

**GCSE MATHEMATICS**

**MARK SCHEME**

Practice Paper Higher 2

Maximum marks: 80

Calculator

View detailed guidance on the conclusions you can draw from your students' performance in these papers on the MERiT welcome page. Understand how your students compare with others and target revision effectively by entering marks into MERiT.

1	0.049		B1	[1]
2	(a) 27		B1	
	(b) 31		B1	
	(c) 25 or 45	<i>Allow both</i>	B1	[3]
3	(a) $x(x - 1)$ or $x \times (x - 1)$ or $(x - 1)x$ or $(x - 1) \times x$		B1	
	(b) $5x^2$ or $-15x$ <i>oe</i>		M1	
	$5x^2$ and $-15x$		A1	
	$5x^2 - 23x$ or $x(5x - 23)$	<i>ft if M1A0 awarded and two terms in x correctly collected</i>	A1ft	[4]
4	(a) 25(%) : 75(%)		M1	
	or $\frac{1}{4} : \frac{3}{4}$	<i>oe</i>		
	1 : 3	SC1 3 : 1	A1	
	(b) $19.5 \div 3$ or $26 \div 4$ or 6.5	<i>oe</i> $19.5 \div 75 \times 25$	M1	
	6.50	<i>Correct money notation</i>	A1	
	<b>Additional Guidance</b> Condone 6.50p on answer line provided £ sign is not crossed out		M1A1	[4]
5	0.3		B1	[1]

**6 Alternative method 1**

6 stated or shown on diagram as length from A to intersection of AB and horizontal line from D. B1

*Maybe on diagram*

$10^2 - \text{their } 6^2 \text{ or } 64 \text{ or } (BC)^2 + 6^2 = 10^2$  M1dep

*their 6 is the length from A to intersection of AB and horizontal line from D.*

*$10^2 + \text{their } 6^2 \text{ or } 136$*

$\sqrt{\text{their } 64}$  M1dep

*64 must come from  $10^2 - \text{their } 6^2$*

8 A1

*8 with no working M0*

**Alternative method 2**

6 stated or shown on diagram as length from A to intersection of AB and horizontal line from D. B1

*Maybe on diagram*

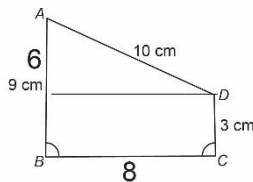
3, 4, 5 Pythagorean triple shown M1

6, 8 shown or stated M1dep

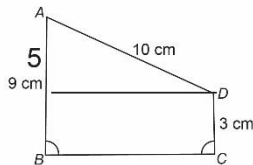
8 A1

*8 with no working M0*

**Additional Guidance**



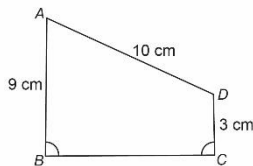
Minimum for 4 marks



B0  
M1  
M1dep  
A0

$$10^2 - 5^2 = 75$$

$$\sqrt{75} \approx 8.5$$

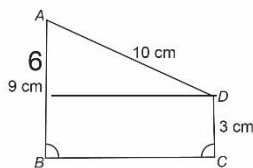


B0  
M0

$$10^2 - 5^2 = 75$$

$$\sqrt{75} \approx 8.5$$

Use of cos rule. If left with cos 90 M0



B1  
M0

$$10^2 = x^2 + 6^2 - 2 \times 6 \times x \times \cos 90$$

[4]

7	$7 \times 6$ or 42 or $8 \times 9$ or 72 or $9 \times 4$ or 36 or $10 \times 1$ or 10 or 160	M1	
	<i>At least one product shown or one correct value</i> (their $42 +$ their $72 +$ their $36 +$ their $10$ ) $\div 20$	M1dep	
	<i>Must have the sum of 4 products divided by 20</i> <i>Condone missing brackets</i> $(7 \times 6 + 8 \times 9 + 9 \times 4 + 10 (x 1)) \div 20$ is M2		
	8	A1	[3]
8	$2x + 2x - 10 + x + 25 + 2x + 30$ or $ax + 45$ or $7x + b$	M1	
	<i>Allow one error in <b>their</b> 7 terms</i> oe $25 + 30 - 10$ or 45		
	$2x + 2x - 10 + x + 25 + 2x + 30 = 360$ or $7x + 45$ or <i>their</i> $ax + 45 = 360$ or <i>their</i> $7x + b = 360$	M1dep	
	oe $360 - \mathbf{their} 45$ or 315		
	$7x + 45 = 360$	M1dep	
	oe $\mathbf{their} 315 \div 7$		
	45	A1	
	<b>Additional Guidance</b>		
	$x = 45$ with no working	M3A1	
	$45 + 315 = 360, \frac{315}{7} = 45$	M3A1	
	$2x = 90, x = 45$ (no incorrect working seen)	M3A1	
	$360 - 45 = 215, \frac{215}{7} = 30.714$	M3A0	
	$45 + 215 = 360, \frac{215}{7} = 30.714$	M3A0	
	Embedded answer	M3A0	
	Beware of $25 + 30 - 10 = 45$	M1	
			[4]
9	<b>Alternative method 1</b>		
	$64 + x + x + 24 = 360$ oe	M1	
	$2x = 360 - 24 - 64$	M1	
	or $x = 136$		
	their $\frac{136}{360} \times 5220$ oe	M1	
	1972	A1	

**Alternative method 2**

360 – 64 or 296 M1

$$\frac{296 - 24}{2}$$
 or 136 oe M1

 their  $\frac{136}{360} \times 5220$  oe M1

1972 A1

**[4]****10 Alternative method 1**

45 000 ÷ 1000 or 45 M1

45 ÷ 0.75 M1

or 45 × 1.33...

or their 45 ÷ 0.75

oe

eg 45 ÷ 3 × 4

60 A1

60 minutes or 60 min(s) B1

or 1 hour or 1h(r)

**Alternative method 2**

0.75 × 1000 or 750 M1

45 000 ÷ 750 M1

or 45 000 ÷ their 750

oe

60 A1

60 minutes or 60 min(s) A1

or 1 hour or 1h(r)

**Additional Guidance**

For the B mark 60 minutes or 1 hour must not come from incorrect working

Ignore fw after 60 minutes or 1 hour

Digit 6 implies M0M1 eg 60 000, 6000, 600, 6 or 0.6 M0M1

750 ÷ 45 000 = 0.016... (units would be minutes<sup>-1</sup>) M1M0A0B0

750 ÷ 45 000 = 0.016... and 0.016... × 60 = 1 hour (method is incorrect) M1M0A0B0

Do not accept 60 m for the B mark M1M1A1B0

**[4]****11** 15 B1**[1]**

12	(a) 5	B1	
	(b) 1	B1	
			[2]
13	$\frac{1}{81^{\frac{1}{4}}}$ or $\frac{1}{\sqrt[4]{81}}$ or $\sqrt[4]{\frac{1}{81}}$	M1	
	or $3^{-1}$ or $9^{-\frac{1}{2}}$		
	or $81^{\frac{1}{4}} = 3$ or $\sqrt[4]{81} = 3$		
	or $3^4 = 81$		
	$\frac{1}{3}$	A1	
	<b>Additional Guidance</b>		
	3 without $81^{\frac{1}{4}}$ or $\sqrt[4]{81}$	MOA0	
			[2]
14	<b>Alternative method 1</b>		
	$2476 \div (3 + 1)$ or 619	M1	
	oe		
	their $619 \times (3 - 1)$ or their $619 \times 2$	M1	
	or $2476 \div (3 - 1)$ or $2476 \div 2$		
	or their $619 \times 3 -$ their 619		
	or $(2476 - \text{their } 619) -$ their 619		
	or $1857 - 619$		
	oe		
	1238	A1	
	<b>Alternative method 2</b>		
	$(3 + 1) \div (3 - 1)$ or $4 \div 2$	M1	
	or $(3 - 1) \div (3 + 1)$ or $2 \div 4$		
	oe		
	$2476 \div$ their 2	M1	
	or $2476 \times$ their $\frac{1}{2}$		
	oe		
	1238	A1	
			[3]
15	$7.5 \times 0.4536$ or 3.402	M1	
	or $7.5 \times 0.4536 \times 1000$ or 3402		
	$2.54^2$ or 6.4516	M1	
	oe		
	their $3.402 \times 1000 \div$ their 6.4516	M1dep	
	or their $3402 \div$ their 6.4516		
	oe		
	527.(...)	A1	
	<i>Dep on M1 M1</i>		
			[4]

16	$(-4)^2$ or 16 or $7^2$ or 49 <b>65</b>	M1 A1	
			<b>[2]</b>
17	<b>(a) Alternative method 1</b> $4 + 9 + [1, 12]$ or $[14, 25]$ or $\frac{5}{15} \times 24$ or 8 $8400 \times \frac{21}{50}$ or 3528  oe 211 680	M1  M1dep  A1	
	<b>Alternative method 2</b> $\frac{8400}{50} \times 4$ or 672 and $\frac{8400}{50} \times 9$ or 1512 and $\frac{8400}{50} \times [1, 12]$ or $[168, 2016]$  $\frac{8400}{50} \times 4 + \frac{8400}{50} \times 9 +$ $\frac{8400}{50} \times \frac{5}{15} \times 24$ or 3528  oe 211 680	M1     M1dep    A1	
	<b>(b) Any appropriate explanation</b>  <i>eg1 this is only a sample</i> <i>eg2 it may not reflect the whole population</i> <i>eg3 it may be different on another day</i> <i>eg4 it may be different at another time</i>	B1	
			<b>[4]</b>

**18 Alternative method 1**

25% increase = 1.25		B1
	<i>oe</i>	
20% decrease = 0.8		B1
	<i>oe</i>	
$1.25 \div 0.8 (= 1.5625) (\times 100)$		M1
	<i>oe, eg <math>125 \div 80 (\times 100)</math></i>	
56.25 or 56		A1
	<i>Digits 15625 or 156 is 3 marks, A0</i>	
	<i>SC2 <math>1.25 \div 1.2 = 1.04\dots</math> (or equivalent, eg <math>125 \div 120 = 1.04166\dots</math>)</i>	

**Alternative method 2**

Values chosen for X and Y and F calculated correctly (Call this P) M2  
*If values are decimals then must be given to 1 dp*  
*Allow M1 if one of X + 25% or Y - 20% calculated incorrectly*

X increased by 25% **and** Y decreased by 20% **and**  $X \div Y$  calculated correctly (call this Q)  
*If values are decimals then must be given to 1 dp*  
*Allow M1 if one of X + 25% or Y - 20% calculated incorrectly*

$Q \div P (\times 100)$  M1dep  
*oe Dependent on at least M1*

56.25 or 56 A1  
*Digits 15625 or 156 is 3 marks, A0*

**Alternative method 3**

$x \times 1.25 (= p)$  M1  
*x any quantity*  
*25% increase in x*

$y \times 0.8 (= q)$  M1  
*y any quantity*  
*20% decrease in y*

Their  $p \div$  their  $q$  M1

56.25 or 56 A1

**[4]**

**19 (a)**  $3a(3a - 2)$  B2

*B1  $a(9a - 6)$  or  $3(3a^2 - 2a)$*

**(b)**  $(x + a)(x + b)$  M1

*where  $ab = 20$*

*or  $a + b = -12$*

$(x - 2)(x - 10)$  A1

2 and 10 B1ft

*ft their pair of brackets*

**[5]**

20	2	B1	[1]
21	<p><b>Alternative method 1</b></p> <p>39.5 or 24.5 or 40.5 or 25.5 or 965 or 975</p> <p>One correctly evaluated trial using at least one bound or one correctly evaluated trial giving an answer in range 965 to 975 <i>eg 39.5 × 24.5 = 967(.75)</i> <i>or 39.7 × 24.5 = 972(.65)</i> <i>or 40.5 × 25.5 = 1032(.75)</i> <i>Trial values must be in range of bounds</i></p> <p>Ticks cannot tell and 965 seen and One correctly evaluated trial giving an answer in range 965 to 970 or Ticks cannot tell and 975 seen and One correctly evaluated trial giving an answer in range 970 to 975 <i>eg 967.75</i> <i>eg 972.6</i></p> <p><b>Alternative method 2</b></p> <p>One correctly evaluated trial giving an answer below 970 (or their value [965, 975])</p> <p>One correctly evaluated trial giving an answer below 970 (or their value [965, 975])</p> <p>and One correctly evaluated trial giving an answer above 970 (or their value [965, 975])</p> <p>Ticks cannot tell</p> <p>and One correctly evaluated trial giving an answer below 970 (or their value [965, 975])</p> <p>and One correctly evaluated trial giving an answer above 970 (or their value [965, 975]) <i>eg 967.75 and 1032.75</i> <i>or 967.75 and 1000</i> <i>or 967.75</i></p>	<p>B1</p> <p>M1</p> <p>A1</p> <p>M1</p> <p>M1dep</p> <p>A1</p>	<p>[3]</p>
22	<p><math>x^2 + ax + ax + a^2 (-7)</math> or <math>x^2 + 2ax + a^2 (-7)</math> or <math>2ax = 10x</math> or <math>2a = 10</math> or <math>a = 5</math> or <math>a^2 - 7 = b</math> or <math>(x + 5)^2</math>                    oe <math>a = 5</math> and <math>b = 18</math></p> <p><b>Additional Guidance</b></p> <p><math>(x + 5)^2 - 7 = x^2 + 10x + 18</math> <math>a = 7</math> and <math>b = 18</math></p>	<p>M1</p> <p>A1</p> <p>M1A1</p> <p>M0</p>	<p>[2]</p>



23	(-3, 5)		B1	
				[1]
24	(a)	Angle $ACP = x$ or angle $PAC$ (base angles of) isosceles triangle (are equal)	M1	
		Angle $APC = 180 - 2x$	M1dep	
		angle sum of triangle (= $180^\circ$ )		
		<b>and</b>		
		angle $BPC = 2x$		
		angles on straight line (add to $180^\circ$ )		
		$BPC = 2x$ external angle of triangle (= sum of interior opposite angles)		
		Angle $ABC = 2x$ or angle $BPC$	A1	
		(base angles of) isosceles triangle (are equal)		
		SC2 'Correct' response but has reason(s) missing or incorrect		
	(b)	Angle $ACB = 2x$	M1	
		$x + 2x + 2x = 180$ oe e.g. 1 $5x = 180$	M1	
		e.g. 2 $90 - \frac{1}{2}x = 2x$		
		36	A1	
				[6]
25	(a)	(height of cylinder =) 14	B1	
		May be seen in method or on diagram		
		$\frac{1}{3} \times \pi \times 6^2 \times \text{their } 14$ (= $168\pi$ )	M1	
		oe eg [527.5, 528]		
		$\frac{2}{3} \times \pi \times 6^3$ (= $144\pi$ )	M1	
		oe eg [452, 452.16]		
		$168\pi + 144\pi$	A1	
		oe eg $312\pi - 168\pi = 144\pi$		
	(b)	1500 (g)	B1	
		$(312\pi \times) 2^3$ (= $2496\pi$ )	M1	
		oe		
		eg $\frac{1}{3} \times \pi \times 12^2 \times \text{their } 28 + \frac{2}{3} \times \pi \times 12^3$		
		or [7837.4, 7842.432]		
		Their $1500 \div \text{their } 2496\pi$	M1dep	
		[0.19, 0.1914]	A1ft	
		fit their 1500 and their 28		
		Accept 0.2 if correct method seen		
				[8]