



Name: _____

Year 9 Stage 5.2 Mathematics Assignment Term 3 2022

Geometrical Figures, Indices & Trigonometry

Task number: 3

Weighting: 25%

Due Date: 2/9/2022

Outcomes assessed:

MA5.2-14MG calculates the angle sum of any polygon and uses minimum conditions to prove triangles are congruent or similar

MA5.2-7NA applies index laws to operate with algebraic expressions involving integer indices

MA4-16MG applies Pythagoras' Theorem to calculate side lengths in right-angled triangles, and solves related problems

Nature and description of the task:

As a result of completing this Assignment, students should be familiar with the topics:

- Geometrical Figures – Classifying and measuring angles, solving for unknown angles using parallel lines, classifying triangles as well as finding interior and exterior angles sums, classify and find angle sums of quadrilaterals, find the interior and exterior angle sum of polygons, use congruency tests and similarity tests of triangles as well as find the scale factor of similar figures.
- Indices and Surds – prime factor trees, index laws for multiplying, dividing, power of a power, zero power, negative indices, scientific notation, significant figures
- Trigonometry - Pythagoras' Theorem to find hypotenuse and short sides, 2D and 3D Pythagoras problems, trigonometric ratios, finding unknown sides

On the 2nd of September 2022 you will receive a similar selection of questions from the Preparation Activity to complete in 50 minutes in an in-class Validation Task. You are expected to investigate/attempt each of these questions before the in-class Validation Task. The final mark for this assessment will be the mark you receive on the in-class Validation task.

NOTE: You will NOT have access to the Preparation Activity during the Validation Task.

Non-Completion of Task:

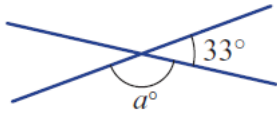
If you know you are going to be away on the day the Assessment Task is due and are unable to hand in the Assignment on the due day, then you must have supportive documentation.

Preparation Activity

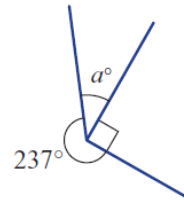
Geometrical Figures

1. Find the value of the pronumerals in the following:

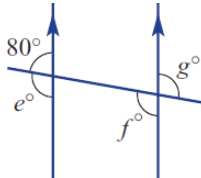
a.



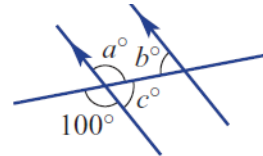
b.



c.

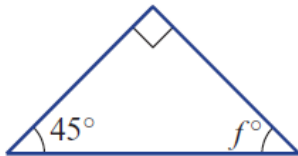


d.

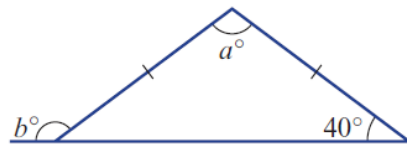


2. Find the value of the pronumeral in the following shapes:

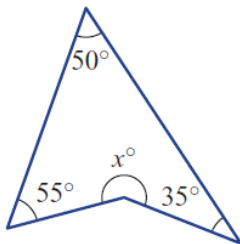
a.



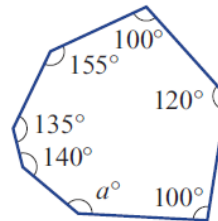
b.



c.

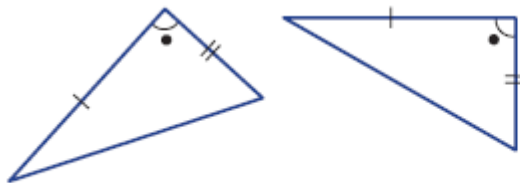


d.

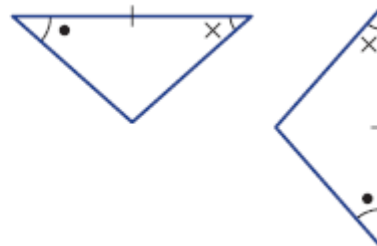


3. Which congruence test (SSS, SAS, AAS, RHS) would be used to show that these pair of triangles are congruent.

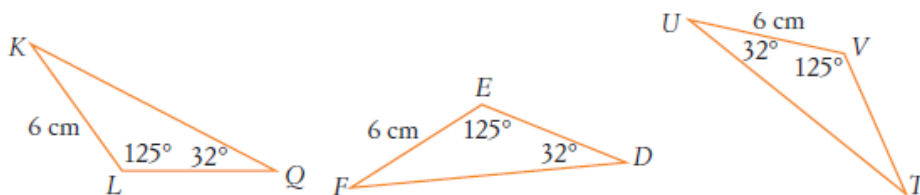
a.



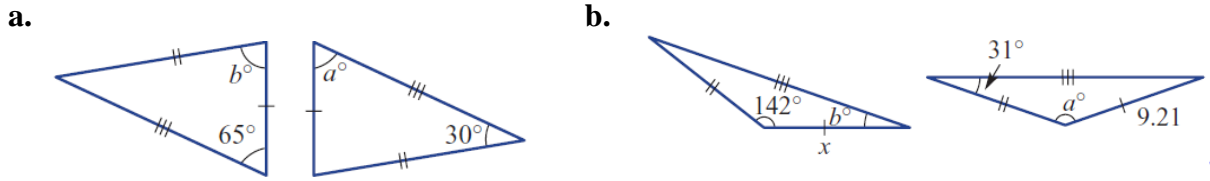
b.



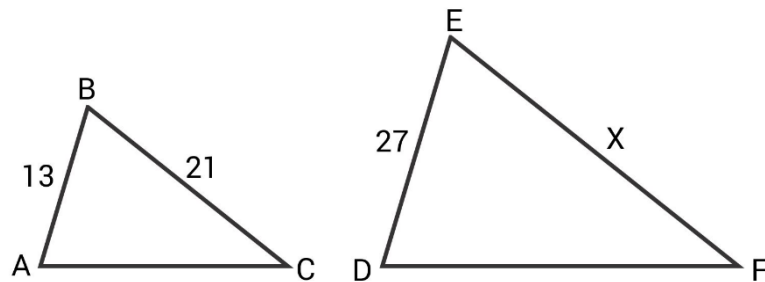
4. For the set of triangles below decide which two are congruent and state the congruency test used:



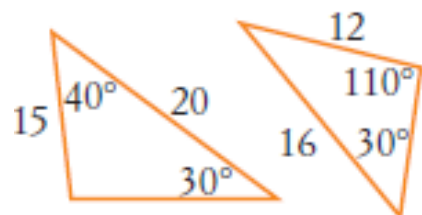
5. The below triangles are congruent, find the pronumerals.



6. The below triangles are similar, find the value of the pronumeral, to 2 decimal places.



7. Are the below triangles similar? State what test you have used.



Indices

8. Draw a prime factor tree for the number 56 and express it as a sum of its prime factors in index notation.

Prime Factorisation: _____

9. Simplify and evaluate the following using index laws, ensure all indices are positive:

i.

a $j^5 \times j^3$

b $s^{25} \times s^5$

ii.

a $3r^4 \times 2r^2s^2$

b $8v^5w^2 \times 4v^4w^7$

iii.

a $a^{12} \div a^5$

b $n^8 \div n$

iv.

a $\frac{8st^8}{2t^2}$

b $\left(\frac{5^2}{8}\right)^4$

v.

a $(n^6)^2$

b $(5bc^3)^4$

vi.

a $x^0 + y^0$

b $8x^0 + 5$

vii.

a m^{-2}

b $4x^3y^{-5}$

10. Write these numbers using scientific notation.

a. 23 0000

b 0.0000072

c. 0.000000000000000786

d 450000000

11. Write these numbers back into the decimal form (expanded form).

a. 4.67×10^8

b. 5.4×10^{-6}

12. State how many significant figures the below numbers have.

a. 15000

b. 0.0005

c. 4.0003

d. 0.040

13. Round the following to the number of significant figures in the brackets.

a. 0.002434 (2)

b. 0.0000259 (1)

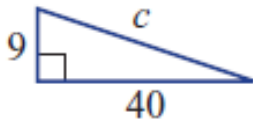
c. 4.5674 (1)

d. 893456382763 (5)

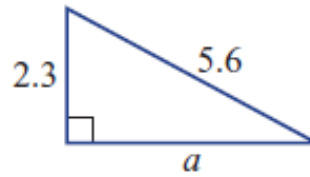
Right-Angled Triangles and Trigonometry

14. Using Pythagoras Theorem, find the value of the pronumerals to 2 decimal places.

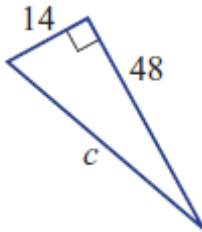
a



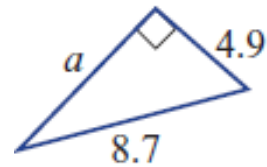
b.



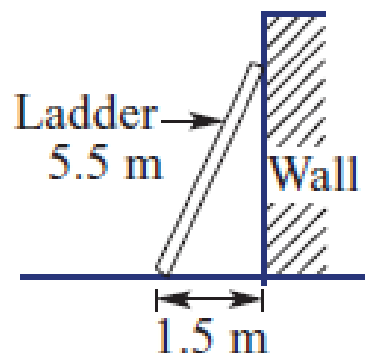
c



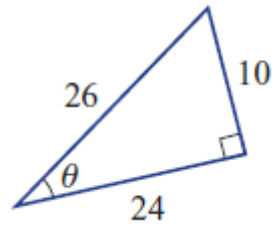
d



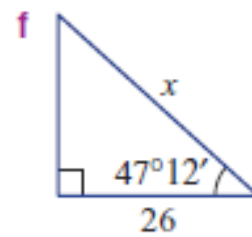
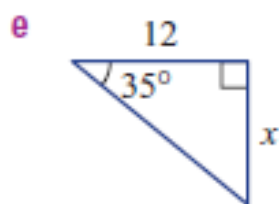
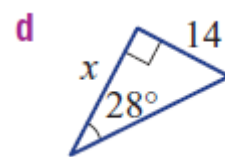
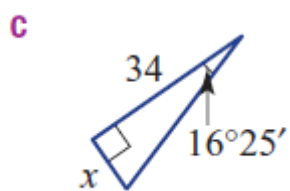
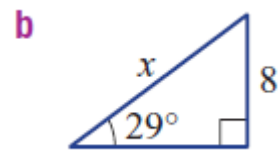
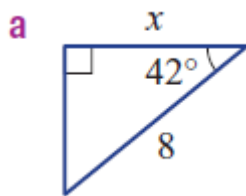
15. The diagram below represents a ladder leaning against a wall. Using the lengths given and Pythagoras Theorem, find how far up the wall the ladder reaches to 2 decimal places.



16. For the triangle below write the trigonometric ratios for $\sin \theta$, $\cos \theta$, $\tan \theta$.



17. Using the trigonometric ratios, find the value of x .



ANSWERS

1. a. $a = 147^\circ$
b. $a = 33^\circ$
c. $f = 100^\circ$ $c = 100^\circ$ $g = 100^\circ$
d. $a = 100^\circ$ $b = 80^\circ$ $c = 80^\circ$

2. a. $f = 45^\circ$
b. $a = 100^\circ$ $b = 140^\circ$
c. $x = 220^\circ$
d. $a = 150^\circ$

3. a. SAS b. AAS

4. $\triangle K L Q \equiv \triangle F E D$, (AAS)

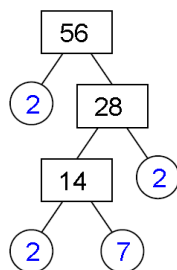
5. a. $a = 65$ b. $a = 85$
b. $a = 142$ $x = 9.21$ $b = 7$

6. 43.62 (2dp)

7. Yes, (AAA)

8.

$$56 = 2^3 \times 7$$



9.

- i. a) j^8 b) s^{30}
ii. a) $6r^6s^2$ b) $32v^9w^9$
iii. a) a^7 b) n^7
iv. a) $4st^6$ b) $\frac{5^8}{8^4}$
v. a) n^{12} b) $5^4b^4c^{12}$
vi. a) 2 b) 13
vii. a) $\frac{1}{m^2}$ b) $\frac{4x^3}{y^5}$

10. a. 2.3×10^5
b. 7.2×10^{-6}
c. 7.86×10^{-14}
d. 4.5×10^8

11. a. 467 000 000
b. 0.0000054

12. a. 2
b. 1
c. 5
d. 2

13. a. 0.0024
b. 0.00003
c. 5
d. 893460000000

14. a. 41 b. 5.11
c. 50 d. 7.19

15. 5.29m

16. $\sin \theta = \frac{10}{26}$

$$\cos \theta = \frac{24}{26}$$

$$\tan \theta = \frac{10}{24}$$

17. a. 5.945
b. 16.501
c. 10.02
d. 26.33
e. 8.40
f. 38.27