

Topic test 8

Trigonometry

- Time allowed: 45 minutes
- Part A: 20 multiple-choice questions (40 marks)
- Part B: 17 free-response questions (60 marks)

Name: _____

Part A

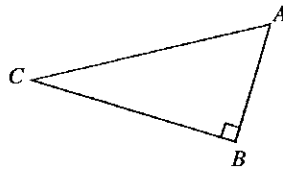
20 multiple-choice questions

2 marks each: 40 marks

Circle the correct answer.

- 1 For this triangle, which side is adjacent to angle A?

- A AB
- B AC
- C BC
- D None of the above

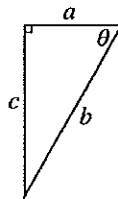


- 2 $14 \tan 79^\circ \approx$

- A 0.49
- B 19.70
- C 72.02
- D 5.14

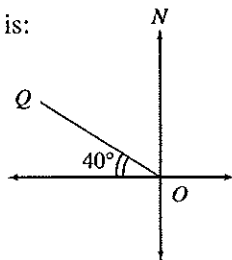
- 3 In the triangle below, $\frac{a}{b} =$

- A $\sin \theta$
- B $\cos \theta$
- C $\tan \theta$
- D None of the above



- 4 The bearing of Q from O is:

- A 320°
- B 40°
- C 310°
- D 140°



- 5 32.75° in degrees and minutes is:

- A $32^\circ 45'$
- B $32^\circ 75'$
- C $32^\circ 34'$
- D $32^\circ 55'$

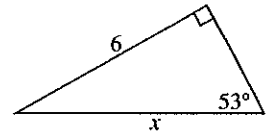
- 6 $\sin 46^\circ 27' \approx$

- A 0.7538
- B 0.7248
- C 0.7226
- D 0.7193

- 7 The correct expression for the length of x is

- A $6 \tan 53^\circ$
- C $6 \sin 53^\circ$

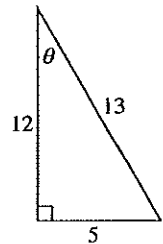
- B $\frac{6}{\tan 53^\circ}$
- D $\frac{6}{\sin 53^\circ}$



- 8 In the triangle on the right, $\tan \theta =$

- A $\frac{5}{13}$
- C $\frac{12}{13}$

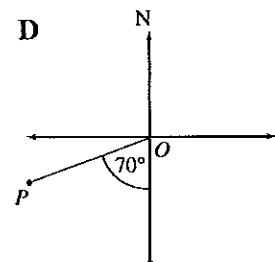
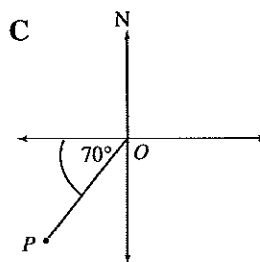
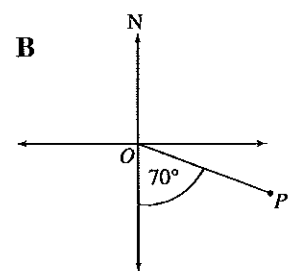
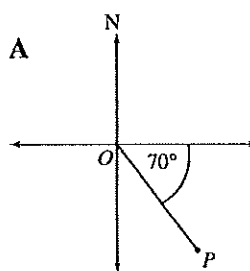
- B $\frac{5}{12}$
- D $\frac{13}{12}$



- 9 $45^\circ 3'$ is equal to:

- A 45.05°
- C 45.5°
- B 45.3°
- D 45.03°

- 10 In which of the following diagrams does P have a bearing of 200° from O?



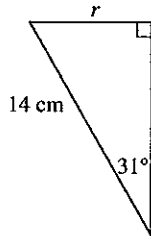
Topic test 8: Trigonometry continued

11 $\frac{4}{\cos 18^\circ} \approx$

- A 0.22 B 0.95
C 0.99 D 4.21

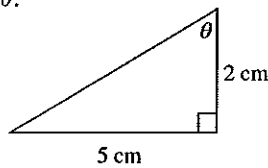
12 Use the sine ratio to find the length of r .

- A 7.21 cm
B 8.41 cm
C 12.00 cm
D 27.18 cm



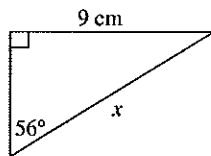
13 Find the size of angle θ .

- A 22°
B 44°
C 68°
D 70°



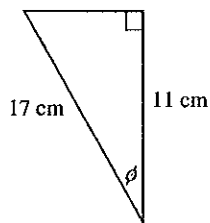
14 Find x .

- A 7.46 cm
B 10.86 cm
C 16.09 cm
D 31.31 cm



15 Find ϕ .

- A 33°
B 40°
C 50°
D 57°

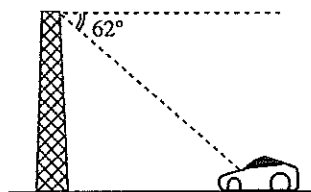


16 If $\sin A = 0.7034$, then $A \approx$

- A 1° B 12°
C 45° D 70°

17 The angle of depression of the car from the top of the tower is:

- A 28°
B 38°
C 45°
D 62°

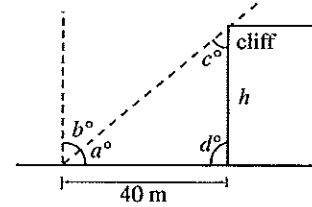


18 The bearing of south-east is:

- A 135° B 140°
C 145° D 150°

19 From a point on level ground 40 metres from the base of a cliff, the angle of elevation to the top of the cliff is 72° . Which angle in the diagram is 72° ?

- A a°
B b°
C c°
D d°



20 Find the height, h , of the cliff from Question 19.

- A 12 m B 38 m
C 123 m D 130 m

Part B

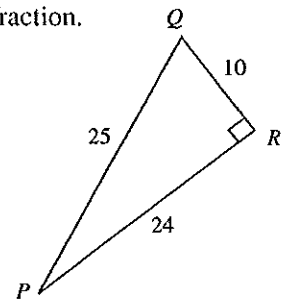
17 free-response questions

60 marks

Show working where appropriate.

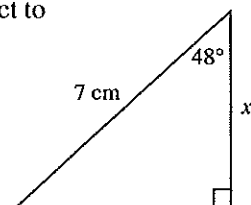
21 (4 marks)

a Write $\cos Q$ as a fraction.



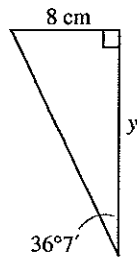
b Find the size of Q to the nearest degree.

22 (3 marks) Find x correct to two decimal places.

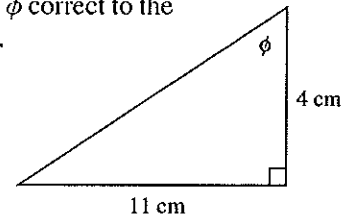


Topic test 8: Trigonometry continued

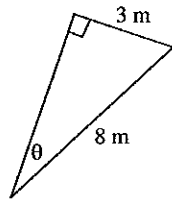
- 23 (3 marks) Find y correct to two decimal places.



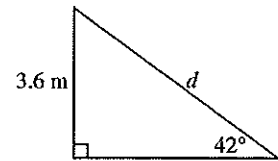
- 28 (3 marks) Find ϕ correct to the nearest minute.



- 24 (2 marks) Find θ correct to the nearest degree.

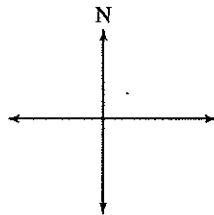


- 29 (3 marks) Find d correct to two decimal places.



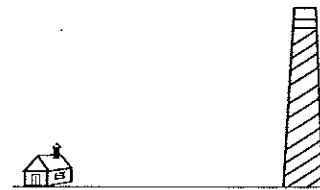
- 25 (4 marks)

- a Sketch a bearing of east-southeast on the diagram below.



- b Write the three-figure bearing for east-southeast.

- 30 (3 marks) From the top of a tower 126 metres high, Jane sees her house at an angle of depression of 50.3° . How far, correct to the nearest metre, is her house from the foot of the tower?



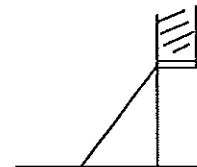
- 26 (2 marks) Convert 21.862° to degrees and minutes, to the nearest minute.

- 27 (4 marks) Find X :

- a to the nearest degree if $\cos X = 0.8214$

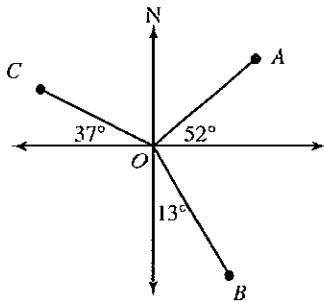
- b to the nearest minute if $\tan X = \frac{2}{7}$

- 31 (2 marks) A 9-metre ladder exactly reaches a window 7 metres above the ground. What angle, correct to the nearest minute, does the ladder make with the ground?



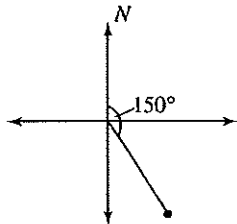
Topic test 8: Trigonometry *continued*

32 (6 marks) Write the bearing of each point from O .



33 (3 marks) A kite is attached to a string 132 metres long. The string makes an angle of 22° with the ground. Calculate, to the nearest metre, the height of the kite above the ground.

34 (5 marks) A boat leaves port and sails 175 km on a bearing of 150° .

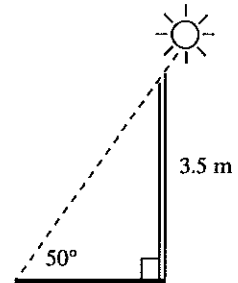


a How far south does it travel, correct to the nearest kilometre?

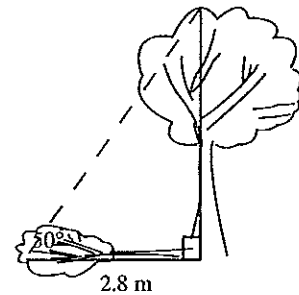
b What is the bearing of the port from the boat?

35 (5 marks)

a A vertical pole has a height of 3.5 metres. Find the length of its shadow correct to one decimal place when the angle of elevation of the Sun is 50° .



b A nearby tree makes a shadow of 2.8 metres. Calculate correct to one decimal place the height of the tree.



36 (4 marks) $\triangle XYZ$ is a triangle with $\angle Y = 90^\circ$, $\angle Z = 44^\circ 39'$, $XZ = 8$ cm. Find the length of YZ correct to two decimal places.

37 (4 marks) Find correct to two decimal places the area of an equilateral triangle with sides of 5 cm.

END OF TEST.

ANSWERS TO TRIGONOMETRY TOPIC TEST 8

PART A

1	A	2	C	3	B	4	C	5	A	6	B
7	D	8	B	9	A	10	C	11	D	12	A
13	C	14	B	15	C	16	C	17	D	18	A
19	A	20	C								

PART B

21a	$\frac{2}{5}$	b	66°	22	4.68 cm	23	10.96 cm	24	22°
25a	Check	b	113°	26	$21^{\circ}52'$	27a	35°	b	$15^{\circ}57'$
28	$70^{\circ}1'$	29	5.38 m	30	105 m	31	$51^{\circ}3'$	32	038°
								A	
32B	167°	32C	307°	33	49 m	34a	152 km	b	$33^{\circ}T$
35a	2.9 m	b	3.3 m	36	5.69 cm	37	13.98 cm^2		

- Updated Aug/06

Topic test 8: Trig

Tania Ahmed



part A:

- ① A ✓ ② C ✓ ③ B ✓ ④ C ✓ ⑤ A ✓ ⑥ B ✓ ⑦ D ✓ ⑧ B ✓ ⑨ A ✓ ⑩ C ✓
⑪ D ✓ ⑫ A ✓ ⑬ C ✓ ⑭ B ✓ ⑮ C ✓ ⑯ C ✓ ⑰ D ✓ ⑱ A ✓ ⑲ A ✓ ⑳ C ✓

part B:

21) a) $\cos Q = \frac{10}{25}$ ✓

$\therefore \cos Q = \frac{2}{5}$ ✓

b) $Q = \cos^{-1} \frac{2}{5}$

$= 66.4 \dots$ ✓

$\therefore \hat{Q} \hat{=} 66^\circ$ (c.mst deg) ✓

22) $\cos 48 = \frac{x}{7}$

$x = 7 \cos 48$

$= 4.683 \dots$ ✓

$\therefore x \hat{=} 4.68$ (c.2dp) cm ✓

23) $\tan 36^\circ 7' = \frac{8}{y}$ ✓

$y = \frac{8}{\tan 36^\circ 7'}$

$= 10.964 \dots$

$\therefore y \hat{=} 10.96$ (c.2dp) cm

24) $\sin \theta = \frac{3}{8}$ ✓

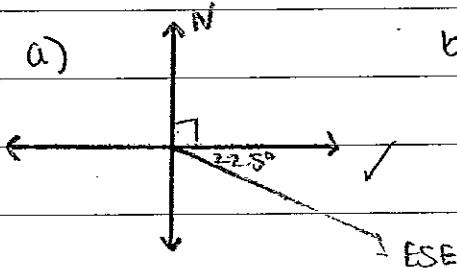
$\theta = \sin^{-1} \frac{3}{8}$

$= 22.0 \dots$

$\therefore \theta \hat{=} 22^\circ$ (c.mst deg)

25) a)

b) 113° ✓



26) $21.862^\circ \hat{=} 21^\circ 52'$ (c.mst min)

(27) a) $\cos X = 0.8214$
 $X = \cos^{-1} 0.8214$
 $= 34.7\dots$

$\therefore X \hat{=} 35^\circ$ (cst deg)

b) $\tan X = \frac{2}{7}$

$X = \tan^{-1} \frac{2}{7}$
 $= 15^\circ 56' 43''\dots$

$\therefore X \hat{=} 15^\circ 57'$ (cst min)

(28) $\tan \phi = \frac{11}{9}$

$\phi = \tan^{-1} \frac{11}{9}$ ✓

$= 70^\circ 1' 0''\dots$

$\therefore \phi \hat{=} 70^\circ 1'$ (cst min)

(29) $\sin 42 = \frac{3.6}{d}$

$d = \frac{3.6}{\sin 42}$ ✓

$= 5.380\dots$

$\therefore d \hat{=} 5.38$ (c2dp) m

(30) $\tan 50.3 = \frac{126}{x}$ ✓

$x = \frac{126}{\tan 50.3}$

$= 104.6\dots$ ✓

$\therefore x \hat{=} 105$ (cst m) m

\therefore Jane's house is 105 m from the foot of the tower.

(31) $\sin \theta = \frac{7}{9}$ ✓

$\theta = \sin^{-1} \frac{7}{9}$ ✓

$= 51^\circ 31' 27''\dots$

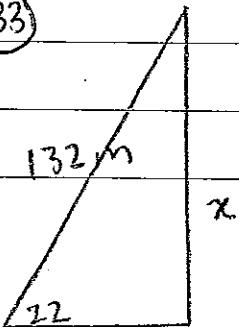
$\therefore \theta \hat{=} 51^\circ 31'$ (cst min) \therefore The ladder makes an angle of $51^\circ 31'$ (cst min) with the ground.

(32) A) 0.88° ✓

B) 167° ✓

C) 307° ✓

(33)



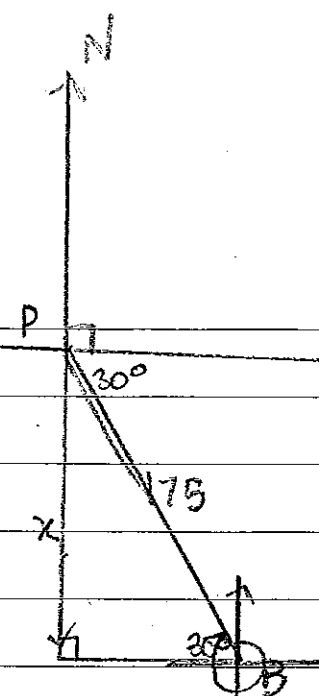
$\sin 22 = \frac{x}{132}$

$x = 132 \sin 22$
 $= 49.4\dots$ ✓

$\therefore x \hat{=} 49$ (cst m) m

\therefore the kite is 49 m above the ground

34



a) $\sin 30 = \frac{x}{175}$ ✓
 $x = 175 \sin 30$
 $= 87.5$
 ≈ 88 (const km) km

∴ The boat has travelled 88 (const km) km south.

b) The bearing of port from the boat is 300°

35

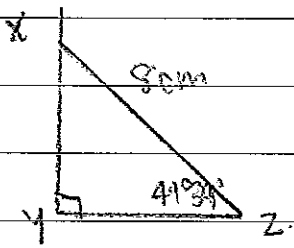
a) $\tan 50 = \frac{3.5}{x}$
 $x = \frac{3.5}{\tan 50}$ ✓
 $= 2.93 \dots$

∴ $x \approx 2.9$ (cldp) m ∴ the length of the shadow is 2.9 m

b) $\tan 50 = \frac{x}{2.8}$
 $x = 2.8 \tan 50$ ✓
 $= 3.33 \dots$

≈ 3.3 (const m) m ∴ the height of the tree is 3.3 m.

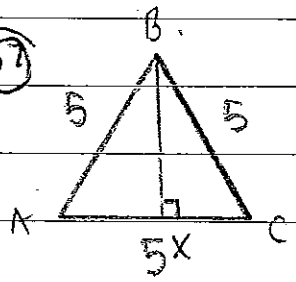
36



$\cos 44^\circ 39' = \frac{yz}{80}$ ✓
 $yz = 80 \cos 44^\circ 39'$
 $= 5.691 \dots$

∴ $yz \approx 5.69$ (const 2dp) cm

37



$bx = \sqrt{5^2 + 2.5^2}$
 $= 5.590 \dots$ ✓

$A = \frac{1}{2} bh$
 $= \frac{1}{2} \times 5 \times 5.590 \dots$
 $= 13.975$ ✓

∴ Area ≈ 13.98 (c 2dp) cm^2