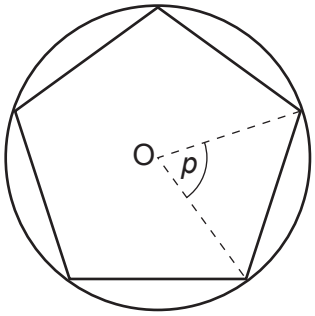
1 Yuki inscribed a regular pentagon in a circle, centre O.

(a) Show that angle p is 72°. **[1]**



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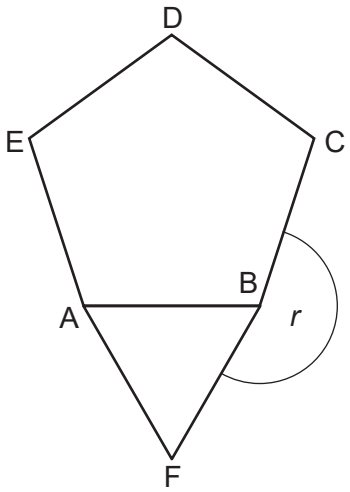
(b) Calculate the sum of the interior angles of a regular pentagon.

(b) .....° **[2]**

(c) The diagram shows a regular pentagon, ABCDE, and an equilateral triangle ABF.

Work out the size of the reflex angle *r*.



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(c) ..... ° **[3]**

2 **(a** Evaluate, writing each answer as a whole number.

(i) $4^{17} \div 4^{14}$

(a)(i) _____ **[2]**

(ii) 12^{0}

(ii) _____ **[1]**

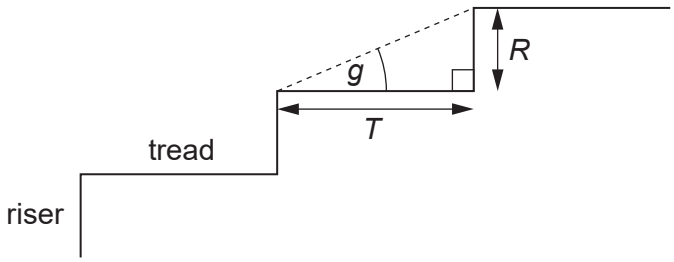
(iii) $8^{\frac{4}{3}} \times 8^{-1}$

(iii) _____ **[3]**

(b) Given that $f(x) = x^2 - 3x$, work out f(5).

(b) _____ **[1]**

3 A staircase consists of treads of length T and risers of length R, as shown.



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There are four safety requirements:

- T must be at least 220 mm
- R must be at most 220 mm
- $T + 2R$ must be at least 550 mm and at most 700 mm
- angle g must not be more than 42°.

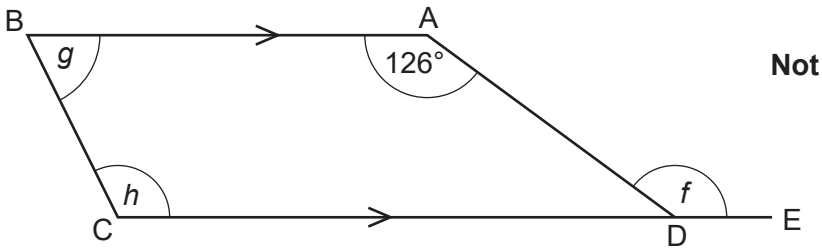
(a) Russell wants a staircase with $T = 222$ mm and $R = 218$ mm.
These values satisfy the first two safety requirements.

Show whether these values satisfy each of the other two safety requirements. **[4]**

(b) Calculate the largest value that R can be when $T = 270$ mm.
Show that your solution satisfies all the safety requirements.

(b) ..... mm **[4]**

4 ABCD is a quadrilateral.
BA is parallel to CDE.
Angle *h* is **not** equal to 126°.



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(a) What is the mathematical name for quadrilateral ABCD?

(a) ..... **[1]**

(b) Find the size of angle *f*.
Give a geometrical reason for your answer.

f = ...° because.....

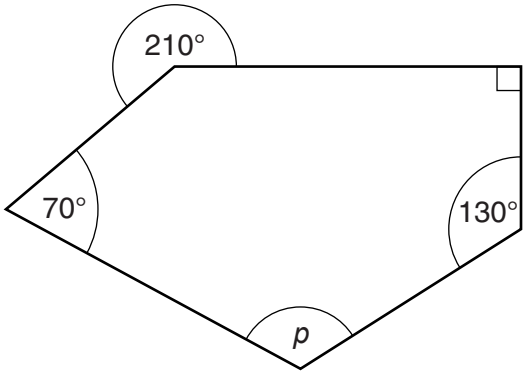
..... **[2]**

(c) Angle *h* is 4 times the size of angle *g*.

Work out the size of angle *h*.

(c) .....° **[3]**

5 Calculate angle *p*.



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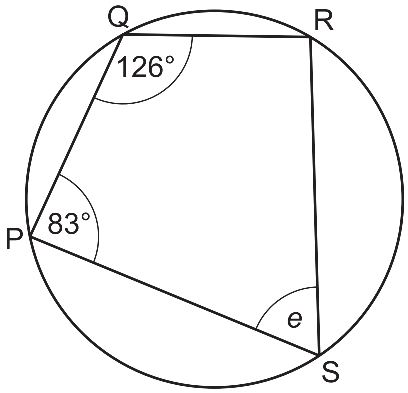
_____ ° **[3]**

6 **(a)** P, Q, R and S are points on the circumference of a circle.



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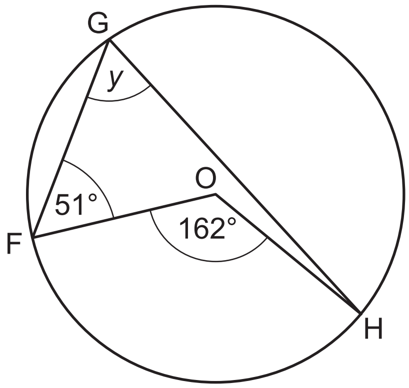
Work out the size of angle *e*.
Give a reason for your answer.

e = ____________ ° because ¢¢

¢¢ **[2]**

(b) F, G and H are points on a circle, centre O.



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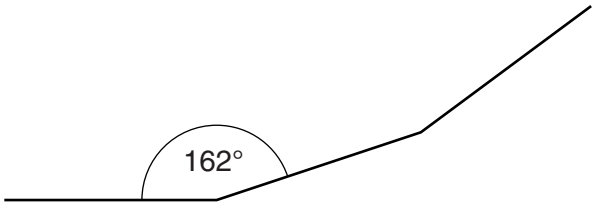
Work out the size of angle *y*.

(b) ¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢° **[1]**

7 This diagram shows part of a regular polygon.



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How many sides does this polygon have?

_____ **[3]**