargement	B1
		Scale factor 0.5	B1
		(1,3)	B1
			[3]
3.	(a)	Rotation	B1
		180	B1
		(About) origin <i>oe</i>	B1
	(b)	(i) Translation left 4, down 3 <i>Allow B1 for left 3, down 4</i>	B2
		(ii) Reflection	B1
		(in the line) $y = x$	B1
			[7]
4.	(a)	Any 90° rotation <i>Allow wrong length flagpole</i>	B1
		Rotation 90° anti-clockwise about (0, 0) <i>B1 for 90° clockwise rotation about (0, 0)</i>	B2
	(b)	Correct position <i>(1,0) (1,-2) (1,-3) (2,-3) (2,-2)</i> <i>B1 for reflection in $x = 1$ or in $y = c$</i> <i>Apply same scheme if flag A is used</i>	B2
No label, or labelled incorrectly - correct positions to get full marks. No pole, but squares correct - deduct 1 in each part.			[5]

Day 9 Mark Scheme: Volume

1.	(a)	$60/(6.2 \times 3.7)$	M1
		2.6(155....) or rounded answer <i>2.61 or 2.62</i>	A1
		2.6	A1
		<i>Accuracy mark</i>	
	(b)	$600 \div 100 \div 100$	M1
		<i>600 \div 100 or 0.2 \times 0.3</i>	
		0.06	A1
			[5]
2.	(a)	$2n^5$	M1
		<i>$\pi 10$</i>	
		31.4.....	A1
	(b)	$250 = \pi r^2 h$	M1
		$250 \div 25\pi = h$	A1
		$h = 3.2$ or 3.18 (.....)	A1
		<i>3.19 A0</i>	
			[5]
3.		$5 \times 1.6 (=8)$	M1
		$\frac{1}{2} \pi 2.5^2 (= 9.817...)$	M1
		<i>Allow even if $\frac{1}{2}$ is missing</i>	
		<i>(=19.63...) or 5 used as radius</i>	
		<i>(= 39 26) but not both</i>	
		Rectangle or semicircle $\times 230$	M1 dep
		<i>dep on the relevant M1</i>	
		Adding their 2 volumes or areas	M1 dep
		<i>dep on 1st and 2nd M1s</i>	
		4097 to 4100 inclusive	A1
			[5]

Day 19 Mark Scheme: Angles

1.	180 – 137		M1
	43		A1
	<i>Further working such as 90 – 43 = 47 invalidates both marks</i>		
			[2]
2.	(a) (i) 130		B1
	(ii) 50×2		
	Or $(180 - \text{their } x) \times 2$		M1
	100		A1 ft
	<i>Do not ft from 90 in part (i)</i>		
	(b) 12×5		M1
	60		A1
	cm^3		B1
	<i>Note: Mark is for units</i>		
			[6]
3.	(a) $360 \div 10$		M1
	36		A1
	(b) $180 - 36$		
	Or $180 - \text{their } x$		
	<i>Or exterior angle = 36</i>		M1
	<i>Note: 36 on its own scores M0</i>	144	A1 ft
			[4]
4.	(a) $360 \div 9$ or 40 or $(2 \times 9 - 4)$, right angles		M1
	140		A1
	140		A1 cao
			[2]