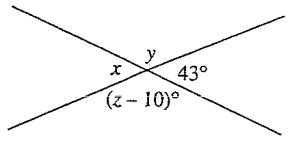
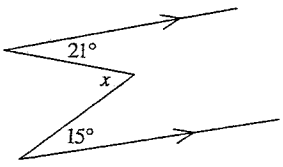
Test yourself 4

1. Find the values of all pronumerals

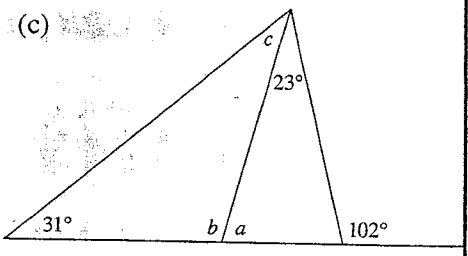
(a)



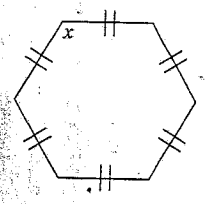
(b)



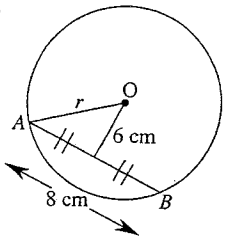
(c)



(d)

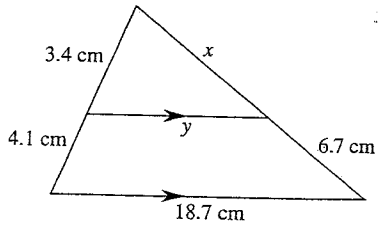


(e)

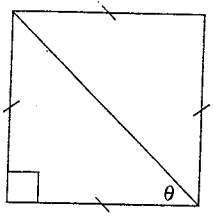


(O is the centre of the circle)

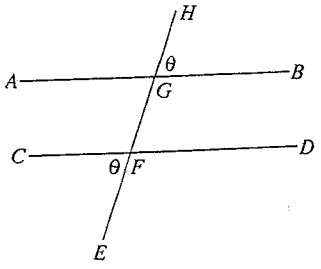
(f)



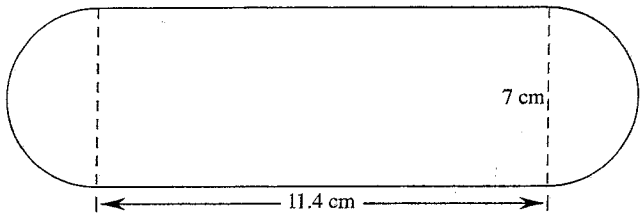
(g)



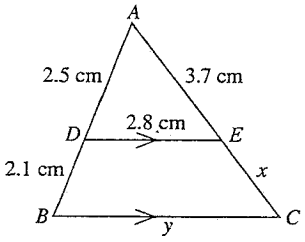
2. Prove that AB and CD are parallel lines.



3. Find the area of the figure, to 2 decimal places.



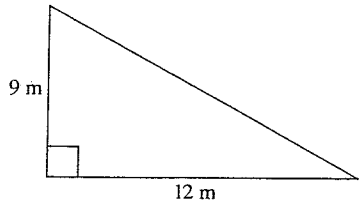
4. (a) Prove that triangles ABC and ADE are similar.
   (b) Evaluate x and y to 1 decimal place.



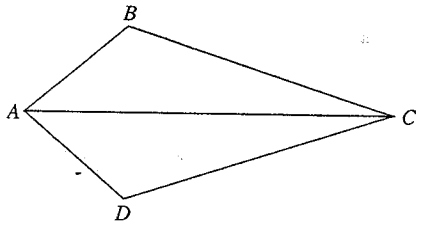
5. Find the size of each interior angle in a regular 20-sided polygon.

6. Find the volume of a cylinder with radius 5.7 cm and height 10 cm, correct to 1 decimal place.

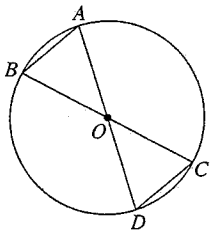
7. Find the perimeter of the triangle below.



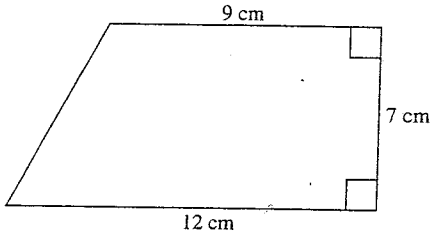
8. (a) Prove triangles ABC and ADC are congruent in the kite below.



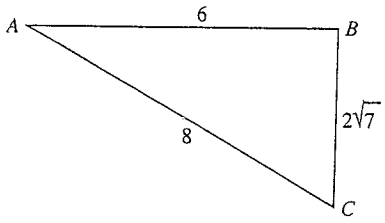
   (b) Prove triangles AOB and COD are congruent. (O is the centre of the circle.)



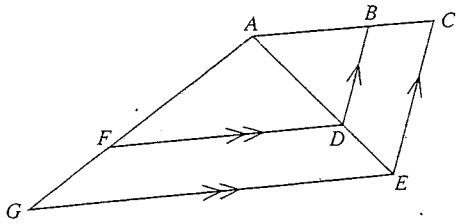
9. Find the area of the figure below.



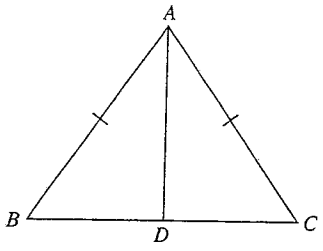
10. Prove triangle ABC is right-angled.



11. Prove $\frac{AF}{AG} = \frac{AB}{AC}$

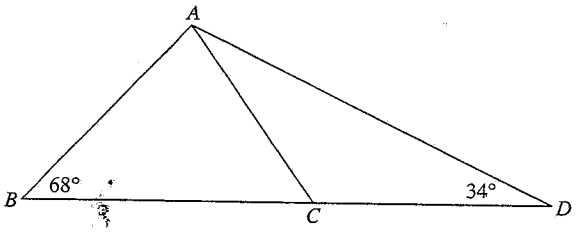


12. Triangle ABC is isosceles, and AD bisects BC.



(a) Prove triangles ABD and ACD are congruent.
(b) Prove AD and BC are perpendicular.

13. Triangle ABC is isosceles, with $AB = AC$. Show that triangle ACD is isosceles.

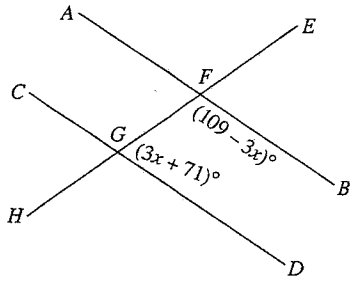


14. Prove that opposite sides in any parallelogram are equal.

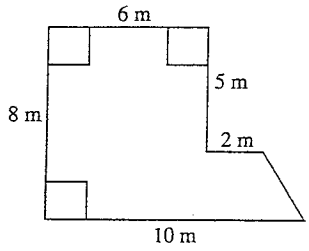
15. A rhombus has diagonals 6 cm and 8 cm.
(a) Find the area of the rhombus.
(b) Find the length of its side.

16. The interior angles in a regular polygon are 140°. How many sides has the polygon?

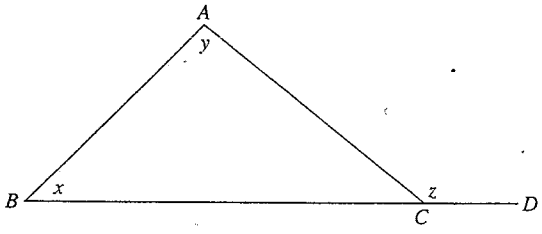
17. Prove AB and CD are parallel.



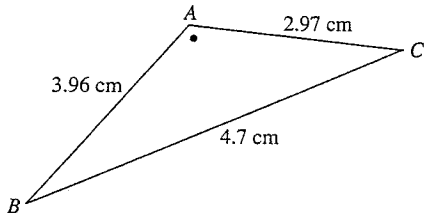
18. Find the area of the figure below.

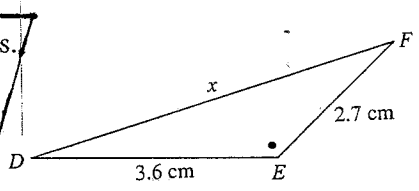


19. Prove that $z = x + y$ in the triangle below.



20. (a) Prove triangles ABC and DEF are similar.
(b) Evaluate x to 1 decimal place.





TEST YOURSELF 4 – ANSWERS

1. (a) $x = 43°$, $y = 137°$, $z = 147°$ (b) $x = 36°$
(c) $a = 79°$, $b = 101°$, $c = 48°$ (d) $x = 120°$
(e) $r = 7.2$ cm (f) $x = 5.6$ cm, $y = 8.5$ cm
(g) $\theta = 45°$

2. $\angle AGF = \theta$
(vertically opposite $\angle$s HGB)
So $\angle AGF = \angle CFE = \theta$
These are equal corresponding $\angle$s
$\therefore AB \parallel CD$

3. 118.28 cm^2

4. (a) $\angle DAE = \angle BAC$
(common)
$\angle ADE = \angle ABC$
(corresponding angles, $DE \parallel BC$)
$\angle AED = \angle ACB$
(similarly)
$\therefore \triangle ABC$ and $\triangle ADE$ are similar (AAA)
(b) $x = 3.1$ cm, $y = 5.2$ cm

5. 162° 6. 1020.7 cm^3 7. 36 m

8. (a) $AB = AD$
(adjacent sides in kite)
$BC = DC$
(similarly)
AC is common
$\therefore \triangle ABC$ and $\triangle ADC$ are congruent (SSS)
(b) $AO = CO$
(equal radii)
$BO = DO$
(similarly)
$\angle AOB = \angle COD$
(vertically opposite angles)
$\therefore \triangle AOB$ and $\triangle COD$ are congruent (SAS)

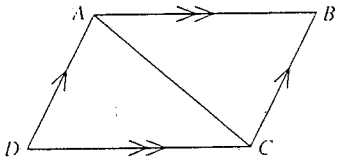
9. 73.5 cm^2

10. $6^2 + (2\sqrt{7})^2 = 36 + 28 = 64 = 8^2$
$\therefore \triangle ABC$ is right-angled
(Pythagoras)

11. $\dfrac{AF}{AG} = \dfrac{AD}{AE}$
(equal ratios on intercepts)
$\dfrac{AD}{AE} = \dfrac{AB}{AC}$
(similarly)
$\therefore \dfrac{AF}{AG} = \dfrac{AB}{AC}$

12. (a) $AB = AC$
(given)
$\angle B = \angle C$
(base $\angle$s of isosceles $\triangle$)
$BD = DC$
(AD bisects BC, given)
$\therefore \triangle ABD \equiv \triangle ACD$ (SAS)
(b) $\angle ADB = \angle ADC$
(corresponding $\angle$s in congruent $\triangle$s)
But $\angle ADB + \angle ADC = 180°$
(straight $\angle$)
So $\angle ADB = \angle ADC = 90°$
So AD and BC are perpendicular.

13. $\angle ACB = 68°$
(base $\angle$s of isosceles $\triangle$)
$\angle CAD = 68° - 34°$
(exterior $\angle$ of $\triangle$)
$= 34°$
$\therefore \angle CAD = \angle ADC = 34°$
So $\triangle ACD$ is isosceles
(base $\angle$s equal)

14. 

$\angle DAC = \angle ACB$
(alternate $\angle$s $AD \parallel BC$)
$\angle BAC = \angle ACD$
(alternate $\angle$s $AB \parallel DC$)
AC is common
$\therefore \triangle ABC \equiv \triangle ADC$ (AAS)
$\therefore AB = DC$
(corresponding sides in congruent $\triangle$s)
Similarly, $AD = BC$
$\therefore$ opposite sides are equal.

15. (a) 24 cm^2 (b) 5 cm 16. 9

17. $\angle BFG + \angle FGD = 109° - 3x + 3x + 71°$
$= 180°$
These are supplementary cointerior $\angle$s
$\therefore AB \parallel CD$

18. 57 m^2

19. $\angle ACB = 180° - (\angle A + \angle B)$
($\angle$sum of $\triangle$)
$= 180° - x - y$
$\angle ACD = 180° - \angle ACB$
(straight $\angle$)
$z = 180° - (180° - x - y)$
$= 180° - 180° + x + y$
$= x + y$

20. (a) $\angle A = \angle E$
(given)
$\dfrac{AC}{EF} = \dfrac{2.97}{2.7} = 1.1$
$\dfrac{AB}{DE} = \dfrac{3.96}{3.6} = 1.1$
$\therefore \dfrac{AC}{EF} = \dfrac{AB}{DE}$
So $\triangle ABC$ and $\triangle DEF$ are similar (two sides in proportion, included $\angle$s equal)
(b) $x = 4.3$ cm