Stage 5 Mathematics student work sample – Grade D

Can Do: Trigonometry

In the examples below, you are asked to demonstrate that you can do something by doing it.
In each case, you get to pick the examples that you think will show that you can do what has been asked.

I understand:
1. I can understand and use the trigonometric ratios (sine, cosine, tangent) in right-angled triangles:

<table>
<thead>
<tr>
<th></th>
<th>Opposite</th>
<th>Hypotenuse</th>
<th>Adjacent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tangent</td>
<td>✔</td>
<td></td>
<td>✔</td>
</tr>
<tr>
<td>Sine</td>
<td>✔</td>
<td></td>
<td>✔</td>
</tr>
<tr>
<td>Cosine</td>
<td>✔</td>
<td>✔</td>
<td></td>
</tr>
</tbody>
</table>

I can use:

\[
\tan \theta = \frac{12}{15}\\
\theta = \tan^{-1}(\frac{12}{15})\\
\theta = 47.19^\circ (to 1 dec pl),
\]

2. I can use trigonometry to solve practical problems involving right-angled triangles:

A lifeguard was standing on his watch tower. He spotted a shark 30 m away from the tower in the area of the beach between the flags. What is the angle of depression equal to?

Grade Commentary

Ali demonstrates basic knowledge and understanding of trigonometry in relation to right-angled triangles. Some accurate mathematical terminology is used, diagrams are clearly labelled, and the three trigonometric ratios are stated correctly in terms of the sides of a right-angled triangle. There is evidence of an appropriate level of competence in performing the calculation required to find the size of an angle, although the side lengths assigned to the triangle do not represent a set of possible side lengths. An attempt is made to construct an appropriate practical problem, but insufficient information is provided for the problem to be solved. Further examples, in order to cover the use of each of the trigonometric ratios, including calculations to find the length of a side, and the construction of practical problems with sufficient information for solution, including one or more problems involving bearings, would enhance the response.

Ali’s response demonstrates characteristics of work typically produced by a student performing at a grade D standard.