Name: _____

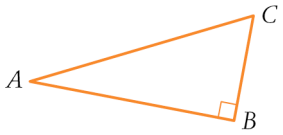
# TOPIC TEST 4
# Trigonometry

- Time allowed: 45 minutes
- Part A: 20 multiple-choice questions (40 marks)
- Part B: 11 free-response questions (60 marks)

## Part A

20 multiple-choice questions
2 marks each: 40 marks
Circle the correct answer.

**1** For this triangle, which side is adjacent to angle $A$?

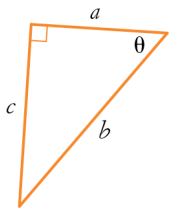



**A** $AB$ **B** $AC$
**C** $BC$ **D** $CA$

**2** The trigonometric ratio $\tan\theta$ is equal to:

**A** $\frac{\text{opposite}}{\text{adjacent}}$ **B** $\frac{\text{adjacent}}{\text{opposite}}$
**C** $\frac{\text{opposite}}{\text{hypotenuse}}$ **D** $\frac{\text{adjacent}}{\text{hypotenuse}}$

**3** In the triangle below, which of the following equals $\cos\theta$?




**A** $\frac{a}{b}$ **B** $\frac{a}{b}$
**C** $\frac{c}{a}$ **D** $\frac{b}{a}$

**4** Evaluate $14\tan 79°$.

**A** 0.49 **B** 19.70
**C** 72.02 **D** 79

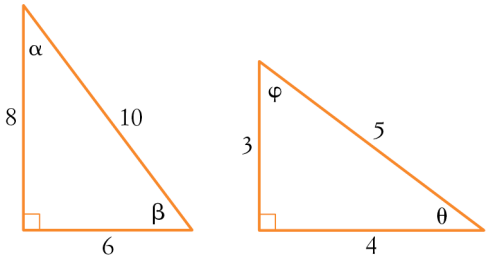
**5** The trigonometric ratio $\sin\theta$ is equal to:

**A** $\frac{\text{opposite}}{\text{adjacent}}$ **B** $\frac{\text{adjacent}}{\text{opposite}}$
**C** $\frac{\text{opposite}}{\text{hypotenuse}}$ **D** $\frac{\text{adjacent}}{\text{hypotenuse}}$

**6** Evaluate $\frac{12}{\cos 35°}$.

**A** 9.82 **B** 9.83
**C** 14.64 **D** 14.65

**7** For these diagrams, which of the following statements is true?




**A** $\cos\theta = \frac{3}{5}$ **B** $\tan\alpha = \frac{4}{5}$
**C** $\tan\varphi = \frac{3}{4}$ **D** $\sin\beta = \frac{4}{5}$

**8** For the diagrams in question 7, which statement is *false*?

**A** $\sin\varphi = \frac{4}{5}$ **B** $\cos\theta = \frac{4}{5}$
**C** $\tan\alpha = \frac{8}{6}$ **D** $\cos\beta = \frac{6}{10}$

**9** Evaluate $\tan 14.6°$.

**A** 0.025 **B** 0.260
**C** 0.261 **D** –0.67

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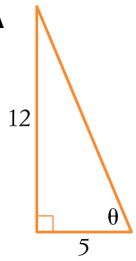
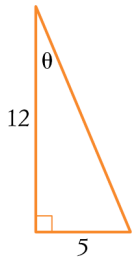
**10** For which triangle below is $\tan\theta = \frac{5}{12}$?

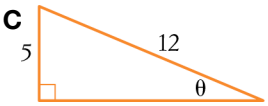
**A**



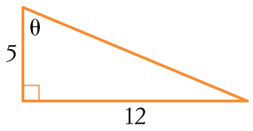

**B**




**C**




**D**




**11** 45°3′ is the same as:

**A** 45.05° **B** 45.3°

**C** 45.5° **D** 45.03°

**12** Evaluate sin 46°27′.

**A** 0.7538 **B** 0.7247

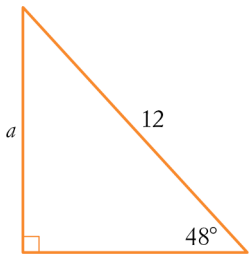
**C** 0.7248 **D** 0.7226

**13** If $\cos\theta = 0.5$, what is the value of θ?

**A** 60° **B** 30°

**C** 1° **D** 53°

**14**




What is the value of *a* in this triangle?

**A** 9.6 **B** 8.9

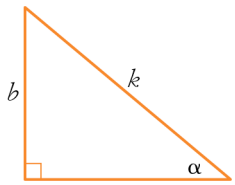
**C** 16.1 **D** 8.0

**15** 32.75° in degrees and minutes is:

**A** 32° 75′ **B** 32°45′

**C** 32.75′ **D** $32°\frac{3}{4}'$

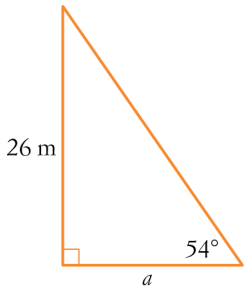
**16** Which of the following is the correct expression for *k*?




**A** $k = b\sin\alpha$ **B** $k = c\sin\alpha$

**C** $k = \sin\frac{\sin\alpha}{b}$ **D** $k = \frac{b}{\sin\alpha}$

**17** What is the value of *a* in this triangle?




**A** 18.8 **B** 18.9

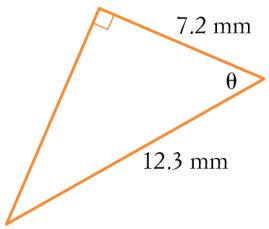
**C** 35.7 **D** 35.8

**18** If $\tan\phi = \frac{3}{2}$, find the value of ϕ.

**A** 35° **B** 36°

**C** 56° **D** 57°

**19** What is the value of θ in this triangle?




**A** 35°49′ **B** 35°50′

**C** 54°10′ **D** 54°11′

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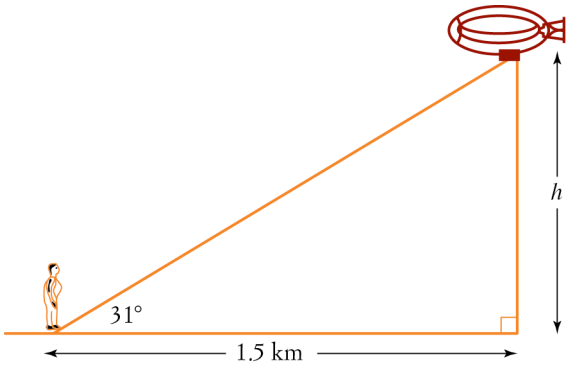
**20** Emersyn saw an airship flying horizontally at an angle of elevation of 31° and at a distance of 1.5 km. How high in metres must the airship be flying?




**A** 772 m **B** 773 m

**C** 900 m **D** 901 m

# Part B

11 free-response questions
60 marks
Show your working where appropriate.

**21** (4 marks) Sketch a right-angled triangle. Label an angle θ and label the sides 'hypotenuse', 'opposite' and 'adjacent' with regard to that angle.

**22** (6 marks) A right-angled triangle has the trigonometric ratio $\tan\theta = \frac{7}{24}$.

**a** Sketch and label the triangle.

**b** Use Pythagoras' theorem to find the length of the third side.

_____

_____

_____

_____

**c** Write the value of $\sin\theta$.

_____

**23** (6 marks) Convert:

**a** 43.15° to degrees and minutes

_____

**b** 21.862° to degrees and minutes, to the nearest minute

_____

**c** 64°50′ to degrees, correct to two decimal places.

_____

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**24** (8 marks) Evaluate each expression correct to three decimal places.

**a** sin 37°

_____

**b** cos 12°48′

_____

**c** tan 26.54°

_____

**d** $\frac{5}{\cos 21°}$

_____

**25** (6 marks) Find the value of θ:

**a** to the nearest degree if cos θ = 0.82

_____

**b** to the nearest minute if tan θ = $\frac{11}{7}$

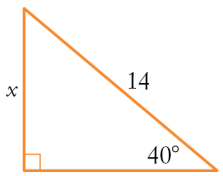
_____

**c** to one decimal place if sin θ = 0.4044

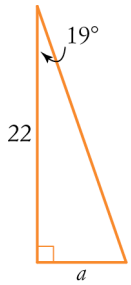
_____

**26** (6 marks) Find the value of each pronumeral in the following diagrams, correct to two decimal places.

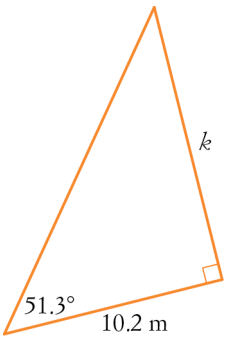
**a**




**b**




**c**



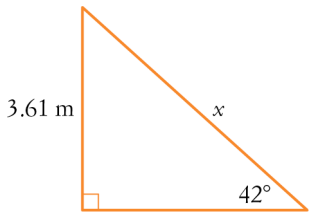

**27** (4 marks) A kite is attached to a string 132 metres long. The string makes an angle of 22° with the ground. Calculate, correct to the nearest metre, the height of the kite above the ground.

_____

_____

**28** (4 marks) Find, correct to two decimal places, the value of each pronumeral in the following triangles.

**a**

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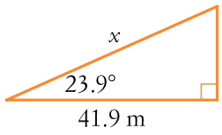
**b**

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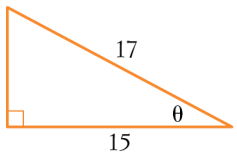
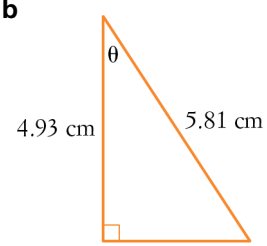
**29** (6 marks) Find θ correct to the nearest minute each time.

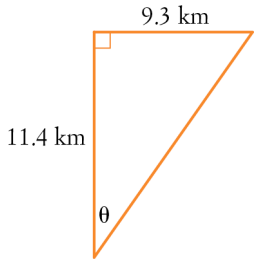
**a**




**b**




**c**




**30** (4 marks) A wall is 2.98 m high. A ladder 3.45 m long is placed to reach the top of the wall.

**a** Find, correct to the nearest degree, the angle that the ladder makes with the wall.

_____

_____

**b** How far from the wall is the foot of the ladder? Answer correct to two decimal places.

_____

_____

**31** (6 marks) Robert is sitting in a cinema 21.2 m away from the screen. The angle from his seat to the top of the screen is 13°18′, measured from the horizontal.

**a** Draw a diagram to show this information.

**b** Find the height of the top of the screen.

_____

_____

**c** Robert moves closer to the screen so that he is 11 m from the front. At what angle (correct to the nearest minute) is the top of the screen now?

_____

_____

**This is the end of the test.**
**Use the rest of the page and the back for extra working space.**

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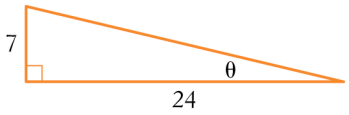
## Answers

| | | | | |
|---|---|---|---|---|
| **1** A | **2** A | **3** A | **4** C | **5** C |
| **6** D | **7** D | **8** C | **9** B | **10** B |
| **11** A | **12** C | **13** A | **14** B | **15** B |
| **16** D | **17** B | **18** C | **19** C | **20** D |

**21** Teacher to check.

**22** **a**




**b** 25 **c** $\frac{7}{25}$

**23** **a** 43°9′ **b** 21°52′ **c** 64.83°

**24** **a** 0.602 **b** 0.975 **c** 0.499 **d** 5.356

**25** **a** 35° **b** 57°32′ **c** 23.9°

**26** **a** 9.00 **b** 7.58 **c** 12.73

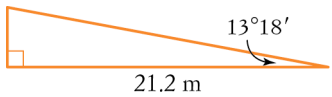
**27** 49 m

**28** **a** 5.40 m **b** 45.83 m

**29** **a** 28°4′ **b** 31°57′ **c** 39°12′

**30** **a** 30° **b** 1.74 m

**31** **a**




**b** 5.01 m **c** 24°29′

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