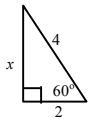
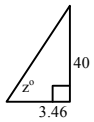
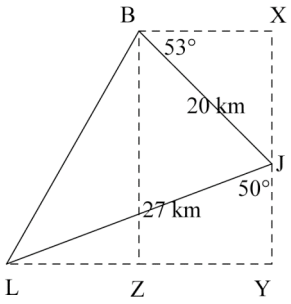
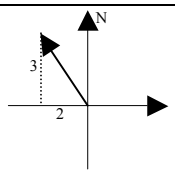
Assessment Schedule – 2008

Mathematics: Solve right-angled triangle problems (90152)

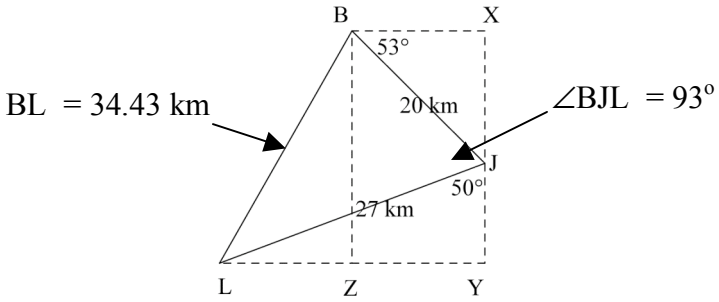
Evidence Statement

	Achievement Criteria	No	Evidence	Code	Judgement	Sufficiency
ACHIEVEMENT	Solve right-angled triangle problems.	1	Distance = 28.3 m	A1	Accept answer where the candidates have their calculator in the wrong mode where the answer is reasonable.	**Achievement:** THREE of A Including at least one A1 and at least one A2.
		2	Angle = $\sin^{-1}\frac{5}{100}$ = 2.8660°	A2	do not allow tan $^5/_{100}$ = 2.862 Accept, because answers look OK: 3.18 (grad mode used) or 0.05 (radian mode used) do not allow sin $^5/_{100}$ = 0.05	
		3	diagonal of frame = 2.690 m	A1		Replacement evidence may be found for: A1 (Pythagoras) in Q7, 8 A2 (Trigonometry) In Q5, 6, 7, 8
		4	$\tan 35° = \frac{EF}{3.25}$ Length EF = 2.2757 m	A2	Accept, because answers look OK: 1.99 (grad mode used) 1.5 (radian mode used) Do not accept 35 x tan3.25 = 1.99 unless the transposed values are seen on the diagram. Accept any rounding.	

ACHIEVEMENT WITH MERIT	Solve problems in practical situations involving right-angled triangles.	5 7 8 (a)	$\sin 29^o = {}^{35}/_{x}$ or $\cos 61^o = {}^{35}/_{x}$ $x = {}^{35}/_{\sin 29}$ or $x = {}^{35}/_{\cos 61}$ Distance to buoy = 72.2 m Using a $^1/_2 = \Delta$ from the base:  $x = \sqrt{12} = 3.46$ or $x = 2\tan 60^o = 3.46$ Using the verticalΔ:  $x = \tan^{-1}({}^{40}/_{3.46})$ $= 85.05$ $\approx 85^o$  In triangle BXJ XJ = 20sin53° = 15.973 BX = 20cos53° =12.036 In triangle LJY JY = 27sin40° =17.355 LY = 27cos40° =20.683 XY = XJ + JY = 33.328 LZ = LY – BX = 8.647 BL = $\sqrt{8.647^2 + 33.328^2}$ = 34.43 km	[A2] M [A1] [A2] M [A2] [A1] M	Accept any rounding. Horizontal distance 63m is A2. Accept, because answer looks OK: 79.6 (grad mode used) Allow $\cos^{-1}({}^{\sqrt{12}}/_{40.15}) = 84^o$ for M Do not allow $\tan({}^{40}/_{4}) = 84^o$ for M $\cos^{-1}({}^{\sqrt{12}}/_{40}) = 85^o$ is incorrect Neither grad nor radian mode are acceptable because answers do not look OK: A2 could be given for any one of the trig calculations.	**Merit:** Achievement PLUS TWO M OR THREE **M**

ACHIEVEMENT WITH EXCELLENCE	Solve problems in word or 3D situations.	6	 $\tan^{-1}(3/2) = 56.3^o$ or $\tan^{-1}(2/3) = 33.7^o$ → bearing = 326°	[A2, M] E	In general, for Excellence, mathematical statements, sensible and correct rounding, and units are expected. Accept, because answer looks OK: 63 (grad mode used). M is awarded for either acute ∠ Only the correct bearing is E, no consistency.	**Excellence:** Merit **Plus one of code** E
		8 (b)	Angle LBZ = $\tan^{-1}\frac{LZ}{BZ}$ = 14.5° Bearing is 14.5° + 180^o = 194.5°	[M] E	Accept, because answer looks OK: 333 (grad mode used)	

Question 8 (solution done using sine / cosine rule)



To find BL, use cosine rule in ΔBJL $BL^2 = 20^2 + 27^2 - 2 \times 20 \times 27 \times \cos 93^o = 1\,185.522\ldots$.

$BL = 34.43$ km

To find ∠LBJ, use either cosine rule $\angle LBJ = \cos^{-1}\left(\frac{20^2 + LB^2 - 27^2}{2 \times 20 \times LB}\right)$ or sine rule $\angle LBJ = \sin^{-1}\left(\frac{27 \times \sin 93^o}{LB}\right)$

$= 51.5^o$ $= 51.5^o$

Required bearing is $143^o + \angle LBJ = 194.5^o$

Judgement Statement

Achievement	Achievement with Merit	Achievement with Excellence
Solve right-angled triangle problems. $3 \times A$ (including at least one of A1 and one of A2)	Solve problems in practical situations involving right-angled triangles. Achievement plus $2 \times M$ or $3 \times M$	Solve problems in word or 3D situations. Achievement with Merit plus $1 \times E$

The following Mathematics-specific marking conventions may also have been used when marking this paper:

- Errors are circled.
- Omissions are indicated by a caret (^).
- **NS** may have been used when there was not sufficient evidence to award a grade.
- **CON** may have been used to indicate 'consistency' where an answer is obtained using a prior, but incorrect answer and **NC** if the answer is not consistent with wrong working.
- **CAO** is used when the 'correct answer only' is given and the assessment schedule indicates that more evidence was required.
- **#** may have been used when a correct answer is obtained but then further (unnecessary) working results in an incorrect final answer being offered.
- **RAWW** indicates right answer, wrong working.
- **R** for 'rounding error' and **PR** for 'premature rounding' resulting in a significant round-off error in the answer (if the question required evidence for rounding).
- **U** for incorrect or omitted units (if the question required evidence for units).
- **MEI** may have been used to indicate where a minor error has been made and ignored.