Answers:

1. $\sim q \rightarrow p$
2. 13
3. $4\sqrt{2}$
4. 54°
5. 30°
6. F or False
7. 10
8. 170°
9. 7
10. 13°
11. 100°
12. 325
13. $3\sqrt{14}$
14. 41
15. 16
16. $2+\sqrt{6}$
17. $\pi/6$ or $\pi:6$
18. $1/\pi$ or $1:\pi$
19. $1/3$ or $1:3$
20. 4
21. $38\sqrt{3}$
22. 64π
23. $2\sqrt{10}$
24. $1/3$ or $1:3$
25. $36/5$

Solutions:

1. Contrapositive is $q \rightarrow \sim p$, inverse of that is $\sim q \rightarrow p$.

2. Third side must be 3, 4, 5, 6, or 7, but to be the largest, it would have to be 6 or 7. 6+7=13

3. $x^2 = 4(12-4) = 4 \cdot 8 = 32 \Rightarrow x = 4\sqrt{2}$

4. Exterior angle has measure $\frac{360^\circ}{10} = 36^\circ$, complement is 54°

5. $CD = 2 \cdot 80^\circ = 160^\circ$, $DB = 360^\circ - 160^\circ - 100^\circ = 100^\circ \Rightarrow \angle CAD = \frac{1}{2}(160-100)^\circ = 30^\circ$

6. p,q T & r F $\Rightarrow p \wedge q$ T $\Rightarrow p \wedge q \rightarrow r$ F

7. $x^2 + 8x = 180 \Rightarrow x^2 + 8x - 180 = 0 \Rightarrow (x+18)(x-10) = 0 \Rightarrow x = 10$

8. $(1+2+...+8)x = 360 \Rightarrow 36x = 360 \Rightarrow x = 10$ is smallest exterior angle $\Rightarrow 170^\circ$ is largest interior angle

9. $2x + \frac{1}{5}x + 3 = 47 \Rightarrow \frac{11}{5}x = 44 \Rightarrow x = 20 \Rightarrow$ base length is 7

10. $2x + 3x = 7x - 13 \Rightarrow 2x = 13 \Rightarrow$ three interior angles are 13°, 19.5°, and 147.5° Smallest angle is 13°

11. Angle intercepts 200° arc, so angle has measure $\frac{1}{2}(200^\circ) = 100^\circ$

12. Man walks net of 125 feet north and 300 feet east. The hypotenuse has length 325.

13. $\sqrt{9^2+6^2+3^2} = \sqrt{81+36+9} = \sqrt{126} = 3\sqrt{14}$

14. $\sqrt{9^2+40^2} = \sqrt{81+1600} = \sqrt{1681} = 41$

15. Distance from center of hole to center of sphere is $\sqrt{10^2-8^2} = \sqrt{100-64} = \sqrt{36} = 6$, so farthest distance is from center to far side of sphere through the center.

6+10=16

16. Circle has equation $x^2+(y-2)^2=6 \Rightarrow a=0,\ b=2,\ r=\sqrt{6} \Rightarrow a+b+r=2+\sqrt{6}$

17. $\dfrac{\frac{4}{3}\pi r^3}{(2r)^3}=\dfrac{\frac{4}{3}\pi r^3}{8r^3}=\dfrac{\pi}{6}$

18. $\dfrac{d}{C}=\dfrac{2r}{2\pi r}=\dfrac{1}{\pi}$

19. ratio of areas is $\dfrac{2k^2}{18k^2}=\dfrac{1}{9}$, so the ratio of the perimeters is $\dfrac{1}{3}$

20. $\dfrac{1}{2}(8+5)h=26 \Rightarrow h=4$

21. $V=\dfrac{1}{3}\cdot 6\left(\dfrac{4^2\sqrt{3}}{4}+\dfrac{6^2\sqrt{3}}{4}+\sqrt{\left(\dfrac{4^2\sqrt{3}}{4}\right)\left(\dfrac{6^2\sqrt{3}}{4}\right)}\right)=2\left(4\sqrt{3}+9\sqrt{3}+6\sqrt{3}\right)=38\sqrt{3}$

22. $8^2+(R-2)^2=(R+2)^2 \Rightarrow 64+R^2-4R+4=R^2+4R+4 \Rightarrow 64=8R \Rightarrow R=8 \Rightarrow A=\pi\cdot 8^2$
$=64\pi$

23. $\pi r^2\cdot 8=320\pi \Rightarrow r^2=40 \Rightarrow r=2\sqrt{10}$

24. ratio of smaller triangle area to larger triangle area is $\left(\dfrac{1}{2}\right)^2=\dfrac{1}{4}$, so the ratio of the smaller triangle's area to the area of the trapezoid is $\dfrac{1}{4-1}=\dfrac{1}{3}$

25. triangle is right, so $15h=12\cdot 9 \Rightarrow h=\frac{108}{15}=\frac{36}{5}$