Name:

Exam Style Questions

Trigonometry

Corbettmaths

Equipment needed: Calculator, pen

Guidance

1. Read each question carefully before you begin answering it.
2. Check your answers seem right.
3. Always show your workings

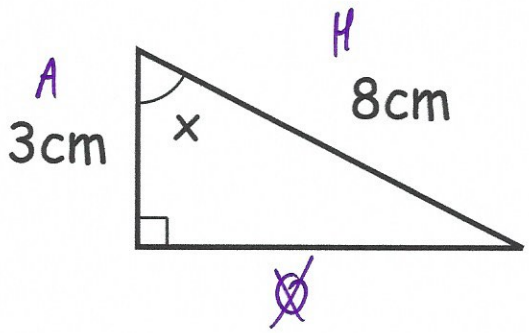
Video Tutorial

www.corbettmaths.com/contents

Videos 329, 330, 331

Answers and Video Solutions

1. Shown below is a right-angled triangle.



C A H

Use trigonometry to work out the size of angle x.

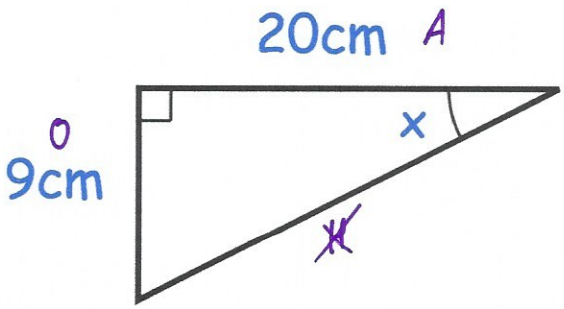
$\cos x = \frac{3}{8}$

$x = \cos^{-1}\left(\frac{3}{8}\right)$

67.98°

(3)

2.



T O A

Work out the size of angle x

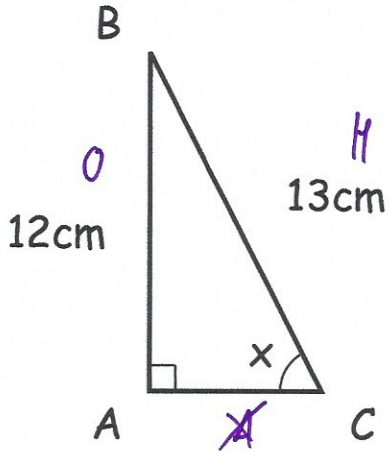
$\tan x = \frac{9}{20}$

$x = \tan^{-1}\left(\frac{9}{20}\right)$

24.23°

(3)

3. ABC is a right-angled triangle



5° H

Work out the size of the angle marked x.

$\sin x = \frac{12}{13}$

$x = \sin^{-1}\left(\frac{12}{13}\right)$

67.38 .....°

(3)

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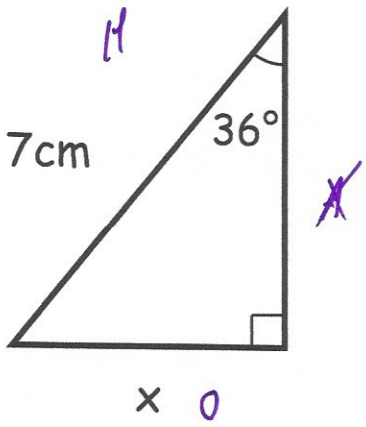
4. Below is a right-angled triangle.



5° H

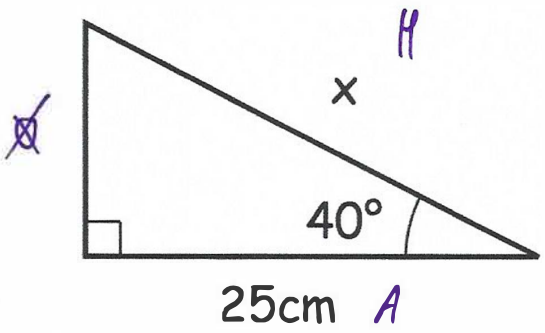
Use trigonometry to work out the length x.

$x = \sin(36) \times 7$

4.11 .....cm

(3)

5.



C A H

Work out the length x.

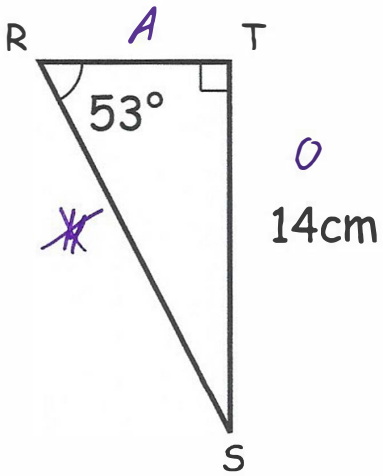
$x = \frac{25}{\cos 40}$

32.64

.....cm

(3)

6.



T O A

Work out the length of RT.

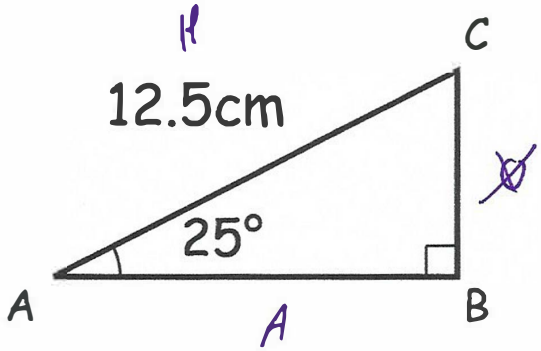
$RT = \frac{14}{\tan 53}$

10.55

.....cm

(3)

7. Triangle ABC has a right angle.
Angle BAC is 25°
AC = 12.5cm



C A H

Calculate the length of AB

$AB = \cos(25) \times 12.5$

11.33 .....cm

(3)

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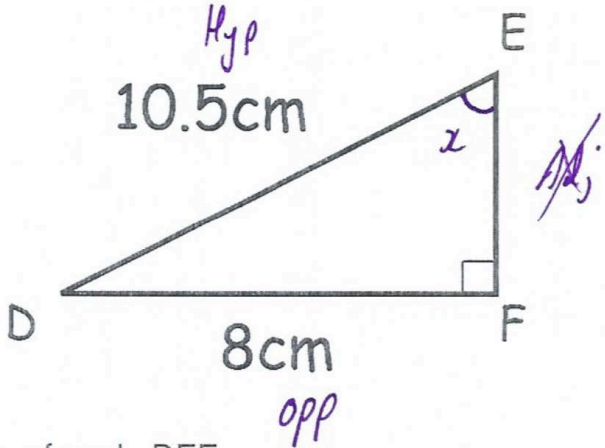
8. DEF is a right-angled triangle.



S O H

Calculate the size of angle DEF.

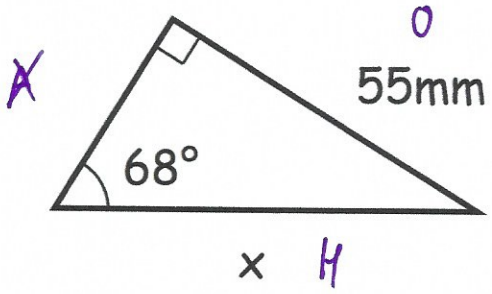
$\sin x = \frac{8}{10.5}$

$x = \sin^{-1}\left(\frac{8}{10.5}\right)$

49.63 .....°

(3)

9.



SOH

Work out the length of side x.
Include suitable units.

$x = \frac{55}{\sin 68}$

$x = 59.32$

59.32mm

.....

(3)

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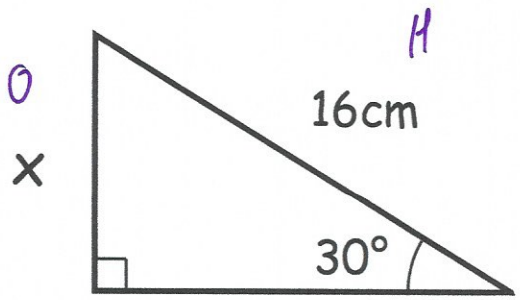
10. Shown is a right-angled triangle



SOH

$sin30° = 0.5$

Work out the value of x

$x = \sin(30) \times 16$

$x = 0.5 \times 16$

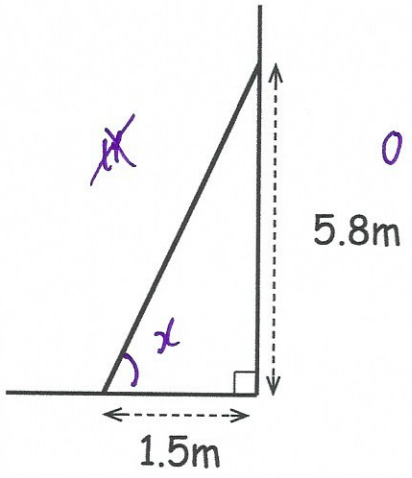
$= 8cm$

8cm

.....

(3)

11. A ladder is placed against a vertical wall.
To be safe, it must be inclined at between 70° and 80° to the ground.



(a) Is the ladder safe?

$\tan x = \frac{5.8}{1.5}$

$x = \tan^{-1}\left(\frac{5.8}{1.5}\right)$

$x = 75.5^{\circ}$

Yes

.....

(3)

(b) Calculate the length of the ladder.

Pythagoras:

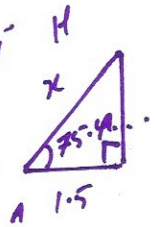
$L^2 = 1.5^2 + 5.8^2$

$L^2 = 35.89$

$L = \sqrt{35.89}$

$L = 5.99$

or Trigonometry



$x = \frac{1.5}{\cos 75.4998...}$

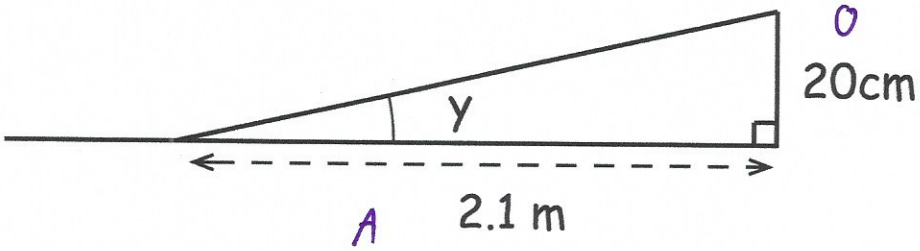
$x = 5.99$

5.99 .....m

(3)

12. A ramp is built to help people enter a building.
The start of the ramp is 2.1 metres from the base of the building.
The ramp has a height of 20 centimetres.

T O A



O
A

Calculate the size of angle y.

$\tan y = \frac{20}{210}$

$y = \tan^{-1}\left(\frac{20}{210}\right)$

$= 5.44$

5.44 .....°

(3)

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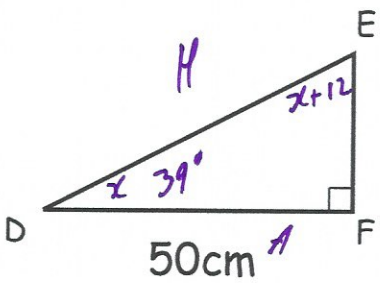
13. Shown below is right-angled triangle DEF.



$2x + 12 = 90$

$2x = 78$

$x = 39$

C A H

Angle E is 12° larger than angle D

Work out the length of DE.

$DE = \frac{50}{\cos 39}$

$DE = 64.34$

64.34 .....cm

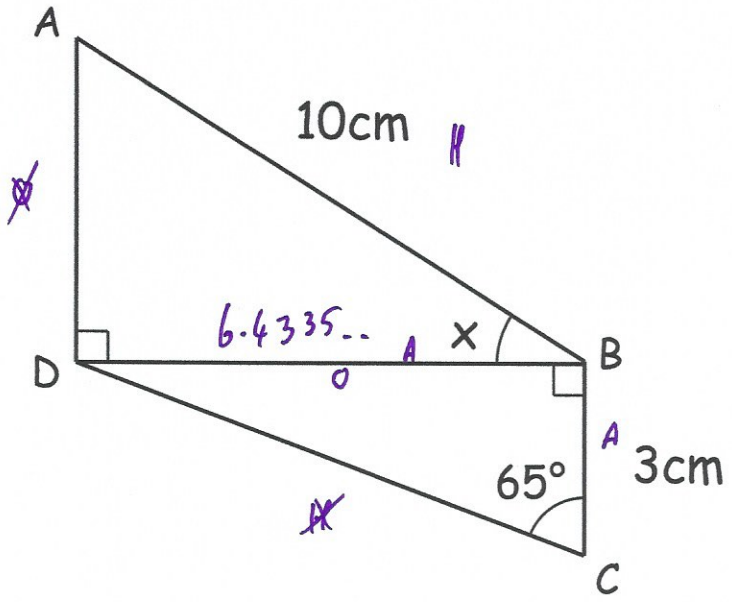
(4)

15. Two right-angled triangles are shown below.

AB is 10cm

BC is 3cm

Angle BCD is 65°



T O A

C A H

Calculate the size of angle ABD

$BD = \tan(65) \times 3$

$= 6.433...$

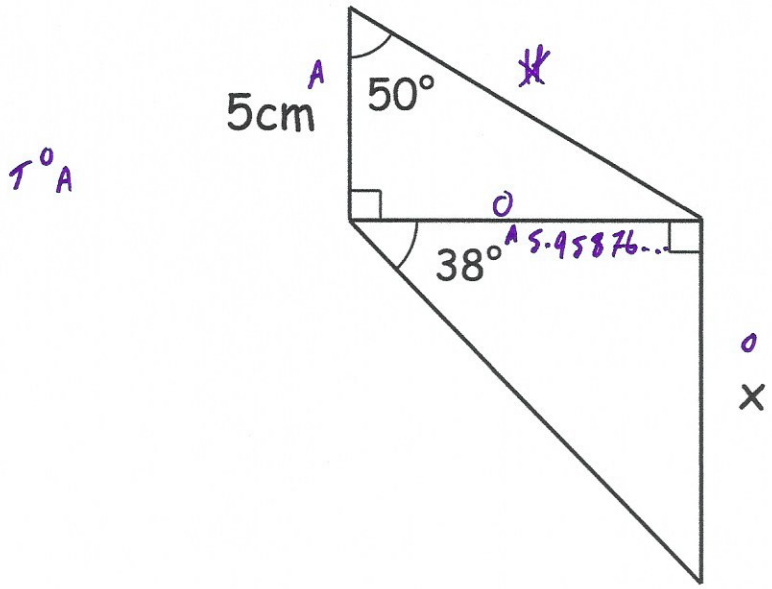
$\cos x = \frac{6.4335...}{10}$

$\cos^{-1}\left(\frac{6.4335...}{10}\right) = 49.9577$

49.96 °

(5)

14. The diagram shows two right-angled triangles.



Calculate the value of x.

Opp = tan(50) × 5

= 5.954767...

x = tan(38) × 5.9587...

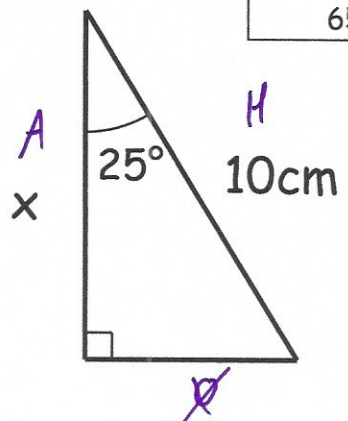
= 4.655...

4.66 .....cm

(5)

16. The diagram shows a right-angled triangle.

Angle	Sine	Cosine	Tangent
25°	0.423	0.906	0.466
65°	0.906	0.423	2.145



C A H

$x = \cos(25) \times 10$

$= 0.906 \times 10$

$= 9.06$

Calculate the length of side x.

9.06 .....cm

(3)

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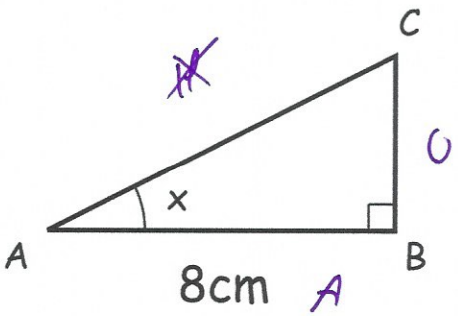
17. ABC is a right-angled triangle.



T O A

$tan x = 0.6$

Work out the length of BC

$BC = \tan x \times 8$

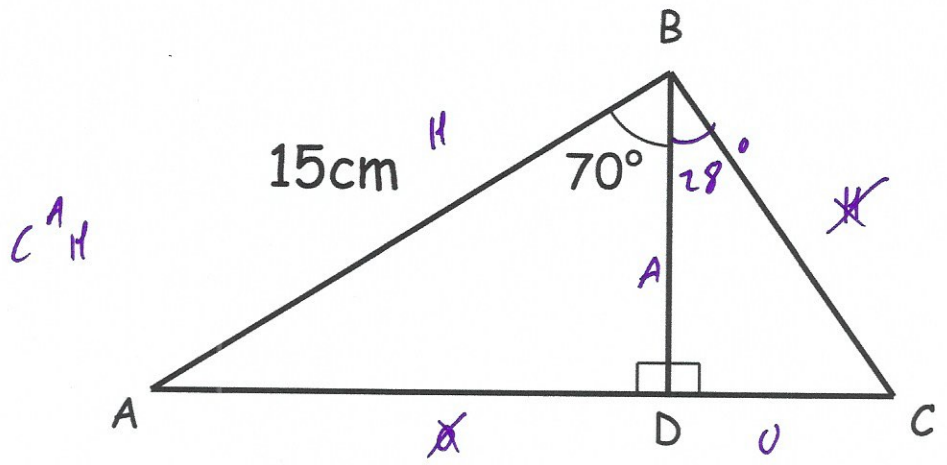
$BC = 0.6 \times 8$

$= 4.8$

4.8 .....cm

(3)

18. Shown below are right-angled triangles, ABD and BCD.



AB = 15cm

Angle ABD = 70°

Angle ABD : Angle DBC = 5 : 2

$70 \div 5 = 14$

$14 \times 2 = 28$

Work out the length of CD

$BD = \cos(70) \times 15$

$= 5.1303...$

$CD = \tan(28) \times 5.1303...$

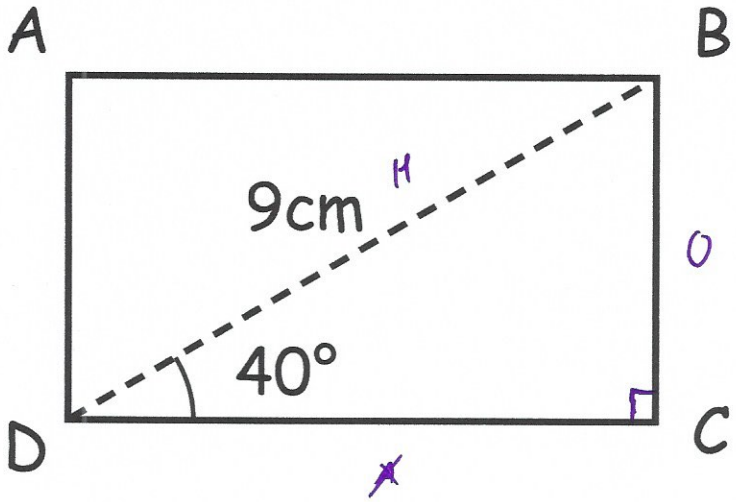
$= 2.7278...$

2.73 .....cm

(5)

19. ABCD is a rectangle.

BD = 9cm
Angle BDC = 40°



5°H

(a) Work out the length of BC

$BC = \sin(40) \times 9$

$= 5.785048...$

5.785 .....cm

(2)

(b) Work out the perimeter of rectangle ABCD

$BC^2 + CD^2 = BD^2$

$5.78508...^2 + CD^2 = 9^2$

$CD^2 = 47.53275512$

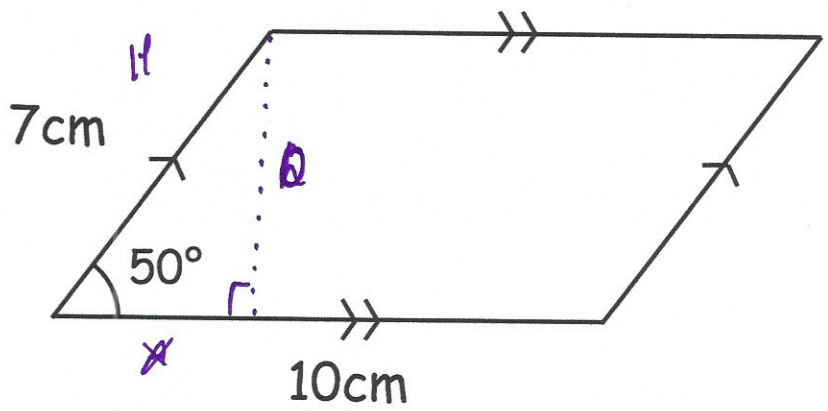
$CD = 6.89439..$

25.36 to 2dp .....cm

(3)

$5.785 + 6.8944 + 5.785 + 6.8944 =$

20. Shown below is a parallelogram.



Calculate the area of the parallelogram.

$O = \sin(50) \times 7$

$= 5.3623...$

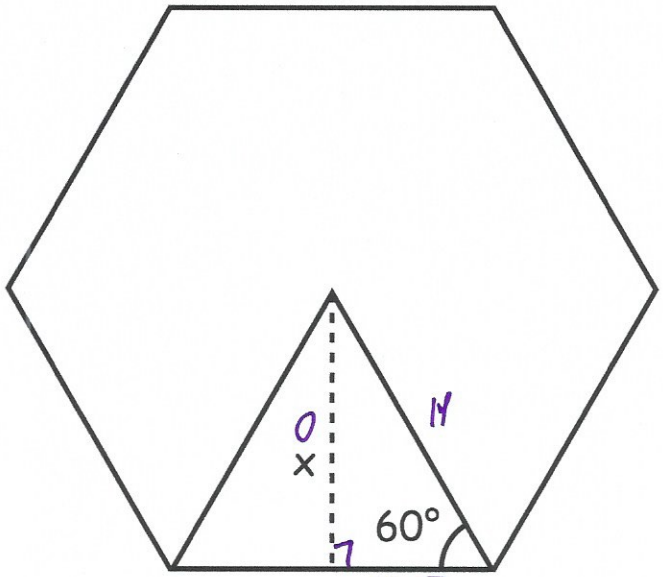
Area $= b \times h$

$= 10 \times 5.3623...$

53.62 .....cm²

(5)

21. A regular hexagon can be divided into 6 equilateral triangles.
The diagram below shows one of the equilateral triangles.



(a) Use trigonometry to find the height, x, of the equilateral triangle.

$x = \tan(60) \times 2.5$

$= 4.330127...$

4.33 ..... cm

(3)

(b) Calculate the area of the equilateral triangle.

$\frac{1}{2} \times 5 \times 4.330...$

10.8253 ..... cm^2

(1)

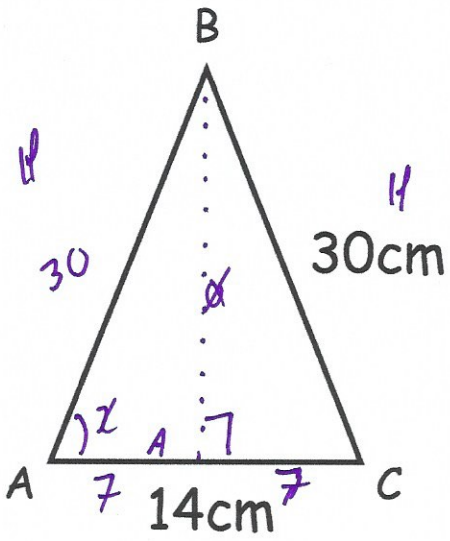
(c) Calculate the area of the hexagon.

$10.8253... \times 6$

64.95 ..... cm^2

(1)

22. Shown below is isosceles triangle, ABC, where AB = BC



(a) Work out the size of angle BAC

$\cos x = \frac{7}{30}$

$= 76.5066...$

76.51 ° to 2 dp. (3)

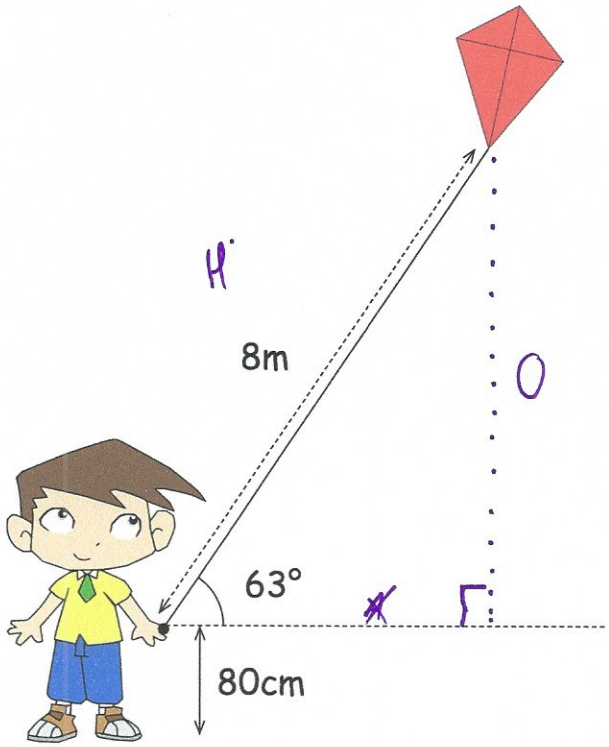
(b) Work out the size of angle ABC

$180 - 76.5066... - 76.5066...$

$= 26.9867...$

26.99 ° to 2 dp. (1)

23. Humphrey is flying a kite.



H

O

SOH

The handle is held 80cm above the ground.
The kite is on a string which is 8m long.
The string makes an angle of 63° with the horizontal.

Calculate the height of the bottom of the kite above the ground.

$O_{pp} = \sin(63) \times 8$

$= 7.128\text{ m}$

$7.128\text{ m} + 0.8\text{ m}$

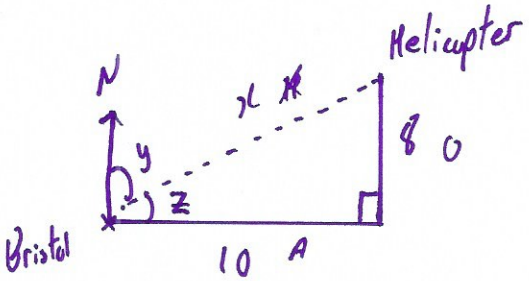
7.928

.....m

(4)

24. A helicopter leaves Bristol and flies due east for 10 miles.
Then the helicopter flies 8 miles north before landing.

(a) Work out the direct distance of the helicopter from Bristol.



$x^2 = 8^2 + 10^2$

$x^2 = 164$

$x = 12.806..$

12.81 .....miles

(3)

(b) Calculate the bearing of the helicopter from Bristol.

$\tan z = \frac{8}{10}$

$z = \tan^{-1}\left(\frac{8}{10}\right)$

$= 38.6598$

$y = 90 - 38.6598$

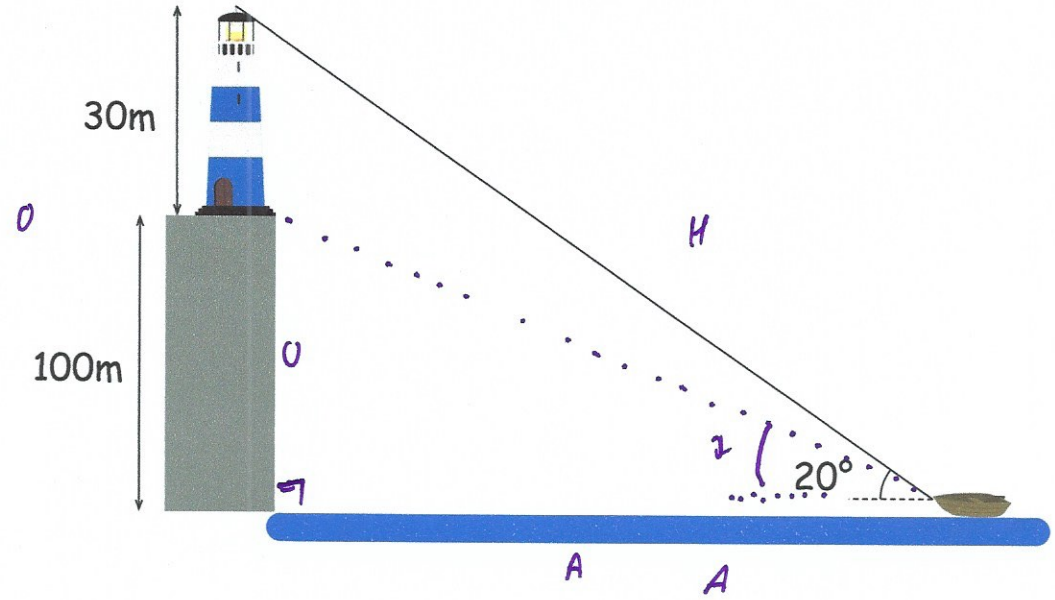
$= 51.3402$

051.34 .....°

(3)

25. A boat is approaching a cliff with a lighthouse on top.

The cliff is 100m high and the lighthouse is 30m tall.



The angle of elevation from the boat to the top of the lighthouse is 20°

(a) Calculate the distance of the boat from the base of the cliff.

$\tan 20^\circ = \frac{130}{A}$

$A = \frac{130}{\tan 20}$

357.172 .....m

(3)

(b) Work out the angle of elevation from the boat to the top of the cliff.

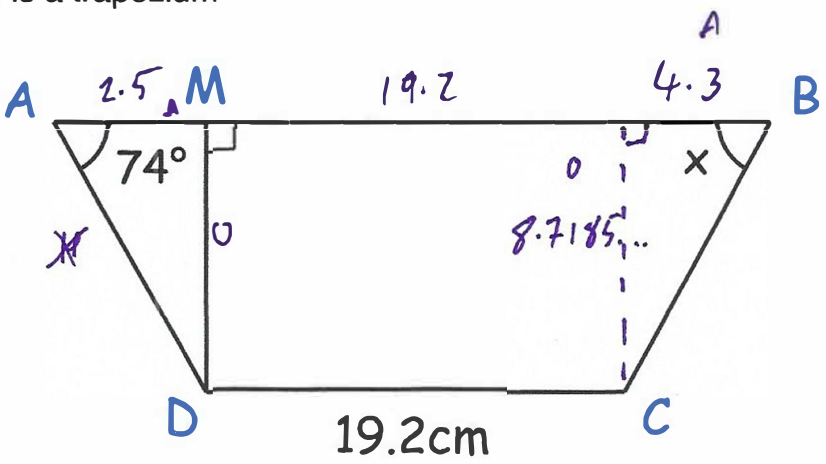
$\tan x = \frac{100}{357.172}$

$x = \tan^{-1}\left(\frac{100}{357.172}\right)$

15.641 .....°

(3)

26. ABCD is a trapezium



Angle BAD = 74°

CD = 19.2cm

AB = 26cm

AM = 2.5cm

Work out the size of angle ABC.

$DM = \tan(74) \times 2.5$

$= 8.718536111...$

$\tan x = \frac{8.7185...}{4.3}$

$x = \tan^{-1}\left(\frac{8.7185...}{4.3}\right)$

63.747°

.....

(5)