**HW 2324_F3_CH10_ Applications of Trigonometry**

# m Three Mathematics Test (2023–2024)

## h.10 Applications of Trigonometry Solutions

Clas Name: _____ (  )

Time

Date

| Mark | /31 | Class Average | |
|---|---|---|---|
| Parent's Signature: | | | |

**Unles** **e not necessary drawn to scale.**

**Secti** **) marks)**

Put th s provided in the box below.

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Answer | | | | | |

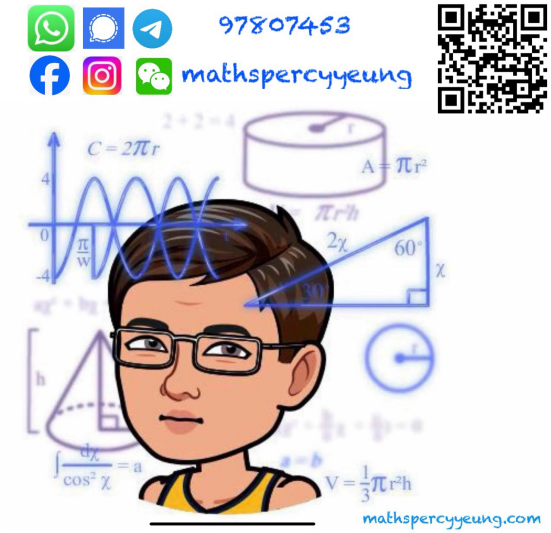
1. Which of the following roads is the steepest?

   A. A road with the gradient of 0.27.

   B. A road with the gradient of $\frac{1}{4}$.

   C. A road with the gradient of $1:5$.

   D. A road with the inclination of 13°.




2. Kelly runs up a slope with the inclination of 10° and rises 50 m vertically. Find her actual distance moved correct to 3 significant figures.

   A. 8.68 m

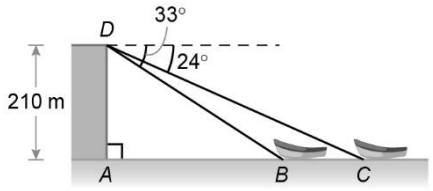
   B. 8.82 m

   C. 284 m

   D. 288 m

(1 mark)

3. In the figure, the angles of depression of two boats $B$ and $C$ from the top $D$ of a cliff are 33° and 24° respectively. $D$ is 210 m above the sea level. Find the distance between the two boats correct to 3 significant figures.




A. 148 m

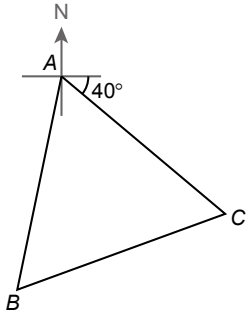
B. 200 m

C. 230 m

D. 368 m

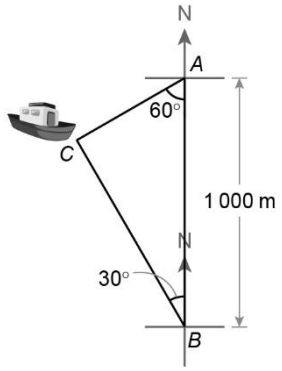
(1 mark)

4. In the figure, $\Delta ABC$ is an equilateral triangle. Find the compass bearing of $C$ from $B$.




A. N10°E
B. N70°E
C. S10°E
D. S70°E

5. On a straight coastline, lighthouse $A$ is 1 000 m due north of lighthouse $B$. The compass bearings of ship $C$ from lighthouses $A$ and $B$ are S60°W and N30°W respectively. Find the shortest distance of ship $C$ from the coastline.




A. $\frac{250\sqrt{3}}{3}$ m

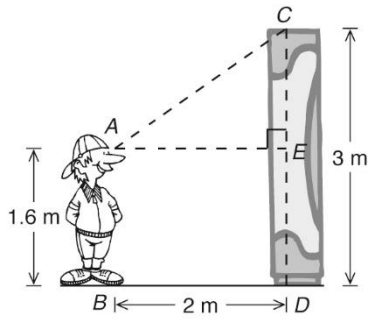
B. $250\sqrt{2}$ m

C. $250\sqrt{3}$ m

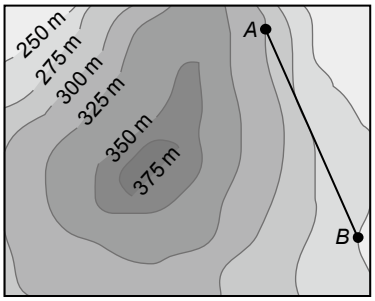
D. $500\sqrt{3}$ m

**Section B: Long Questions (21 marks)**

**1.** In the figure, Michael is looking at the top $C$ of a sculpture $CD$ of height 3 m. Michael is 2 m away from the sculpture and his eye level is 1.6 m above the ground. What is the angle of elevation of the top of the sculpture from Michael? (4 marks)

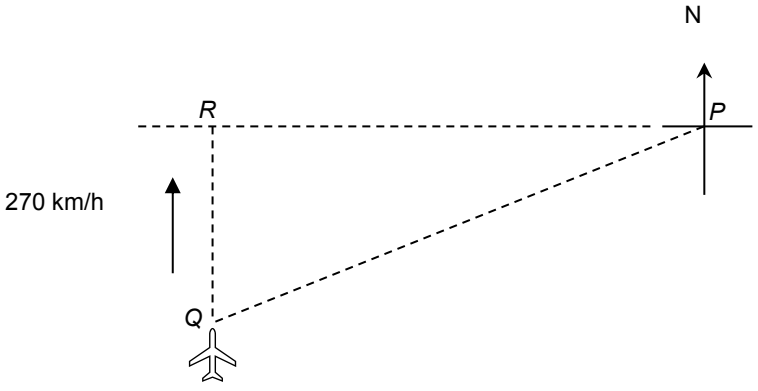



2. The figure shows a map with the scale of $1:10\,000$. From the map, we have $AB = 3\,\text{cm}$. Find the gradient of $AB$. (3 marks)



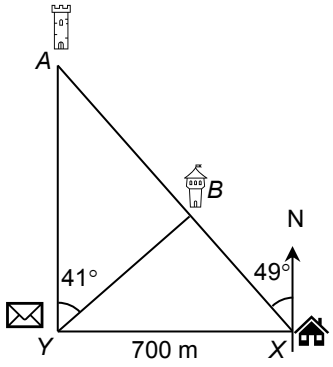
Scale 1 : 10 000

3. As shown in the figure, the compass bearing of $Q$ from airport $P$ is S63°W and the distance between them is 3000 km. $R$ is due west of $P$ and due north of $Q$. If a plane flies due north from $Q$ at a constant speed of 270 km/h, will it reach $R$ within 5 hours? Explain your answer. (3 marks)

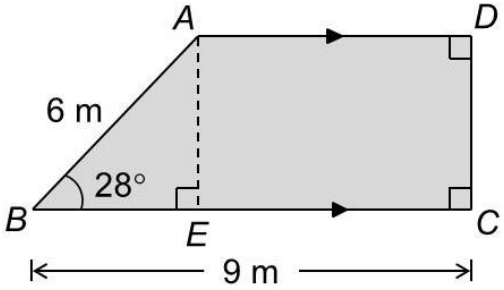


4. In the figure, Janice observes two towers $A$ and $B$ from his house $X$. She finds that $A$, $B$ and $X$ lie on a straight line and the compass bearing of $B$ from $X$ is N49°W. Janice then walks 700 m due west to post office $Y$. She finds that $A$ is due north of $Y$ and the compass bearing of $B$ from $Y$ is N41°E.

**(a)** Find the distance between $B$ and $X$.
**(b)** Find the distance between $A$ and $B$.
(Give your answers correct to 3 significant figures.) (6 marks)



5. The figure shows a trapezium where $AD$ // $BC$ and $\angle ADC = \angle BCD = 90°$. $E$ is a point on $BC$ such that $AE \perp BC$. $AB = 6$ m, $BC = 9$ m and $\angle ABE = 28°$.




**(a)** Find the length of $AD$ correct to 3 significant figures.

**(b)** Ivy claims that the area of trapezium $ABCD$ is greater than 18 $m^2$. Do you agree? Explain your answer.

(5 marks)