1. At the front of the college is a flag pole. Cameron was asked to find its height. He lay on the ground 5 metres back from the pole and looked up at an angle of 60o to the top of the flag pole

5m

60o

Flag pole

How high is the flag pole.

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2. Having found the height of the flag pole, he noticed that the flag pole was unstable and it needed supporting. Cameron wanted to know how much cable he would need to make it stable.(connecting the cable from the top of the flag pole to a point 4m from its base.)

Flag pole

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cable

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3. A skateboard ramp 4.5 metres long drops from the edge of a platform which is 1.8 metres above the ground.

How far is the end of the ramp from the base of the platform?

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4.5m

Platform

1.8m

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x

4. Mr Kane was looking at putting a wheel chair ramp into Te Pukenga (Rm 21). The height from the ground to the door is 0.5m. The ramp could only extend out 2m.

How long would the ramp be?

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2m

0.5m

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5. A similar wheel chair ramp was needed into the Year 13 common room and it could extend out from the wall to a distance of 3m and the ramp could have a length of 3.2m. What would be the angle of the ramp to the ground?

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3m

3.2m

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.6 . Emmerson is very keen on flying kites and he built a number of different types. He had a maximum length of string of 50m. His best kite used all this 50m of string when there was an angle of 44o between the string and the ground. Emmerson wanted to know how high the kite was off the ground.

The height off the ground is?

44o

50m string

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7. Mr Anderson was asked to replace a blown bulb outside the hall. When he fully extended his 4.5m ladder and placed it at an angle of 35 o to the ground, he could reach it. How far away from the hall wall is the ladder standing?

35o

4.5m

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8. In the remodelling of the college, the architects thought that a window shaped like the one shown (not drawn to scale) would be nice in the library. What is the angle marked ?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1.4m

0.8m

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

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9. During a geography lesson, Raewyn was told that the Leaning tower of Pisa had shifted 5.2 m from the vertical since it was built. The height of the tower is 54.4 m. Raewyn wanted to know by how many degrees the tower was now leaning over,

54.4m

5.2m

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**QUESTION TEN**

**A**

**B**

**C**

**D**

**F**

**E**

**G**

**H**

**3 cm**

**4 cm**

**12 cm**

**Diagram NOT**

**to scale**

The diagram to the right shows a cuboid.

**AB** = 4 cm

**AD** = 3 cm

**DH** = 12 cm

Calculate the length of **DF**.

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Length of **DF** = cm

**QUESTION ELEVEN**

**P**

**Q**

**R**

**Diagram NOT**

**to scale**

The diagram shows the plan for a yacht race. The yachts have to sail around buoys at **P, Q** and **R**.

Buoy **Q** is on a bearing of 060o from buoy **P**.

Angle **PQR** = 90o.

**PQ** = 7 km

**QR** = 4 km.

What is the bearing of **R** from **P** ?

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Bearing = o

**QUESTION TWELVE**

A communication mast is to have a cable attached to its top and then secured to the ground. The cable makes an angle of 57o to the ground. If the mast is 20 m tall how long is the cable ?

**57o**

**20 m**

**cable**

**Diagram NOT**

**to scale**

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**QUESTION THIRTEEN**

Two ships leave port together. Ship A sails on a bearing of 160o for a distance of 20 km. Ship B sails on a bearing of 120o for a distance of 15 km. At this stage what is the distance between the ships and what is the bearing of ship B from ship A.

**You may wish to use the space below to sketch a diagram before you start any calculations.**

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ASSESSMENT SCHEDULE:

AS90152

# and

**C4**

# Unit: 5236: TRIGONOMETRY Version 4

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| --- | --- | --- | --- | --- | --- | --- |
|  | Achievement Criteria | No | Evidence | Code | Judgement | Sufficiency |
| Achievement | Solve right-angled triangle problems. | 1 | 8.66m |  | CAO acceptable  Evidence of BOTH Pythagoras AND trigonometry being used is required. | **Achievement:**  For AS equates to obtaining A in the US from Q1-9 |
| 2 | 9.54m |  |
| 3 | 4.12m |  |
| 4 | 2.06m |  |
| 5 | 0.36º |  |
| 6 | 34.7mm |  |
| 7 | 3.69m |  |
| 8 | 34.8º |  |
| 9 | 5.46º |  |
| Achievement with Merit | Solve problems in practical situations involving right-angled triangles. | 10 | DF =  13 cm | AP  M | Correct mathematical statement expected for each question.  Evidence of Pythagoras and/or trigonometry being used is required.  Penalise **IMS** first time it occurs. | **Achievement with Merit:**  **EITHER**  Achievement **plus**  3 x M |
| 11 | ∠QPR = tan-1  ∠QPR = 29.7o  Bearing is 089.7o | AT  M |
| 12 | Cable length =  23.8 m | AT  M |
| Achievement with Excellence | Solve problems in word or 3D situations. | 13 | Ship A  South 20cos20  East 20sin20  Ship B  South 15sin30  East 15cos30  From A to B  East 15cos30 – 20sin20  North 20cos20 – 15sin30  Distance 12.85975638  Bearing 028.57015285o | AT  AP  M  E | Logical setting out with correct mathematical statements required. | **Achievement with**  **Excellence:**  Merit **plus**  E |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Unit Standard 5236 Trigonometry** *Use Pythagoras’ Theorem and trigonometry to find unknowns in right angled triangles.* | | | | |
| **Element Description** | Situation | Reference | Evidence | **Judgement decision.** |
| Use Pythagoras’ Theorem to find lengths in right angled triangles. | * Finding length of hypotenuse * Finding length of another side * Finding length of hypotenuse | 2  3  4 | (or consistent with 1)  4.12m  2.06m | Accept any correct answer to any sensible rounding.  Units not necessary  Require question 3 and 1 of question 1 or question 4 |
| Use trigonometry ratios to find angles in right angled triangles. | * Finding angles using cos * Finding angles using sin * Finding angles using tan | 5  8  9 | 0.36º  34.8º  5.46º | Accept any correct answer to any rounding  *Require 2 out of 3 correct* |
| Use trigonometry ratios to find sides in right angled triangles. | * Finding length using tan * Finding length using sin * Finding length using cos | 1  6  7 | 34.7mm  3.69m | Require 2 out of 3 correct  Accept any correct answer to any rounding |

Sufficiency: To achieve unit 5236 requirements for element 1. All 3 situations to be met. Both angles and lengths need to be found using 2 of sin, cos, tan. Both the hypotenuse and another side need to be found using Pythagoras theorem.