High School Mathematics Test 2013

Year 10

Non Right Triangle Trigonometry

Calculator Allowed

Skills and Knowledge Assessed:

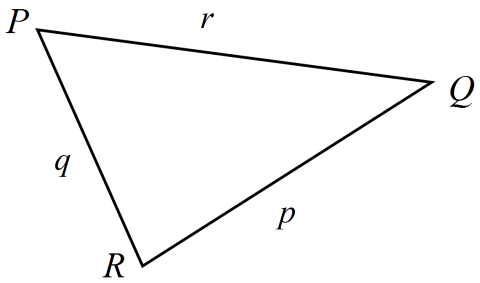
- Apply Pythagoras' theorem and trigonometry to solving three - dimensional problems in right- angled triangles (ACMMG276)
- Use the unit circle to define trigonometric functions, and graph them with and without the use of digital technologies (ACMMG274)
- Solve simple trigonometric equations (ACMMG275)
- Establish the sine, cosine and area rules for any triangle and solve related problems (ACMMG273)

Name_____

Section 1 Short Answer Section

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

1. Write a statement of the cosine rule that could be used to find the size of angle R in the triangle PQR.



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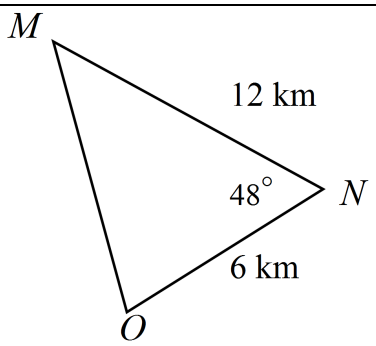
2. Use the cosine rule to find the length of MO, correct to the nearest 10^{th} of a km.



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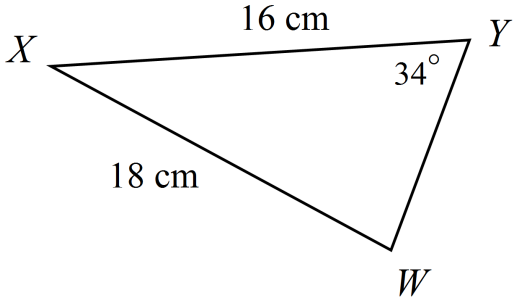
3. Use the sine rule to find the size of $\angle W$.



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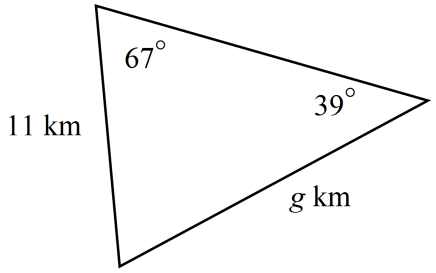
4. Calculate the value of g correct to one decimal place.



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5. Find the value of ϕ, to the nearest degree.

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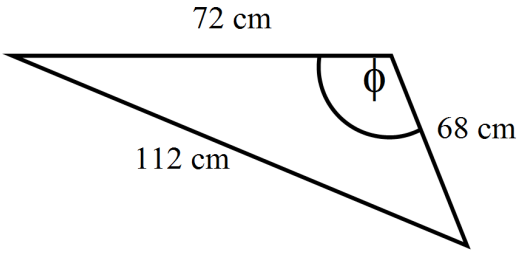

6. G is 200 km due north of H.
I is on a bearing 085° from G.
I is on a bearing 075° from H.
Find the distance GI?

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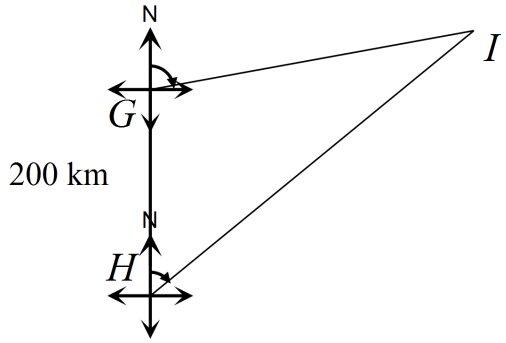

7. Find the area of ΔLMN. .

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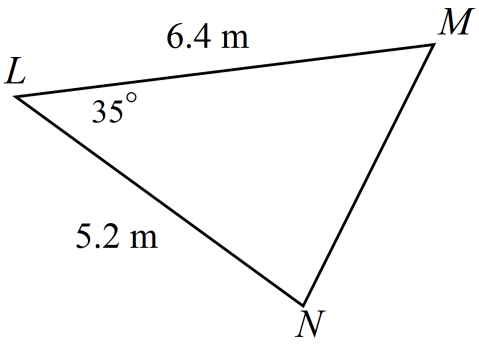

8. The angle of elevation of the lighthouse (L) from boat A is 12^o, and from boat B is 21^o.
The points A and B are 1.5 km apart on a straight line toward the lighthouse.
Calculate the distance BL.

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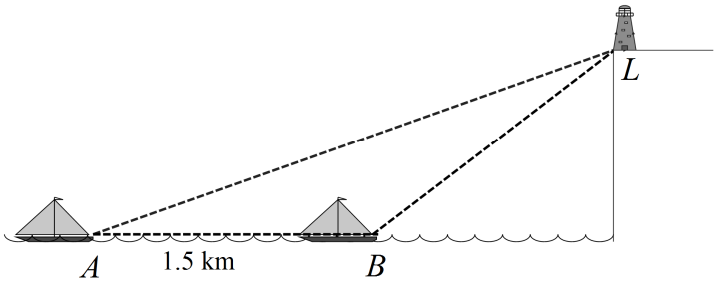

9. Solve $\sqrt{2}\ tan(\beta) - 1 = 0$, for $0^\circ \leq \beta \leq 180^\circ$.

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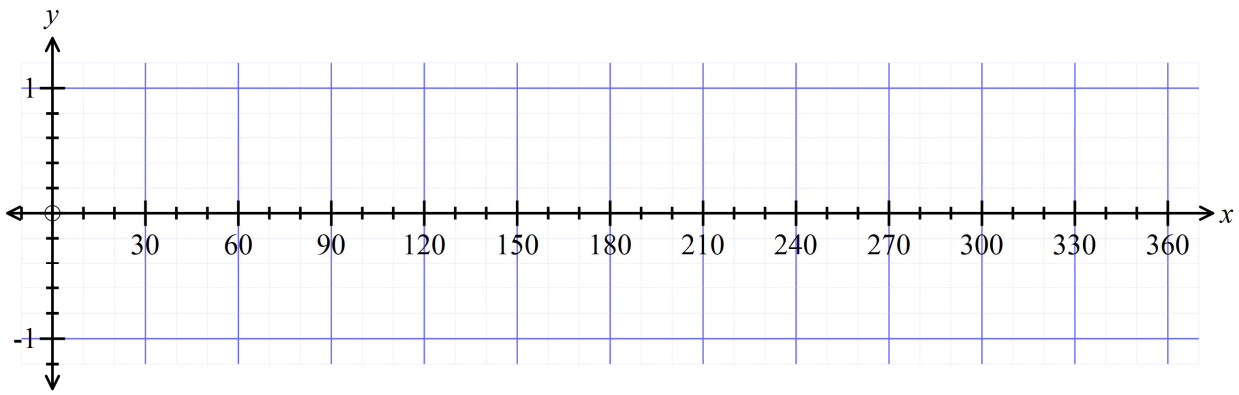
10. Use the grid to draw a sketch of $y = sin\ x$ for $0 \leq x \leq 360^\circ$.



High School Mathematics Test 2013

Non Right Triangle Trigonometry

Year 10

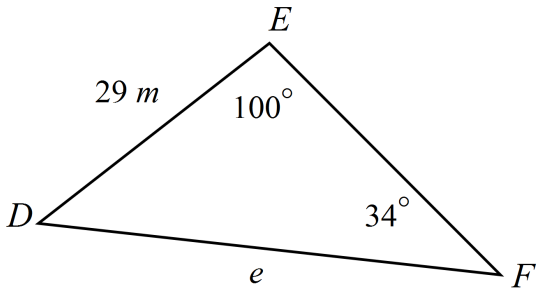
Calculator Allowed

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. Which calculation could be used to find the distance e in triangle DEF?



A. $e = \dfrac{29 \times sin\ 100}{sin\ 34}$

B. $e = \dfrac{29 \times sin\ 34}{sin\ 100}$

C. $e = \dfrac{34 \times sin\ 29}{sin\ 100}$

D. $e = \dfrac{100 \times sin\ 29}{sin\ 34}$

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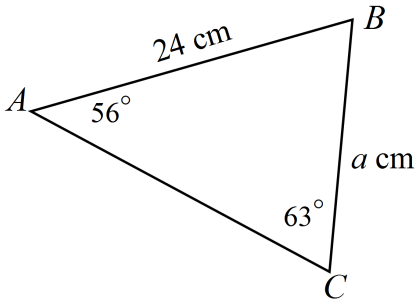
2. Use the sine rule to find the value of a.



A. 22.3

B. 25.8

C. 49.9

D. 128.4

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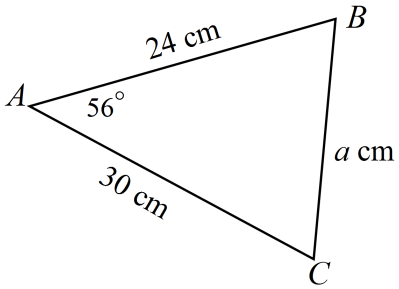
3. Use the cosine rule to find the value of a.



A. 7.2

B. 25.9

C. 31.1

D. 37.2

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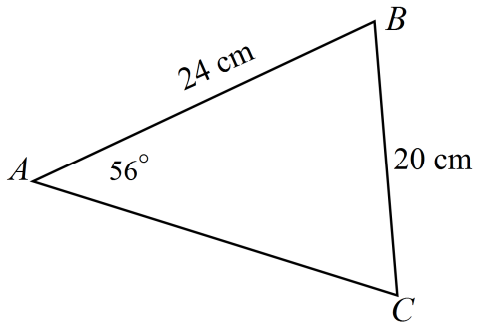
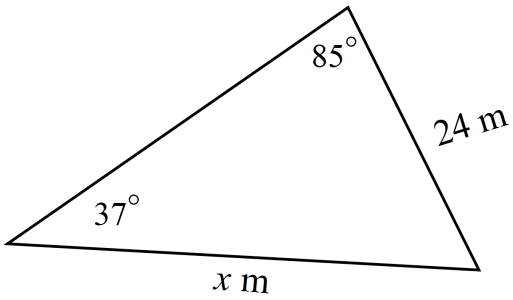
4. Find the size of $\angle ACB$.

A. 8^o
B. 44^o
C. 48^o
D. 84^o



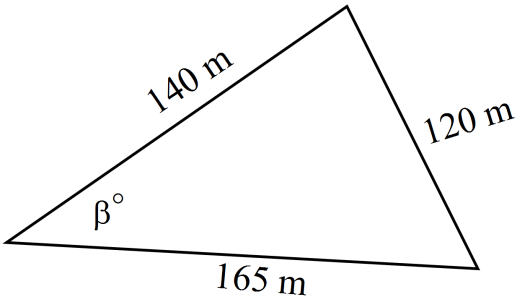
5. Find the value of x.

A. 5.6
B. 14.5
C. 39.7
D. 125.8



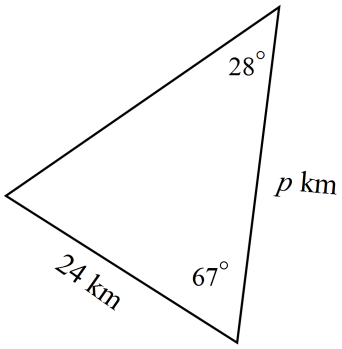
6. Find the value of β.

A. 24^o
B. 45^o
C. 56^o
D. 78^o



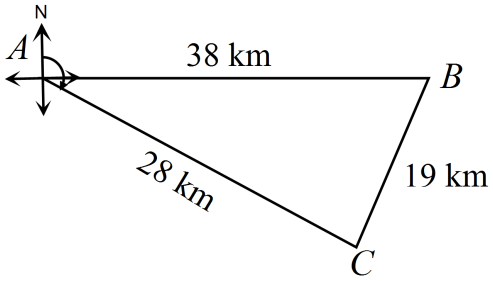
7. Find the value of p, correct to the nearest whole number.

A. 12 km
B. 26 km
C. 47 km
D. 51 km



8. What is the bearing of C from A?

A. 029°
B. 061°
C. 119°
D. 151°



9. Find all the values of θ for which $\sin\theta = 0.5$ and $0 \leq \theta \leq 180^\circ$.

A. $\theta = 30^\circ$ or $\theta = 150^\circ$

B. $\theta = 30^\circ$ or $\theta = 120^\circ$

C. $\theta = 60^\circ$ or $\theta = 150^\circ$

D. $\theta = 60^\circ$ or $\theta = 120^\circ$

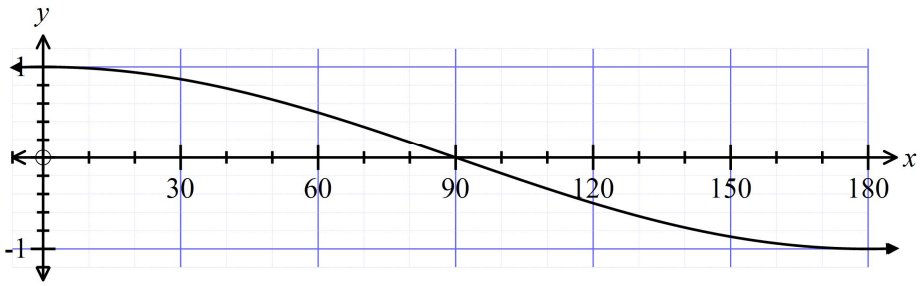
10. Which equation describes the graph shown?

A. $y = x^2$

B. $y = cos(x)$

C. $y = sin(x)$

D. $y = tan(x)$



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Year 10

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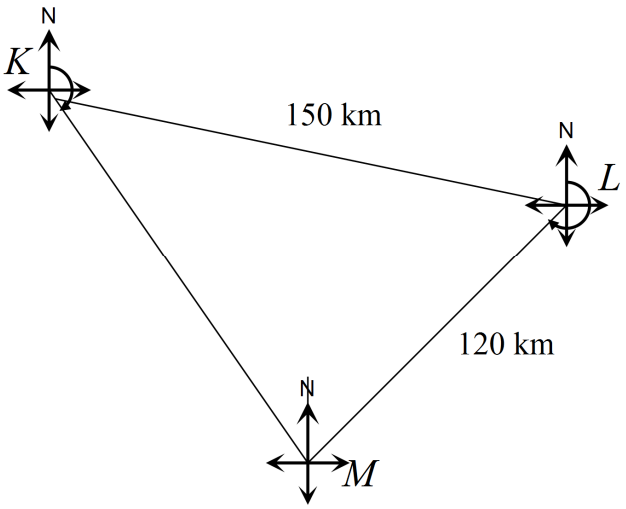
Name_____

Section 3 Longer Answer Section

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

Marks

1. Three town *K, L* and *M* are located such that *KL* = 150 km and *LM* = 120 km.
From *L*, the bearing of *K* is 290° and the bearing of *M* is 240°.



a) What is the distance *KM*? **2**

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b) Find the size of $\angle MKL$ and hence the bearing of *M* from *K*. **3**

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High School
Mathematics Test 2013

Multiple Choice Answer Sheet

Name _____

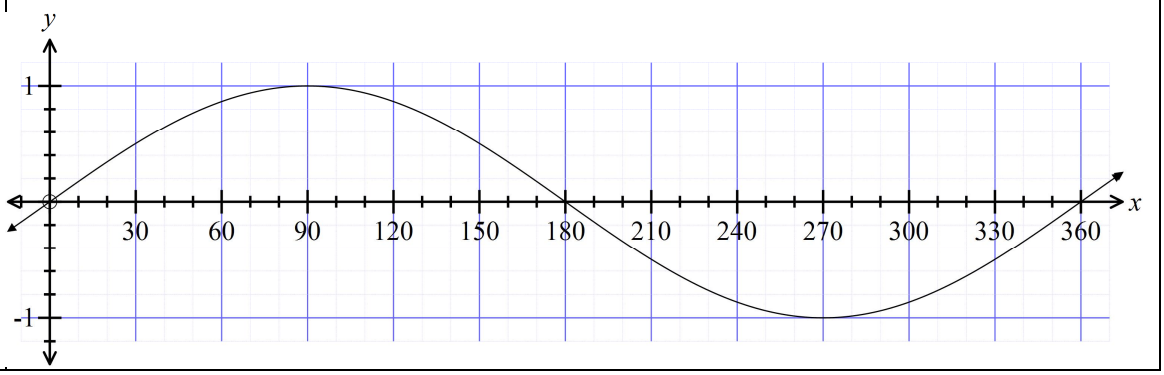
Completely fill the response oval representing the most correct answer.

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 ⬭

High School
Mathematics Test 2013
Non Right Triangle Trigonometry

ANSWERS

Section 1	
1.	$cos\ R = \frac{p^2 + q^2 - r^2}{2qr}$ or $r^2 = p^2 + q^2 - 2 \times p \times q \times cos\ R^\circ$
2.	$n^2 = 12^2 + 6^2 - 2 \times 12 \times 6 \times cos\ 48^\circ$ $= 83.65$ $n = 9.1$ km
3.	$\frac{sinW}{16} = \frac{sin\ 34}{18}$ $sin\ W = \frac{16\ sin\ 34}{18}$ $= 0.497$ $W = 30^\circ$
4.	$\frac{g}{sin\ 67^\circ} = \frac{11}{sin\ 39^\circ}$ $g = \frac{11\ sin\ 67^\circ}{sin\ 39^\circ}$ $g = 16.1$ km
5.	$cos\ \phi = \frac{72^2 + 68^2 - 112^2}{2 \times 72 \times 68}$ $= -\frac{2736}{9792}$ $= -0.2794$ $= 106^\circ$
6.	$\angle HGI = 95^\circ, \angle GHI = 75^\circ$ and $\angle GIH = 10^\circ$ $\frac{GI}{sin\ 75^\circ} = \frac{200}{sin\ 10^\circ}$ $GI = \frac{200\ sin\ 75^\circ}{sin\ 10^\circ}$ $= 1\ 113$ km.
7.	Area $= \frac{1}{2} \times 6.4 \times 5.2 \times sin\ 35^\circ$ $= 9.5\ m^2$

8.	$\angle LAB = 12^\circ$, $\angle LBA = 159^\circ$ *and* $\angle ABL = 9^\circ$ $\frac{a}{\sin 12} = \frac{1.5}{\sin 9^\circ}$ $a = \frac{1.5 \times \sin 12}{\sin 9}$ $= 1.99$ km
9.	$\sqrt{2}\ \tan(\beta) - 1 = 0$ $\sqrt{2}\ \tan(\beta) = 1$ $\tan(\beta) = \frac{1}{\sqrt{2}}$ $\beta = 35^\circ$, for $0^\circ \leq \beta \leq 180^\circ$.
10.	

Section 2	
1.	A
2.	A
3.	B
4.	D
5.	C
6.	B
7.	D
8.	C
9.	A
10.	B

Section 3	
1.	a) $\angle KLM = 290 - 240 = 50^\circ$ $KM^2 = 120^2 + 150^2 - 2 \times 120 \times 150 \times \cos 50^\circ$ $= 13759$ $KM = 117$ km

	b) $\frac{\sin K}{120} = \frac{\sin 50}{117}$ $\sin K = \frac{120 \sin 50}{117}$ $= 0.786$ $K = 52^\circ$ Bearing $= 110^\circ + 52^\circ = 162^\circ$

High School
Mathematics Test 2013

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 ○