Mark schemes

Q1.

5^2 **and** 12^2 seen oe

25 ***and*** *144* ***or*** *169*

M1

$\sqrt{(25 + 144)}$ **or** $\sqrt{169}$

either 25 ***or*** *144 correct*

M1dep

13

Condone scale drawing with answer 13

A1

[3]

Q2.

$6^2 + 8^2$
or 36 + 64
or 100
or $8^2 - 6^2$
or $6^2 + 8^2 - 2 \times 6 \times 8 \times \cos 90$

3, 4, 5 seen

If $6^2 + 8^2$ used in cosine rule must be correct

M1

$\sqrt{6^2 + 8^2}$
or $\sqrt{\text{their } 36 + \text{their } 64}$
or $\sqrt{100}$

oe

$\frac{5 \times 6}{3}$
or $\frac{5 \times 8}{4}$

M1dep

10

10 no working is full marks

A1

Additional Guidance

Scale drawing is M0
(3, 4, 5) × 2 = (6, 8, 10)

M1, M1dep, A1

$\sqrt{6^2 + 8^2} = \sqrt{110} = 10.5$

M1, M1dep, A0

$6^2 + 8^2 - 2 \times 6 \times 8 \times \cos 90$
100 – 96

M1, M0dep

$6^2 + 8^2 - 6 \times 8 \times \cos 90$

M0

$\sqrt{6^2+8^2}=$

M1, M1dep

$\sqrt{6^2}+\sqrt{8^2}=6+8=14$

A0

$6^2 + 8^2 = 12 + 16 = 28$

M1

$\sqrt{28}$

M1dep, A0

6 × 8 ÷ 2 = 24
24 – 8 – 6 = 10

M0

Correct answer but from wrong method

[3]

Q3.

Alternative method 1

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

Maybe on diagram

B1

10^2 – their 6^2 or 64 or $(BC)^2 + 6^2 = 10^2$

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

10^2 + their 6^2 or 136

M1dep

√their 64

64 must come from 10^2 – their 6^2

M1dep

8

8 with no working M0

A1

Alternative method 2

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

Maybe on diagram

B1

3, 4, 5 Pythagorean triple shown

M1

6, 8 shown or stated

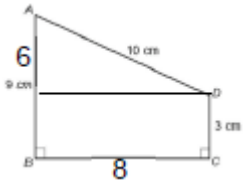
M1dep

8

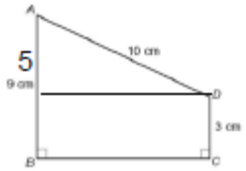
8 with no working M0

A1

Additional Guidance



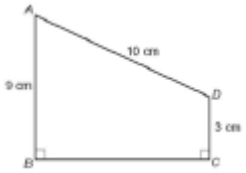
Minimum for 4 marks



$10^2 - 5^2 = 75$

$\sqrt{75} \approx 8.5$

B0,
M1
M1dep
A0

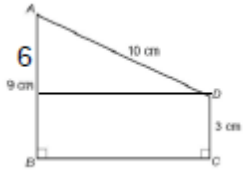


$10^2 - 5^2 = 75$

$\sqrt{75} \approx 8.5$

B0
M0

Use of cos rule. If left with cos 90 M0



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

B1
M0

[4]

Q4.

Alternative method 1

$6^2 + 6^2$
or 36 + 36
or 72

M1

$\sqrt{6^2 + 6^2}$ or $\sqrt{72}$

oe

M1dep

$\sqrt{72} < 10$

oe

eg $\sqrt{72}$ *is between 8 and 9*

A1

Alternative method 2

$3^2 + 3^2$
or 9 + 9
or 18

M1

$\sqrt{3^2+3^2}$ or $\sqrt{18}$

oe

M1dep

$\sqrt{18} < 5$

oe

eg $\sqrt{18}$ *is between 4 and 5*

A1

[3]

Q5.

$25^2 + 43^2$

$43^2 - 25^2$

M1

√their 2474

M1dep

49.7 …

Accept 50 with working

A1

[3]

Q6.

8^2 and 3^2 seen or 8 × 8 and 3 × 3 seen or 64 and 9 seen or 55

M1

$\sqrt{8^2-3^2}$ or $\sqrt{64-9}$ or $\sqrt{55}$

M1dep

M2 for $\sin^{-1}\left(\frac{3}{8}\right) = 22.(...)$ ***and*** *8 cos (their 22.(...))*

or $\cos^{-1}\left(\frac{3}{8}\right) = 67.(...)$ *or 68* ***and*** *8 sin (their 67.(...))*

[7.4, 7.42]

A1

Additional Guidance

$\sqrt{8^2+3^2}$ or $\sqrt{64+9}$ or 8^2+3^2 or $64+9$

M1M0depA0

Only $\sqrt{73}$ or only 73 or only 8.5...

M0

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

Partial method using trigonometry

M0

Ignore units given

8 cm^2 is not 8^2 unless recovered

Correct answer in range seen, ignore further work if truncates or rounds

M2A1

$8^2 = 16$ and $3^2 = 6$, $\sqrt{16-6}$

M1M1depA0

Scale drawing with answer in range [7.4, 7.42]

M2A1

Scale drawing with answer **not** in range [7.4, 7.42]

M0

[3]

Q7.

$8.2^2 + 3.5^2$ or 79.49

M1

$\sqrt{8.2^2 + 3.5^2}$

M1dep

8.9(…)

Accept 9 with working shown

A1

[3]

Q8.

Alternative method 1

6 and 10 seen

M1

(their 6)² + (their 10)² or 136

M1dep

[11.66, 11.7] or $\sqrt{136}$ or $2\sqrt{34}$

A1

Alternative method 2

$12^2 + 20^2$ or 544

M1

$\sqrt{\text{their } 544}$ or $4\sqrt{34}$

or [23.32, 23.324]

M1dep

[11.66, 11.7] or $\frac{\sqrt{544}}{2}$ or $\sqrt{136}$

or $2\sqrt{34}$

A1

[3]

Q9.

Alternative method 1

$6.25^2 + 15^2$

or 39(.0625) + 225

or 264(.0625)

5, 12, 13 seen

M1

$\sqrt{6.25^2 + 15^2}$

or $\sqrt{39(.0625) + 225}$

or $\sqrt{264(.0625)}$

oe

$\frac{13}{5} \times 6.25$

or $\frac{13}{12} \times 15$

M1dep

[16.2, 16.3]

Allow 16 with working shown

A1

Alternative method 2

$\tan^{-1}\frac{6.25}{15}$ or 22.6...

or $\tan^{-1}\frac{15}{6.25}$ or 67.38...

M1

$\frac{15}{\cos \text{ their } 22.6}$

or $\frac{15}{\sin \text{ their } 67.38}$

or $\frac{6.25}{\sin \text{ their } 22.6}$

or $\frac{6.25}{\cos \text{ their } 67.38}$

M1dep

[16.2, 16.3]

Allow 16 with working shown

A1

[3]

Q10.

8^2 **or** 4^2 **or** 64 **or** 16 **or** 80 **or** (-8^2) **or** (-4^2)

M1

$\sqrt{\text{their } 8^2 + \text{their } 4^2}$

M1Dep

8.944(…) **or** $\sqrt{80}$

oe e.g. $4\sqrt{5}$

This mark is implied by 8.94

A1

8.94

ft From any value > 3sf seen or any value given as a surd that is rounded to 3sf

B1ft

[4]

Q11.

$5^2 + 9^2$

or 25 + 81

or 106

M1

$\sqrt{5^2 + 9^2}$

or $\sqrt{25 + 81}$

or $\sqrt{106}$

M1dep

10.29…

Allow 10 or 10.2 if correct working shown

A1

10.3

ft their 2 d.p. answer

B1ft

[4]

Q12.

$(AC^2 =) 23^2 + 31^2 (=1490)$

M1

$\sqrt{23^2 + 31^2}$
or
$\sqrt{\text{their } 1490}$

M1dep

38.6(…) or 39

A1

[3]

Q13.

$(AB^2 =) 9^2 + 7^2 (= 130)$

M1

$\sqrt{9^2 + 7^2}$ or $\sqrt{\text{their } 130}$

M1 dep

11.4(…)

A1

[3]

Q14.

18^2 and 12^2 seen *oe*

or 324 and 144

or 180

M1

$\sqrt{18^2 - 12^2}$ or $\sqrt{180}$ or $6\sqrt{5}$

M1dep

13.41(…) or 13.42

A1

13.4

ft any 2 d.p. or better

B1ft

[4]