1.21 Unit Test: Trigonometry applications

1. Express each value as a decimal, first writing the whole calculator display, and then the 3 sig-fig approximation. [4 marks]

   (a) $\frac{\pi}{6}$ (b) $\frac{\sqrt{2}}{2}$

2. Express each value as a decimal, rounding to 3 sig-figs if necessary. [3 marks]

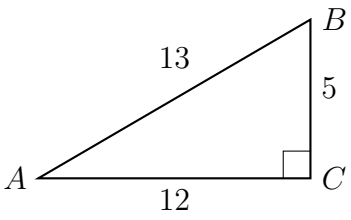
   (a) 2.718×10^5 (b) 6.145×10^{-2}

3. Find the volume of a cone 6 centimeters in diameter and 10 cm tall. [3 marks]

4. A round beach ball has a volume of 12348π cm^3. Find its radius. [3 marks]

5. Find the surface area of a cube with side length 5 cm. [2 marks]

6. $\triangle ABC$ is shown with $m\angle C = 90°$ and the lengths of the triangle's sides are $BC = 5$, $AC = 12$, and $AB = 13$. (not drawn to scale)



   (a) Write down the value of $\cos A$. [1 mark]

   (b) Find the measure of $\angle A$. [2 marks]

7. In right triangle ABC, hypotenuse $\overline{AB}$ has a length of 19.5 cm, and side $\overline{BC}$ has a length of 12.4 cm. What is the measure of angle B? [3 marks]

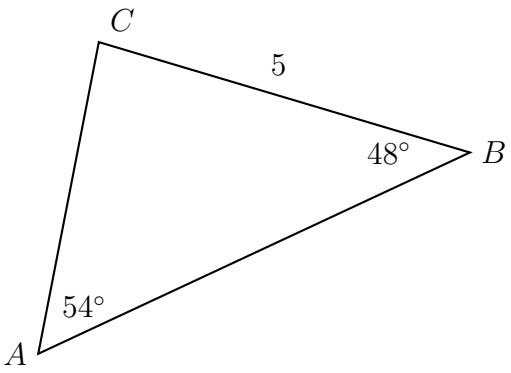
8. Find the slant height of a cone with radius of 1.5 meters and height of 4 m. [3 marks]

9. Triangle ABC has an area of 22, with $AB = 6.5$ and $AC = 7.1$.

   (a) Find the two possible measures for $\hat{A}$. [4 marks]

   (b) Given that $\hat{A}$ is obtuse, find BC. [3 marks]

10. The following diagram shows triangle ABC (not drawn to scale).

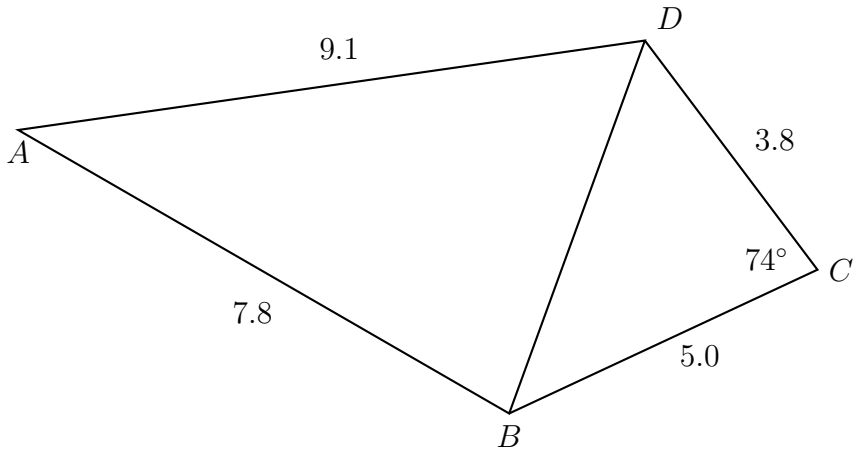


$BC = 5$, $C\hat{A}B = 54°$, and $A\hat{B}C = 48°$

(a) Find AC. [3 marks]

(b) Find the area of triangle ABC. [3 marks]

11. The following diagram shows quadrilateral $ABCD$ (not drawn to scale).



$AB = 7.8$, $BC = 5.0$, $CD = 3.8$, $AD = 9.1$, and $B\hat{C}D = 74°$

(a) Find BD. [3 marks]

(b) Find $A\hat{B}D$. [3 marks]

12. BMI is a measure of a healthy personal weight,

$$BMI = \frac{w}{h^2}$$

where
w is a person's weight in kilograms, and
h is height in meters

(a) Given a height of 160 cm and weight of 54 kg, find the BMI [3 marks]

(b) These measurements are not exact. Assuming the height is between 159-161 cm and weight 53-55 kg, find the bounds of the BMI. [4 marks]

13. The following diagram shows a pole BT 1.6 m tall on the roof of a vertical building.

The angle of depression from T to a point A on the horizontal ground is 35°.

The angle of elevation of the top of the building from A is 30°.

Find the height of the building. [7 marks]