High School
Mathematics Test 2014

Year 9

Right Triangle Trigonometry

Calculator Allowed

Skills and Knowledge Assessed:

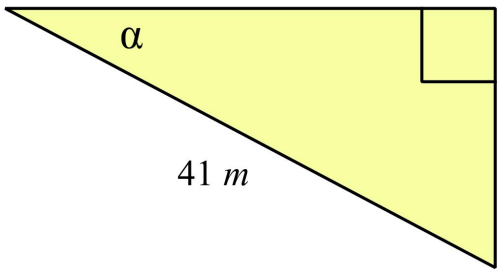
- Use similarity to investigate the constancy of the sine, cosine and tangent ratios for a given angle in right - angled triangles (ACMMG223)
- Apply trigonometry to solve right - angled triangle problems (ACMMG224)
- Solve right- angled triangle problems including those involving direction and angles of elevation and depression (ACMMG245)

Name_____

Section 1 Short Answer Section

Write all working and answers in the spaces provided on this test paper.

1.



What is the value of *tan* α?

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2. Evaluate $45 \times \cos 55^\circ$ correct to 2 decimal places.

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3. If $\sin \beta = 0.459$ find the value of β to the nearest degree.

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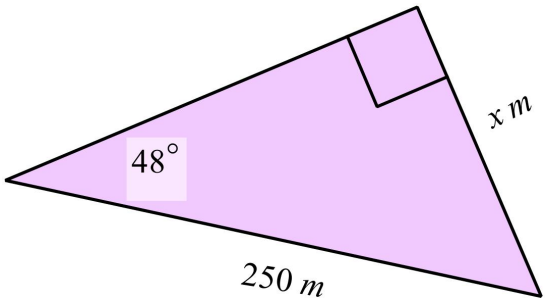
4. Find the value of x, correct to the nearest metre.



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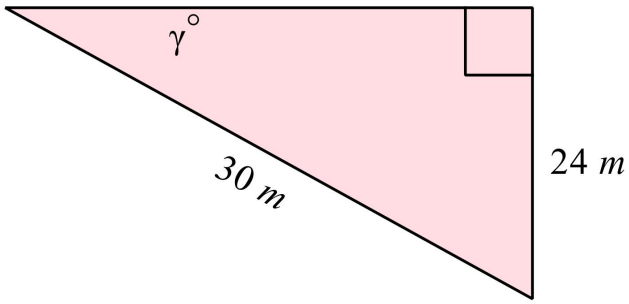
5. Find the value of γ, correct to the nearest degree.



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6. What is the value of y, correct to 1 decimal place?

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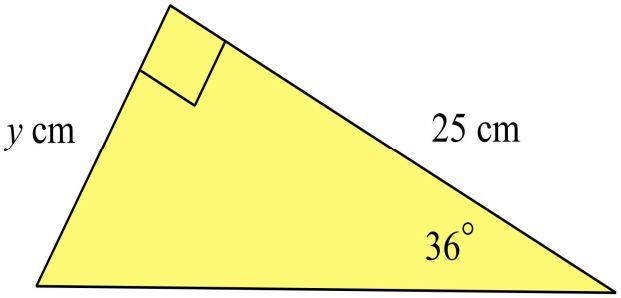

7. Find the size of $\angle G$ correct to the nearest degree.

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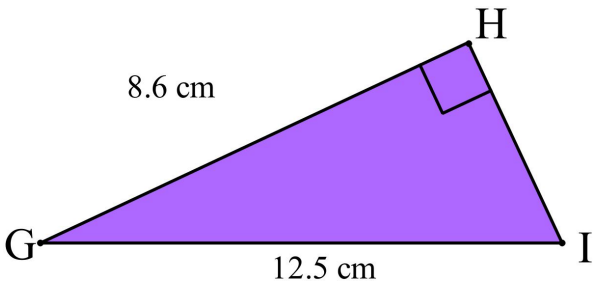

8. Find the value of β correct to the nearest degree.

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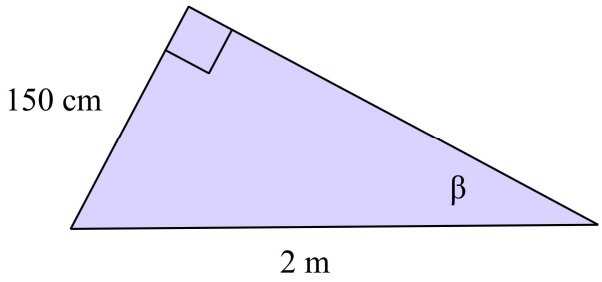

9. Calculate the distance *YZ* (correct to 1 decimal place).

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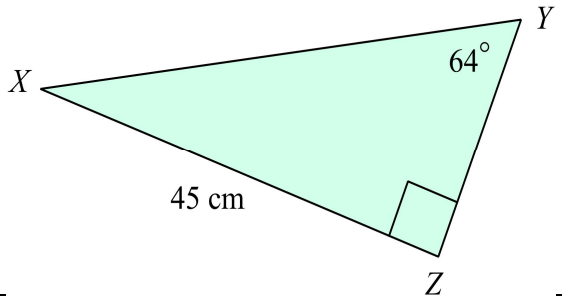

10. From a point 28 m from the base of the building, Miles measures the angle of elevation to be 64°. What is the height of the building?

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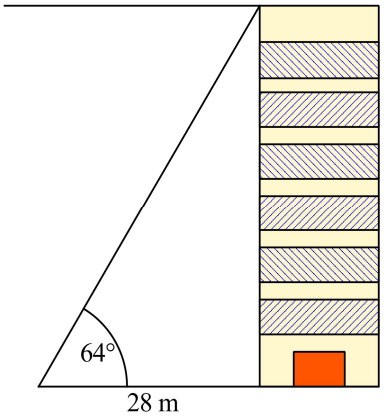

11. A ship sails from *B* to *C* on a bearing of 260° for a distance of 465 km at which time it is due east of A.
How many kilometres is *A* south of *B*?

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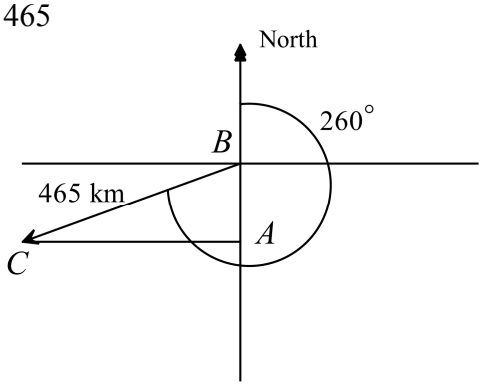
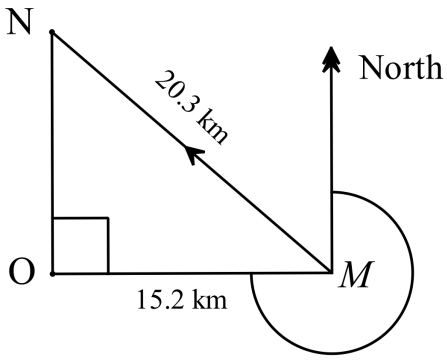


12. Elvis hikes cross country from Motown (*M*) to Nashville (N) a distance of 20.3 km.
Orlean (O) is 15.2 km west of Motown and due south of Nashville. What is the bearing of Nashville from Motown?



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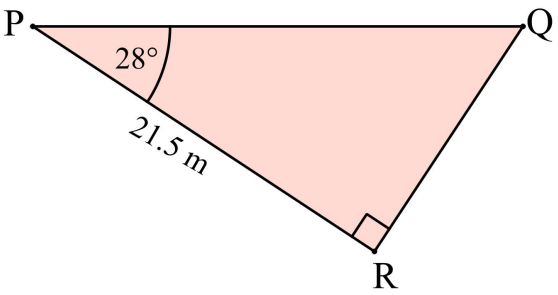
13. Find the length of the hypotenuse of ΔPQR.



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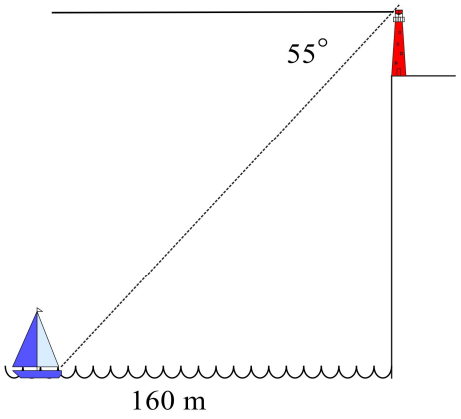
14. From the top deck of a lighthouse, Jessie measures the angle of depression of a yacht which is 160 m out to sea to be 55 °. How far is Jessie in a straight line from the yacht?



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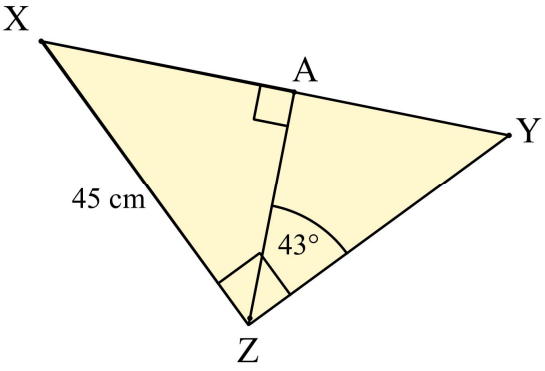
15. Find the distance AY in the diagram.



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High School Mathematics Test 2014

Year 9

Right Triangle Trigonometry

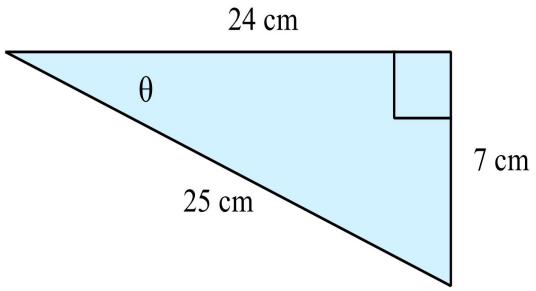
Calculator Allowed

Name_____

Section 2 Multiple Choice Section

Mark all your answers on the accompanying multiple choice answer sheet, not on this test paper. You may do any working out on this test paper. Calculators are allowed for this section.

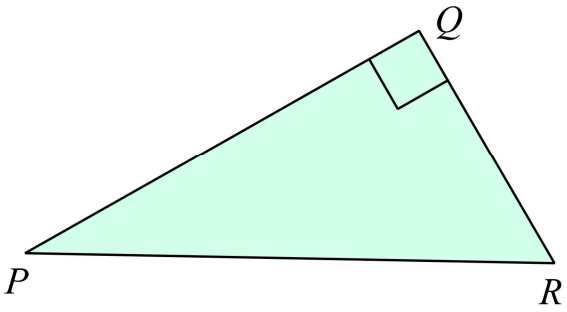
1. In the diagram $\cos\theta = ?$



A. $\frac{7}{25}$ B. $\frac{7}{24}$

C. $\frac{24}{25}$ D. $\frac{25}{24}$

2. What is the value of $\sin P = ?$



A. $\frac{QR}{PR}$

B. $\frac{QR}{QP}$

C. $\frac{PQ}{QR}$

D. $\frac{PQ}{PR}$

3. Evaluate $\tan 56^\circ$ correct to 2 decimal places.

A. 0.56 B. 0.67 C. 0.83 D. 1.48

4. If $\cos X = \frac{3}{5}$ calculate the size of angle X to the nearest degree

A. 37° B. 53° C. 121° D. 149°

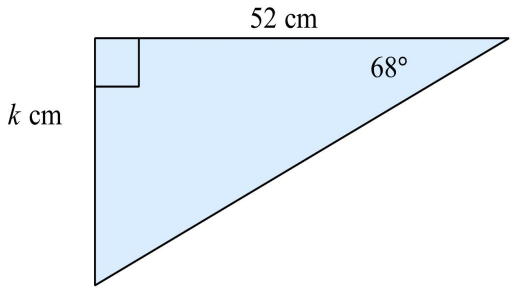
5. Find the value of k correct to one decimal place.

A. 19.5 cm

B. 21.0 cm

C. 48.2 cm

D. 128.7 cm



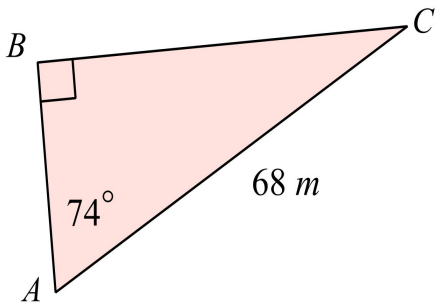
6. Find the length of BC correct to one decimal place.

A. 18.7 m

B. 19.5 cm

C. 65.4 cm

D. 237.1 cm



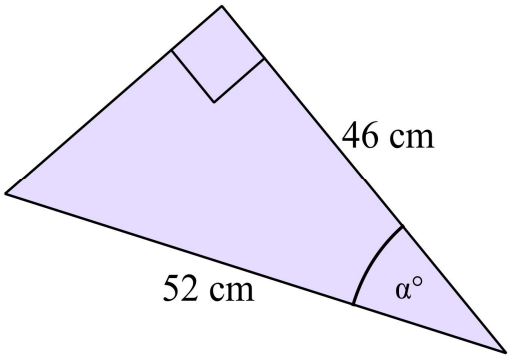
7. Find the value of α , correct to the nearest degree.

A. 28°

B. 41°

C. 49°

D. 62°



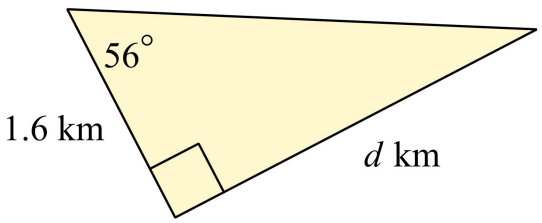
8. Find the value of d correct to one decimal place.

A. 1.3

B. 2.4

C. 2.6

D. 3.9



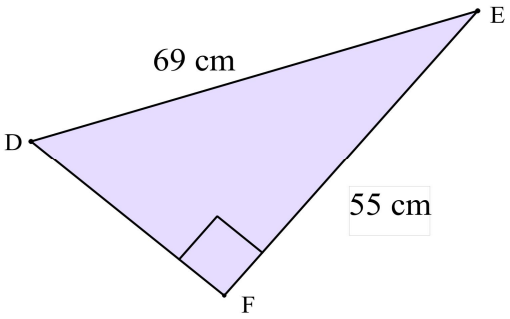
9. Find the size of $\angle D$ correct to the nearest degree.

A. 37°

B. 39°

C. 51°

D. 53°



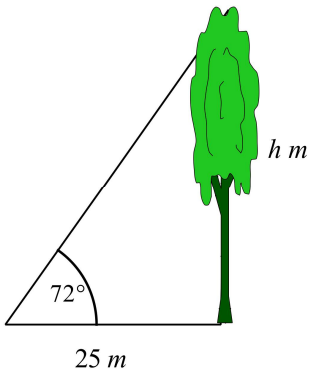
10. Find the height of the tree (h), correct to the nearest 10th of a metre.

A. 7.7 m

B. 8.1 m

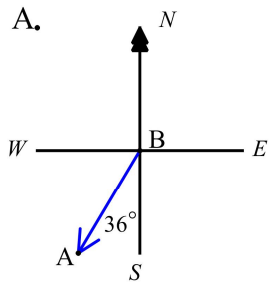
C. 23.8 m

D. 76.9 m

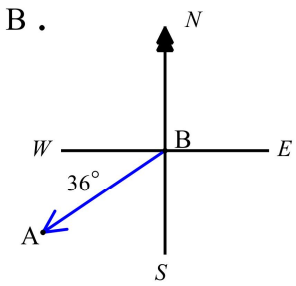


11. The bearing of A from B is 216°.
Which diagram shows this?

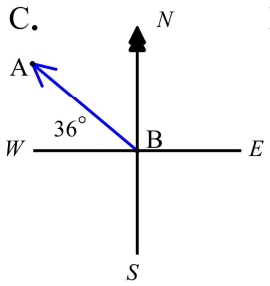
A.



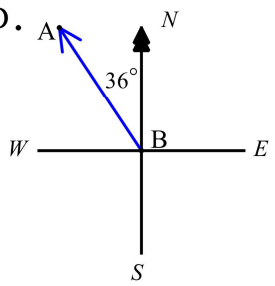
B.



C.



D.



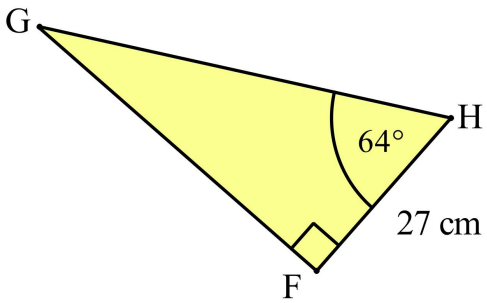
12. What is the length of GH in the diagram?

A. 30 cm

B. 55 cm

C. 62 cm

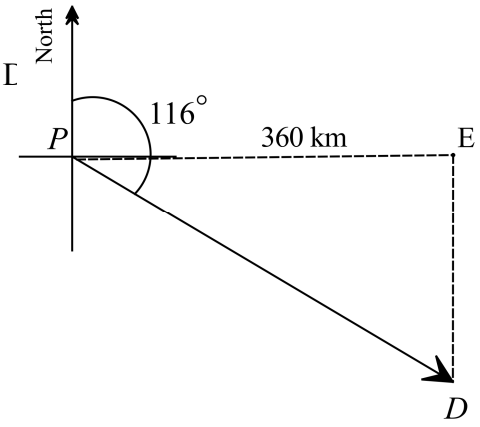
D. 85 cm



13. A plane leaves Perth (*P*) and flies on a bearing 116º to Decuna (D).

Encinada is 360 km due east of Perth and due north of D

How far is Decuna from Perth?



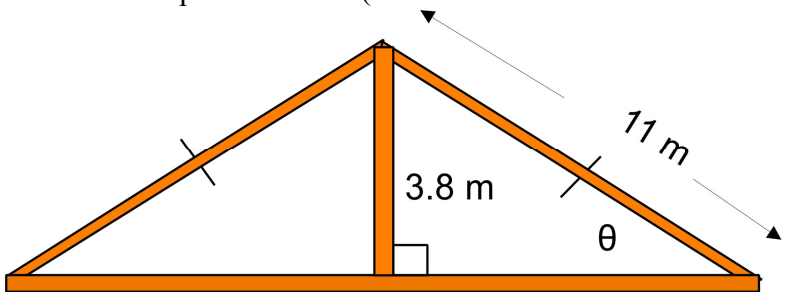
A. 324 km

B. 401 km

C. 738 km

D. 821 km

14. A section of a roof truss is shown. What is the slope of the roof (θ)?



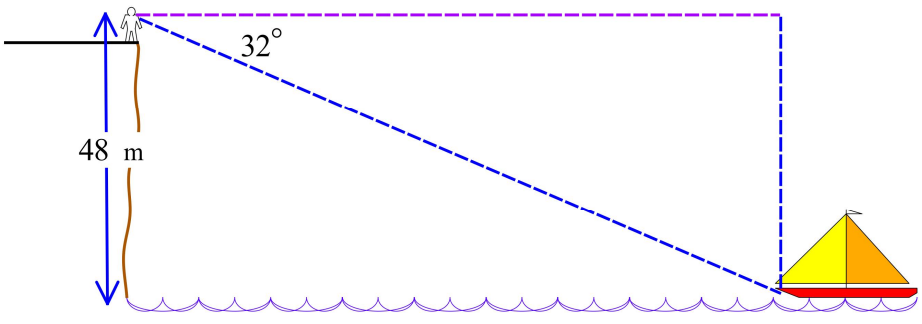
A. 19º

B. 20º

C. 41º

D. 77º

15. Find the distance in a straight line from the observer on the top of the cliff to the boat.



A. 40.7 m

B. 76.8 m

C. 90.6 m

D. 96.0 m

High School
Mathematics Test 2014

Right Triangle Trigonometry

Multiple Choice Answer Sheet

Name _____

Completely fill the response oval representing the most correct answer.

1.	A ⬭	B ⬭	C ⬭	D ⬭
2.	A ⬭	B ⬭	C ⬭	D ⬭
3.	A ⬭	B ⬭	C ⬭	D ⬭
4.	A ⬭	B ⬭	C ⬭	D ⬭
5.	A ⬭	B ⬭	C ⬭	D ⬭
6.	A ⬭	B ⬭	C ⬭	D ⬭
7.	A ⬭	B ⬭	C ⬭	D ⬭
8.	A ⬭	B ⬭	C ⬭	D ⬭
9.	A ⬭	B ⬭	C ⬭	D ⬭
10.	A ⬭	B ⬭	C ⬭	D ⬭
11.	A ⬭	B ⬭	C ⬭	D ⬭
12.	A ⬭	B ⬭	C ⬭	D ⬭
13.	A ⬭	B ⬭	C ⬭	D ⬭
14.	A ⬭	B ⬭	C ⬭	D ⬭
15.	A ⬭	B ⬭	C ⬭	D ⬭

High School
Mathematics Test 2014

Right Triangle Trigonometry

ANSWERS

Section 1 (1 mark each)	
	Working and Answers
1.	$tan\ \alpha = \frac{O}{A} = \frac{9}{40}$
2.	$45 \times cos\ 55^\circ = 25.810939635$ $= 25.81$ (2 decimal places)
3.	$sin\ \beta = 0.459$ $\beta = sin^{-1}(0.459)$ $= 27.3225$ $= 27^\circ$ (nearest degree)
4.	$sin\ 48^\circ = \frac{x}{250}$ $x = 250\ sin\ 48^\circ$ $x = 185.786206$ $x = 186\ m$ (nearest metre)
5.	$sin\ \gamma = \frac{24}{30}$ $\gamma = sin^{-1}\left(\frac{24}{30}\right)$ $= 53.1301$ $= 53^\circ$ (nearest degree)
6.	$tan\ 36^\circ = \frac{y}{25}$ $y = 25\ tan\ 36^\circ$ $x = 18.1635$ $x = 18.2\ m$ (1 dec pl)

7.	$\cos G = \frac{8.6}{12.5}$ $\gamma = \cos^{-1}\left(\frac{8.6}{12.5}\right)$ $= 46.5280$ $= 47^\circ$ (nearest deg
8.	$\sin \beta = \frac{150}{200}$ $\gamma = \sin^{-1}\left(\frac{150}{200}\right)$ $= 48.59$ $= 49^\circ$ (nearest degree)
9.	$\tan 64^\circ = \frac{45}{YZ}$ $\tan 26^\circ = \frac{YZ}{45}$ $YZ = 45 \tan 26^\circ$ $YZ = 21.9479$ $x = 21.9\ m$ (1 dec pl)
10.	$\tan 64° = \frac{h}{28}$ $h = 28 \tan 64°$ $h = 57.40850$ $h = 57.4\ m$ (1 dec pl)
11.	$\angle ABC = 260 - 180 = 80°$ $\cos 80° = \frac{BA}{465}$ $BA = 465 \cos 80°$ $BA = 80.74640$ A is 80.7 km south of B (1 dec pl)
12.	$\cos \angle NMO = \frac{15.2}{20.3}$ $\angle NMO = \cos^{-1}\left(\frac{15.2}{20.3}\right)$ $\angle NMO = 41.5161 = 42^\circ$ $Bearing = 270^\circ + 42^\circ = 312^\circ$

13.	$\cos 28^\circ = \frac{21.5}{PQ}$ $PQ = \frac{21.5}{\cos 28^\circ}$ $PQ = 24.4$ m
14.	Internal angle $= 90 - 55 = 35^\circ$ $\sin 35 = \frac{160}{h}$ $h = \frac{160}{\sin 35}$ $= 278.95$ It is 279 m from Jessie to the Yacht.
15.	$\angle XZA = 90 - 43 = 47^\circ$ $\cos 47 = \frac{AZ}{45}$ $AZ = 45\cos 47 = 30.69$ $\tan 43 = \frac{AY}{30.69}$ $AY = 30.69 \times \tan 43$ $= 28.6$ cm

Section 2 (1 mark each)		
	Working	Answers
1.	$\cos\theta = \frac{A}{H} = \frac{24}{25}$	C
2.	$\sin P = \frac{O}{H} = \frac{QR}{PR}$	A
3.	$\tan 56^\circ = 1.4825 = 1.48$ (2 dec places) From Calculator.	D
4.	$\cos X = \frac{3}{5}$ $X = \cos^{-1}\left(\frac{3}{5}\right)$ $= 53.130$ from calculator $= 53^\circ$ (nearest degree	B
5.	$\tan 68^\circ = \frac{k}{52}$ $k = 52\tan 68^\circ$ $= 128.70$ $= 128.7$ cm	D
6.	$\sin 74 = \frac{BC}{68}$ $BC = \sin 74 \times 68$ $= 65.36579$ $= 65.4\ m$	C
7.	$\cos\alpha = \frac{46}{52}$ $\alpha = \cos^{-1}\left(\frac{46}{52}\right)$ $= 27.795$ $= 28^\circ$ (Nearest degree)	A

8.	$\tan 56 = \frac{d}{1.6}$ $d = \tan 56 \times 1.6$ $= 2.372$ $= 2.4$ km	B
9.	$\sin D = \frac{55}{69}$ $D = \sin^{-1}\left(\frac{55}{69}\right)$ $= 52.854$ $= 53^\circ$	D
10.	$\tan 72 = \frac{h}{25}$ $h = \tan 72 \times 25$ $= 76.9420$ $= 76.9\ m$	D
11.	$216^\circ = 180^\circ + 36^\circ$ So is 36° past 180°	A
12.	$\cos 64 = \frac{27}{GH}$ $GH = \frac{27}{\cos 64}$ $= 61.59$ cm	C
13.	$\angle EPD = 116 - 90 = 26^\circ$ $\cos 26^\circ = \frac{360}{PD}$ $PD = \frac{360}{\cos 26^\circ}$ $PD = 401$ km	B

14.	$\sin\theta = \frac{3.8}{11}$ $\theta = \sin^{-1}\left(\frac{3.8}{11}\right)$ $= 20.209545$ $= 20^\circ$	B
15.	$\sin 32 = \frac{48}{d}$ $d = \frac{48}{\sin 32}$ $= 90.5798$ $= 90.6\ m$	C

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Right Triangle Trigonometry

Multiple Choice Answer Sheet

Name ___Marking Sheet

Completely fill the response oval representing the most correct answer.

1.	A ○	B ○	C ●	D ○
2.	A ●	B ○	C ○	D ○
3.	A ○	B ○	C ○	D ●
4.	A ○	B ●	C ○	D ○
5.	A ○	B ○	C ○	D ●
6.	A ○	B ○	C ●	D ○
7.	A ●	B ○	C ○	D ○
8.	A ○	B ●	C ○	D ○
9.	A ○	B ○	C ○	D ●
10.	A ○	B ○	C ○	D ●
11.	A ●	B ○	C ○	D ○
12.	A ○	B ○	C ●	D ○
13.	A ○	B ●	C ○	D ○
14.	A ○	B ●	C ○	D ○
15.	A ○	B ○	C ●	D ○