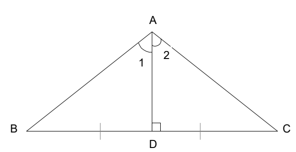
Answer Key

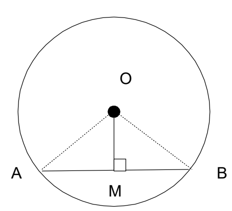
1. 20
2. $x = 3\sqrt{29}$
3. $5\sqrt{2}$
4. 13
5. 9
6. 5
7. $6\sqrt{3}$
8. AF = $\sqrt{2}$, AG = $\sqrt{3}$
9. $\frac{169}{2}\pi$
10. 5
11. $5\frac{1}{3}$
12. $6\frac{2}{3}$
13. $8\frac{1}{3}$
14. 3 : 4 : 5
15. 13
16. $28\frac{4}{5}$
17. $31\frac{1}{5}$
18. $33\frac{4}{5}$
19. 5 : 12 : 13
20. 1

21. 2
22. 4
23. 0.5
24. 1.25
25. $1.25^2 = 1.5625$
26. 24
27. 132
28. 12
29. 126
30. 20
31. 630
32. $h = 60/13$.
33. $3\sqrt{5}$.
34. $10\sqrt{5}$.
35. 6.72
36. 15
37. $\sqrt{5}$
38. 360

39. Our attempt is to prove ΔABD ≈ ΔACD. Since D is the midpoint, BD=CD. AB = AC (isosceles). AD is a common side to both ΔABD and ΔACD. Thus, we have proved that ΔABD≈ΔACD (SSS), which implies ∠1 = ∠2. Moreover, ∠ADB = ∠ADC. Since ∠ADB+∠ADC=180°, ∠ADB=∠ADC=90°.

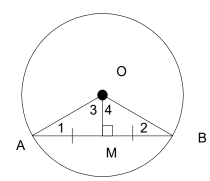


40. Draw auxiliary lines OA and OB (radius). ΔAOB is an isosceles triangle. (Why?) Since M is the midpoint of AB, OM⊥AB.

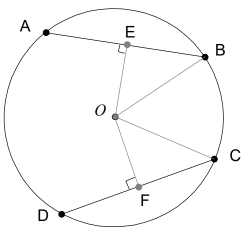


41. AM = 12. Since OM⊥AB (by the previous problem), ΔAOM is a right triangle, r = OA, the hypotenuse, = $\sqrt{5^2 + 12^2}$= 13. Thus, the area of the circle is $13^2\pi$ = 169π cm^2.

42. It is sufficient to prove ΔOAM ≈ ΔOBM since it follows that AM = BM. By the three facts: (i) OA=OB (radius), (ii) ∠3=∠4 for ∠3=90° - ∠1 and ∠4 = 90° - ∠2 while ∠1 = ∠2 for ΔOAB is an isosceles triangle. (iii) OM is a common side to both ΔOAM and ΔOBM, we are able to prove that ΔOAM ≈ ΔOBM (SAS). Thus, our goal is achieved.



43. ΔOBE and ΔOCF are two right triangles.
    OB = OC (= radius)
    CF = BE
    Therefore,
    OE = OF (HL)



44. OE = OF (from the result of the previous problem).
Two right triangles are congruent:
$\Delta OEP \cong \Delta OFP$ (HL).
Thus, $\angle 1 = \angle 2$.