School Name
Mathematics Test 2017

Year 9

Right Triangle Trigonometry

Calculator Allowed Test

Name_____

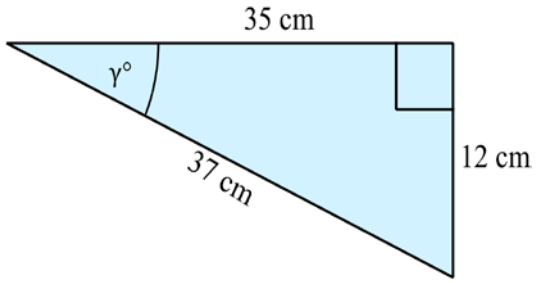
Skills and Knowledge Assessed:

- 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)

Section 1 Short Answer Section

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

1. In the diagram, what is the value of $\sin\gamma°$?



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2. Calculate $20\ tan\ 35°$, correct to 3 significant figures.

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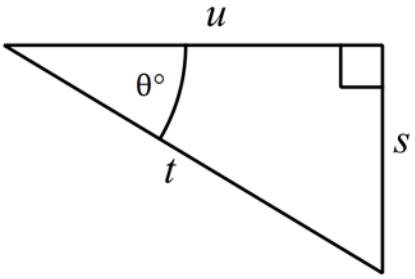
3. Write an expression for $tan\ \theta$.



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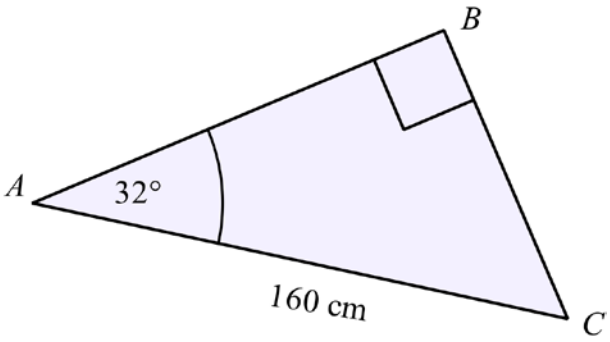
4. What is the distance AB?
(Answer correct to 1 decimal place.)



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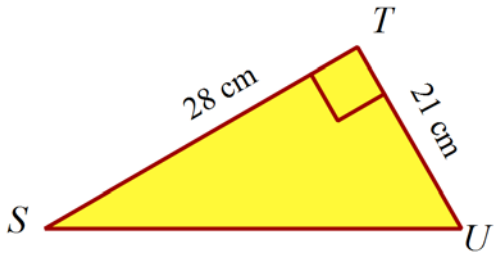
5. Find the size of $\angle TUS$.



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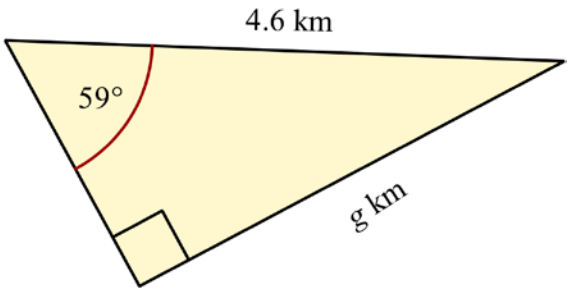
6. Find the value of g correct to one decimal place.



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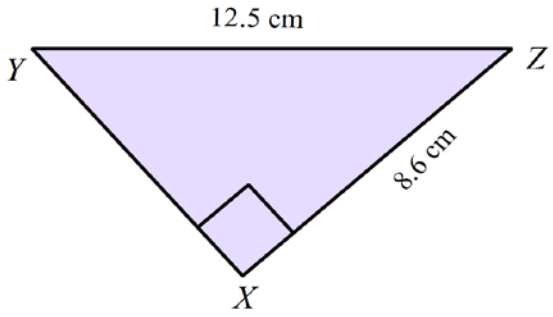
7. Find the size of $\angle Y$ correct to the nearest degree.



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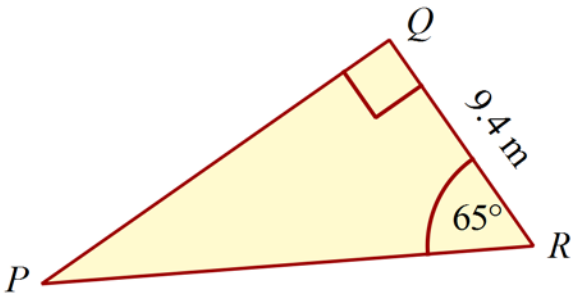
8. Find the length of PQ correct to one decimal place.



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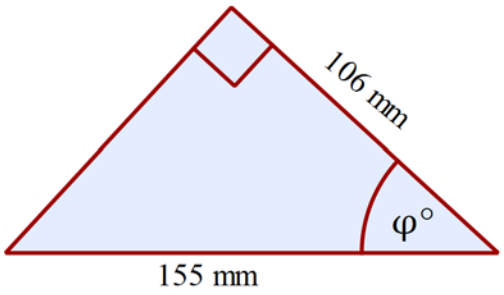
9. What is the value of φ?



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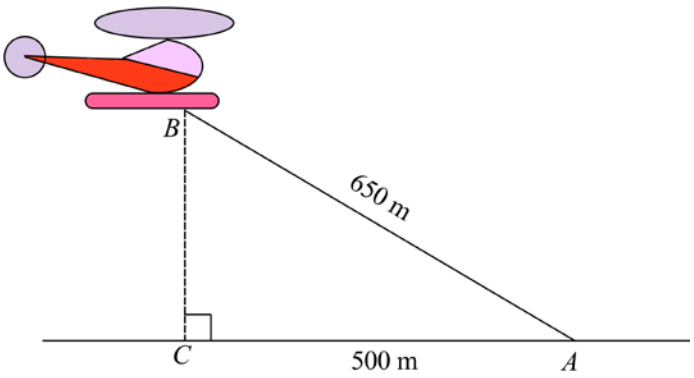
10. A helicopter (B) is hovering directly above C which is 500 m from A on level ground.
Radar at A measures the direct distance to the helicopter to be 650 m.
What is the angle of elevation of B, when viewed from A?



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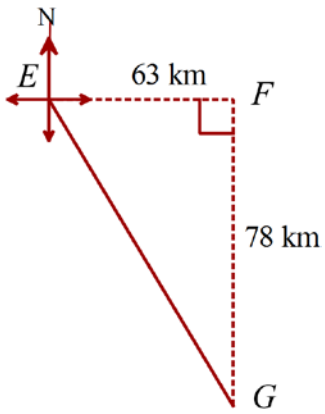
11. EC = 63 km and FG = 78 km.
What is the bearing of G from E?



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12. A geographer at Angel Falls, hikes 172.8 m back from the base of the falls and measures the angle of elevation of the top of the falls to be 80^o.

Use this information to calculate the height of Angel Falls.

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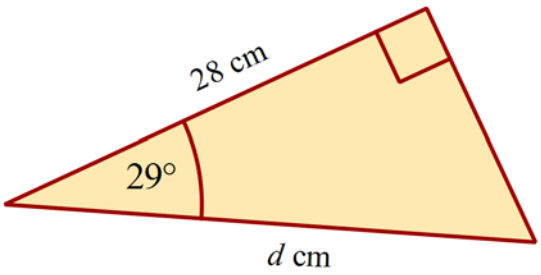
13. What is the value of d?
(Answer to nearest 10^{th} metre.)



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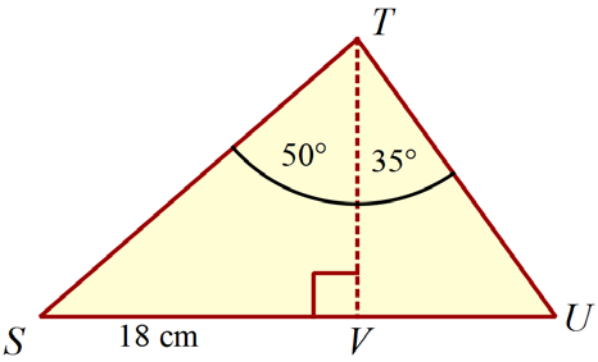
14. In ΔSTU, V is a point on SU, such that $SV = 18$ cm, $\angle STV = 50°$ and $\angle VTU = 35°$.
Calculate the distance TU to the nearest mm.



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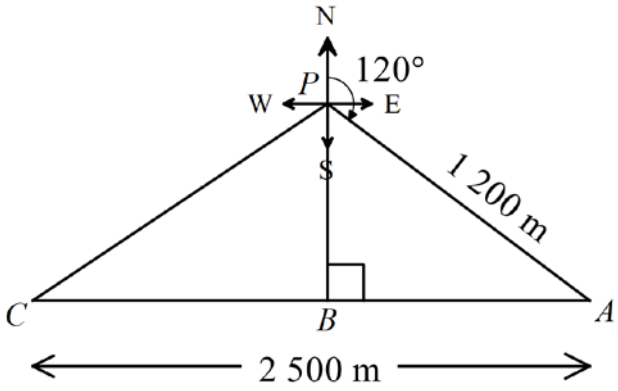
15. Point *A* is 2500 km due east of point *C*.
Point *B* is between A and C and is due south of point *P*.
Point *A* is 1200 m from *P* on a bearing of 120°.
What is the distance *CB*?



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School Name
Mathematics Test 2017

Year 9

Right Triangle Trigonometry

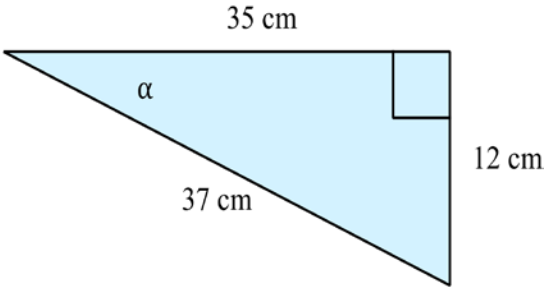
Calculator Allowed

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.

In the diagram, what is the value of $\tan\alpha$?



A. $\frac{12}{35}$

B. $\frac{12}{37}$

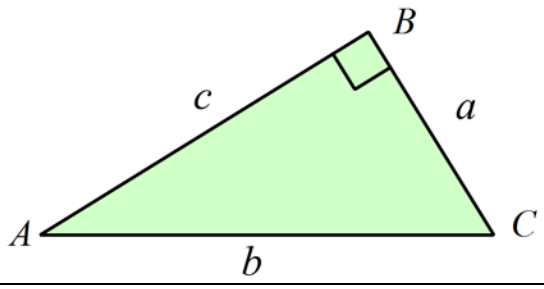
C. $\frac{35}{37}$

D. $\frac{35}{12}$

2. What is the value of $12 \times \cos 38°$, correct to 2 decimal places.

A. 7.39 B. 9.46 C. 15.23 D. 19.49

3. In this triangle, which expression is equal to $\frac{c}{b}$?



A. *cos C*

B. *sin A*

C. *sin C*

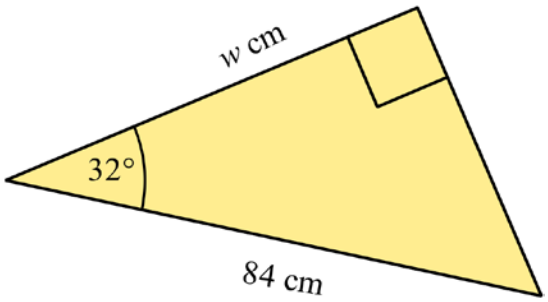
D. *tan C*

4. Given that $\sin x° = 0.9336$, what is the value of x, correct to the nearest degree?

A. 21 B. 43 C. 47 D. 69

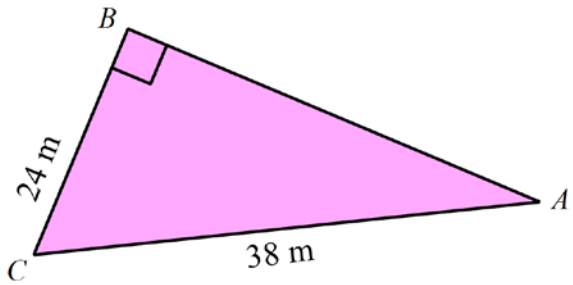
5. What is the value of w?

A. 44.5
B. 52.5
C. 71.2
D. 99.1



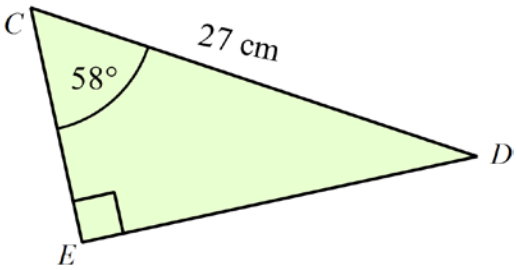
6. Find the size of $\angle C$, correct to the nearest degree.

A. 32°
B. 39°
C. 51°
D. 58°



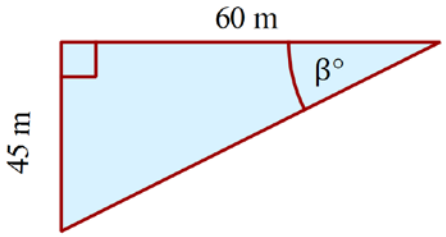
7. Find the length of *DE*, correct to the nearest mm.

A. 14.3 cm
B. 22.9 cm
C. 43.2 cm
D. 51.0 cm



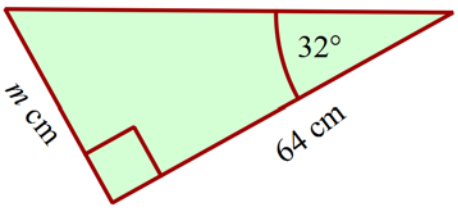
8. Find the value of β, to the nearest degree.

A. 37°
B. 41°
C. 49°
D. 53°



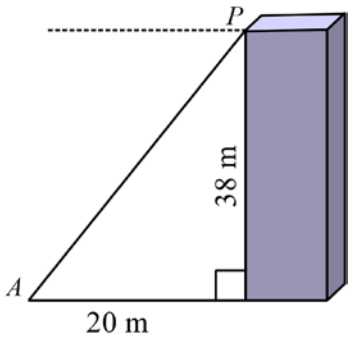
9. Find the value of *m*, to the nearest 10^{th} cm.

A. 33.9 cm
B. 40.0 cm
C. 54.3 cm
D. 75.5 cm



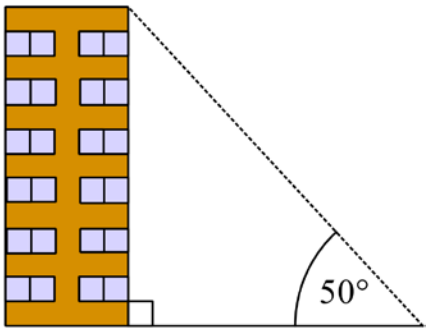
10. Calculate the angle of elevation of P from A.

A. 28^o
B. 32^o
C. 58^o
D. 62^o



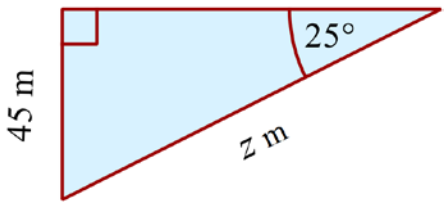
11. Find the height of the building, correct to the nearest 10 cm.

A. 11.1 m
B. 17.3 m
C. 18.9 m
D. 22.6 m



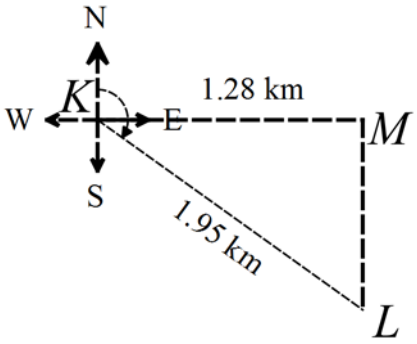
12. Find the value of z correct to 1 decimal place.

A. 40.8 m
B. 49.7 m
C. 96.5 m
D. 106.5 m



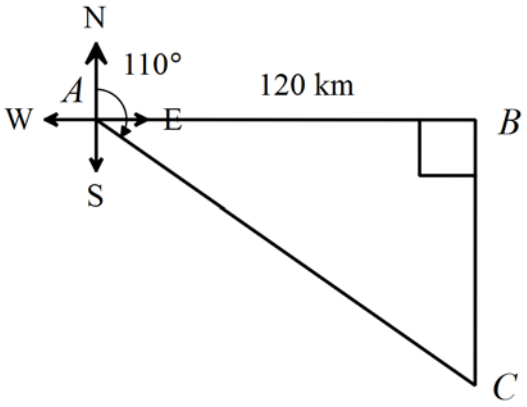
13. What is the bearing of L from K ?

A. 049°
B. 131°
C. 139°
D. 221°



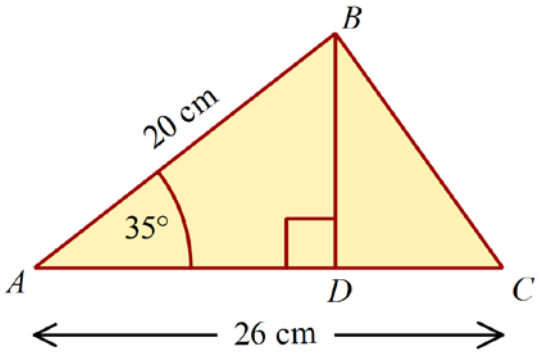
14. Point *B* is 120 km due east of point *A*.
Point *B* is also due north of point *C*.
Point *C* is on a bearing 110° from point *A*.
What is the distance *AC*?

A. 128 km
B. 137 km
C. 330 km
D. 351 km



15. Find the length of *DC*.

A. 9.6 cm
B. 12.0 cm
C. 14.5 cm
D. 16.4 cm



School Name

Mathematics 2017

Multiple Choice Answer Sheet

Right Triangle Trigonometry

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 ⬭

School Name
Mathematics Test 2017

Year 9

Right Triangle Trigonometry

Non Calculator Section

ANSWERS

Question	Working and Answer
1.	$\sin\gamma = \frac{O}{H} = \mathbf{\frac{12}{37}}$
2.	$20 \tan 35° = 14.00415$ $= \mathbf{14.0\ (3\ sig\ fig)}$
3.	$\tan\theta = \frac{O}{A}$ $= \mathbf{\frac{s}{u}}$
4.	$\cos 32° = \frac{AB}{160}$ $AB = 160 \times \cos 32°$ $= 135.687695$ $= \mathbf{135.7\ cm\ (1\ dec\ place)}$
5.	$\tan \angle TUS = \frac{28}{21}$ $= \frac{4}{3}$ $\angle TUS = \tan^{-1}\left(\frac{4}{3}\right)$ $= 53.1301$ $= \mathbf{53°\ (nearest\ degree)}$
6.	$\sin 59° = \frac{g}{4.6}$ $g = 4.6 \times \sin 59°$ $= 3.942969$ $= \mathbf{3.9\ km\ (1\ dec\ place)}$

Question	Working and Answer
7.	$\sin \angle Y = \frac{8.6}{12.5}$ $\angle TUS = \sin^{-1}\left(\frac{8.6}{12.5}\right)$ $= 43.47199931$ **$= 43°$ (nearest degree)**
8.	$\tan 65° = \frac{PQ}{9.4}$ $PQ = 9.4 \times \tan 65°$ $= 20.158365$ **$= 20.2$ m (1 dec place)**
9.	$\cos \varphi° = \frac{106}{155}$ $\varphi = \cos^{-1}\left(\frac{106}{155}\right)$ $= 46.853120274190665998381924678851$ **$= 47°$ (Nearest degree)**
10.	$\cos A = \frac{500}{650}$ $A = \cos^{-1}\left(\frac{500}{650}\right)$ $= 39.7151372$ $= 40°$ **Angle of elevation is 40°**
11.	$\tan \angle FEG = \frac{78}{63}$ $\angle FEG = \tan^{-1}\left(\frac{78}{63}\right)$ $= 51.072456$ $= 51°$ (nearest degree) Bearing = 90 + 51 **Bearing is 141°**
12.	Let the height of fall be h. $\tan 80° = \frac{h}{172.8}$ $h = 172.8 \tan 80°$ $= 978.86324$ **Height = 979 m (nearest m)**

Question	Working and Answer
13.	$\cos 29° = \frac{28}{d}$ $d = \frac{28}{\cos 29°}$ $= 32.0139139$ $\boldsymbol{d = 32.0\ m}$ **(nearest tenth metre)**
14.	In ΔSTV $\tan 50° = \frac{18}{TV}$ $TV = \frac{18}{\tan 50°}$ $= 15.1$ cm In ΔTUV $\cos 35° = \frac{15.1}{TU}$ $TU = \frac{15.1}{\cos 35°}$ $= 18.4383$ $\boldsymbol{= 18.4\ cm}$ **(nearest mm)**
15.	$\angle BPA = 180 - 120 = 60°$ $\sin 60° = \frac{AB}{1200}$ $AB = 1200 \sin 60°$ $= 1039.230$ $= 1039\ m$ (nearest "m) CB = 2500 - 1039 **= 1461 m**

School Name
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Year 9

Right Triangle Trigonometry

Calculator Allowed
Multiple Choice
Section

ANSWERS

Question	Working	M C Answer
1.	$tan\ \alpha = \frac{O}{A} = \frac{12}{35}$	**A**
2.	$12 \times \cos 38° = 9.4561290...$ $= 9.46$ (correct to 2 decimal places.)	**B**
3.	$sin\ C = \frac{O}{H} = \frac{c}{b}$	**C**
4.	$\sin x° = 0.9336$ $x = \sin^{-1}(0.9336)$ $= 69$	**D**
5.	$cos\ 32° = \frac{w}{84}$ $w = 84 \times cos\ 32°$ $= 71.236040..$ $= 71.2$ (1 dec place)	**C**
6.	$cos\ C = \frac{24}{38}$ $C = cos^{-1}\left(\frac{24}{38}\right)$ $= 50.83328928$ $= 51°$	**C**
7.	$sin\ 58° = \frac{DE}{27}$ $DE = 27 \times sin\ 58°$ $= 22.8972....$ $= 22.9$ cm (nearest mm)	**B**

8.	$\tan \beta° = \frac{45}{60}$ $\beta = tan^{-1}\left(\frac{45}{60}\right)$ $\beta = 36.87°$ $= 37°$ (nearest degree)	**A**
9.	$tan\ 32° = \frac{m}{64}$ $m = 64 \times tan\ 32°$ $= 39.99163...$ $= 40.0$ cm +	**B**
10.	$tan\ A = \frac{38}{20}$ $A = tan^{-1}\left(\frac{38}{20}\right)$ $= 62.241459$ Angle of elevation is 62°.	**D**
11.	$tan\ 50° = \frac{h}{14.5}$ $h = 14.5 \times tan\ 50°$ $h = 17.28042709...$ $h = 17.3$ m	**B**
12.	$sin\ 25° = \frac{45}{z}$ $z = \frac{45}{sin\ 25°}$ $= 106.479071$ $= 106.5$ m	**D**
13.	$cos\ \angle MKL = \frac{1.28}{1.95}$ $\angle MKL = cos^{-1}\left(\frac{1.28}{1.95}\right)$ $= 48.97333$ $= 49°$ (nearest degree) Bearing = 90 + 49 $= 139°$	**C**

14.	$\angle BAC = 110 - 90 = 20°$ $\cos 20° = \frac{120}{AC}$ $AC = \frac{120}{\cos 20°}$ $= 127.701332$ $= 128 \text{ km}$ (naarest km)	**A**
15.	$\cos 35° = \frac{AD}{20}$ $AD = 20 \cos 35°$ $= 16.4$ $DC = 26 - 16.4$ $= 9.6 \text{ cm}$	**A**

School Name

Mathematics 2017

Multiple Choice Answer Sheet

Right Triangle Trigonometry

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 ○