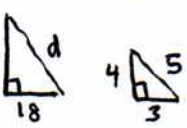# GEOMETRY - BFG SOLUTIONS

1. (A) Given $p \to q$,
the converse is $q \to p$
the inverse of the converse is $\sim q \to \sim p$
the contrapositive of the inverse
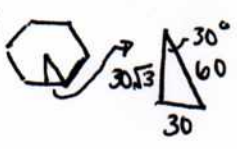of the converse is $p \to q$

2. (C)

$5(6) = 30$

3. (D) Area $= \dfrac{d_1 \times d_2}{2} = \dfrac{(10)(5)}{2} = 25$

4. (B) $\sqrt{8^2 + 6^2 + 2^2} = \sqrt{104} = 2\sqrt{26}$

5. (B) Given $p \to q$, then only the contrapositive is definitely true $(\sim q \to \sim p)$
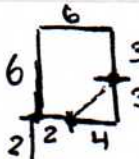
6. (E) $m = \dfrac{15-12}{6-10} = -\dfrac{3}{4}$ $\perp m = \dfrac{4}{3}$

$y - 15 = \dfrac{4}{3}(x-6)$

$y = \frac{4}{3}x + 7 \to 4x - 3y = -21$

7. (A) $x - 2 + (5x - 16) = 180$
$6x = 196$, $x = 33$
$m\angle 8 = m\angle 1 = 33 - 2 = 31°$
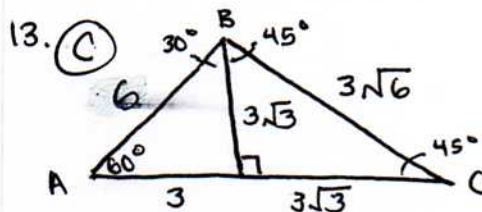
8. (C)

$\frac{2}{3}(6) = 4$
$60(4) = 240$

9. (B) $S_1 + S_2 > S_3$ and
$S_1 - S_2 < S_3$

10. (A)

$A_\triangle = \frac{1}{2}(1)(1) = \frac{1}{2}$
$A_\square = (1)(\sqrt{2}) = \sqrt{2}$
$A_\square = (\sqrt{2})(\sqrt{2}) = 2$
$4(\frac{1}{2}) + 4(\sqrt{2}) + 2$
$= 4 + 4\sqrt{2}$

11. (D)

$\sqrt{3^2 + 4^2}$
$= \sqrt{25} = 5$

12. (C) Geometric mean $= \sqrt{18(2)}$
$= \sqrt{36} = 6$
Arithmetic mean $= \dfrac{10 + 12}{2} = 11$
$11 + 6 = 17$

13. (C)

14. (E) $x + 15 + 2x + 5 + x = 180$
$x = 40$
$y = 75 + x = 75 + 40 = 115$
$z = 180 - 75 - (115 - 70) = 60$
$40 + 115 + 60 = 215$

15. (C) The circumcenter is where the perpendicular bisectors of a triangle intersect.

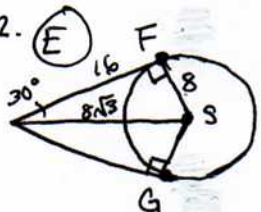**16.** (D) $A = \dfrac{s^2\sqrt{3}}{4} = 9\sqrt{3}$
$s^2 = 36 \to s = 6$

17. (B) $V_{sphere} = \frac{4}{3}\pi r^3 = 972\pi$
$r^3 = 729$, $r = 9$
$C = 2\pi r = 18\pi$

18. (B) $V_{sphere} = \frac{4}{3}\pi r^3$
$\frac{4}{3}\pi(5^3) = 500\pi/3$
$\dfrac{500\pi}{3} \cdot \dfrac{1}{2} = \dfrac{250\pi}{3}$

19. (D) $V_{cone} = \frac{1}{3}\pi r^2 h$

$= \frac{1}{3}\pi(6)^2(14) = 168\pi$

$V_{sphere} = \frac{4}{3}\pi r^3 = \frac{4}{3}\pi(3)^3 = 36\pi$

$168\pi + 36\pi = 204\pi$

20. (B) Semiperimeter = 9

$A = \sqrt{9(9-4)(9-6)(9-8)}$

$= 3\sqrt{15}$

21. (C) $A = 180(n-2)$

$= (8)(180) = 1440$
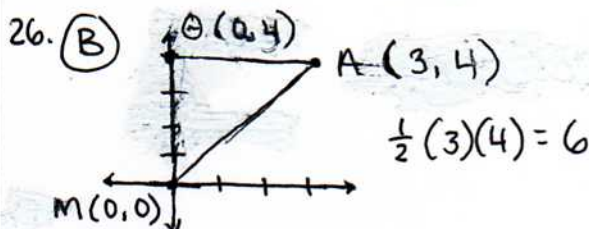
$B = 6(10) = 60$

$1440 + 60 = 1500$

22. (E)

$\frac{1}{2}(8)(8\sqrt{3})$

$= 32\sqrt{3}$

$2(32\sqrt{3}) = 64\sqrt{3}$

23. (B) $15^2 - 9^2 = 12^2$

$d_2 = 24$

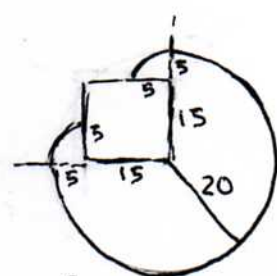$Area = \frac{d_1 \times d_2}{2} = \frac{(18)(24)}{2} = 216$

24. (D) The center of a polygon's inscribed circle is the in-center, which is the point of intersection of the polygon's angle bisectors.
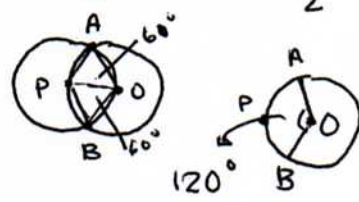
25. (E) $3x + x = 16 \rightarrow x = 4$

$GS = 3x = 3(4) = 12$

$SA = x = 4$

$(3y)(4y) = (12)(4)$

$12y^2 = 48$

$y = 2$

25. continued ... $TN = r = \boxed{8}$

$IS = 3(2) = 6$

$SN = 4y = 4(2) = \boxed{8}$

$TS = GS - 8 = 12 - 8 = \boxed{4}$

Semiperimeter $TSN = \frac{8+8+4}{2} = 10$

$Area_{TSN} = \sqrt{10(10-8)(10-8)(10-4)}$

$= \sqrt{240} = 4\sqrt{15}$

26. (B)

$\frac{1}{2}(3)(4) = 6$

27. (B) $A = \pi r^2$

let $r_1 = 1$, $A_1 = \pi$

$r_2 = 4$, $A_2 = 16\pi$

28. (B)

$\frac{3}{4}\pi r^2 = \frac{3}{4}\pi(400) = 300\pi$

$\frac{1}{4}(\pi)(r^2) = \frac{1}{4}\pi(25) = \frac{25\pi}{4}$

$2(\frac{25\pi}{4}) = \frac{50\pi}{4} = \frac{25\pi}{2}$

$\frac{600\pi}{2} + \frac{25\pi}{2} = \frac{625\pi}{2}$

29. (C)

$m\angle AOB = m\,\overarc{APB} = 120°$