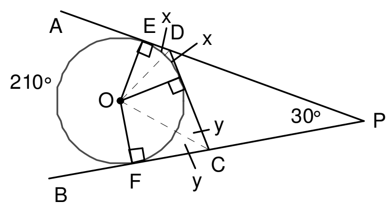
1. $\theta=\frac{1}{2}\left|60(1)-11(15)\right|=\frac{1}{2}\left|60-165\right|=\frac{1}{2}\left|-105\right|=52.5°$ (D)

2. Converse $(p\to q)=(q\to p)$. Inverse $(q\to p)=(\sim q\to\sim p)$. Converse $(\sim q\to\sim p)=(\sim p\to\sim q)$. (A)

3..



Sum of acute angles of 4 rt. Δs is $360°$.

$\therefore m\measuredangle EOF+2x+2y=360°$

$150°+2x+2y=360°;\quad 2x+2y=210°;\qquad x+y=105°$

$\therefore m\measuredangle O\ (i.e.\ m\measuredangle EOC)=180°-105°=75°$ (A)

4. $Area=\frac{1}{2}(12\cdot 25)=150$ (E)

5. $A=\sqrt{18(18-10)(18-12)(18-14)}=\frac{1}{2}(14)h$; $A=\sqrt{18(8)(6)(4)}=7h$; $24\sqrt{6}=7h$; $h=\frac{24\sqrt{6}}{7}$ (C)

6. $6\left(\frac{s^2\sqrt{3}}{4}\right)=150\sqrt{3}$; $s^2=100$; $s=10$. $A=150\sqrt{3}=\frac{1}{2}ap=\frac{1}{2}a(60)=30a$. $\therefore a=5\sqrt{3}$. (B)

7. $l=\sqrt{6^2+5^2}$; $LA=\frac{1}{2}pl=\frac{1}{2}(10\pi)\left(\sqrt{61}\right)=5\pi\sqrt{61}$. (C)

8. $r=\frac{l_1\cdot l_2}{h}=\frac{(3)(4)}{5}$; $V=\frac{1}{3}\pi\left(\frac{12}{5}\right)^2h_1+\frac{1}{3}\pi\left(\frac{12}{5}\right)^2h_2=\frac{1}{3}\pi\left(\frac{12}{5}\right)^2(h_1+h_2)=\frac{1}{3}\pi\left(\frac{12}{5}\right)^2(5)=\frac{48\pi}{5}$ (C)

9. The point of concurrency for altitudes of a triangle is the orthocenter. (C)

10. Arc length$=\frac{\theta}{2\pi}(\pi d)$. $6\pi=\frac{\theta}{2\pi}(16\pi)$; $\theta=\frac{3\pi}{4}$ (E)

11. $4x+(6x-20)=90°$; $10x=110$; $x=11$. $4x=44°$; $(6x-20)=46°$. $180°-44°=136°$ (D)

12. Order of A/B is unimportant. Either PA = 6 & PB = 36 or vice versa. $\therefore PA\cdot PB=(6)(36)=216$ (D)

13. $SA=4\pi r^2=4\pi(9)^2=4(81\pi)=324\pi$ (B)

14. $r=\frac{1}{2}(a+b-c)=\frac{1}{2}(11+60-61)=\frac{1}{2}(10)=5$ (A)

15. Example: $\frac{x^2}{a^2}-\frac{y^2}{b^2}=1$. $\frac{x^2}{7}=\frac{y^2}{5}+8$; $\frac{x^2}{7}-\frac{y^2}{5}=8$; $\frac{x^2}{56}-\frac{y^2}{40}=1$. $\therefore$ *hyperbola* (A)

16. $x^2+y^2-2x+4y+5=0$; $x^2-2x+1+y^2+4y+4=-5+1+4$; $(x-1)^2+(y+2)^2=0$; pt (1, -2) (B)

17. 6-8-10 rt Δ; r = $\frac{1}{2}(6+8-10)=\frac{1}{2}(4)=2$; $A_\Delta-A_\bigcirc=\frac{1}{2}(6)(8)-\pi(2)^2=24-4\pi$ (A)

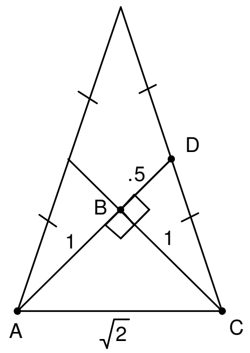
18. Must have correct x,y,z intercepts so need LCM of 2,3, & 4: 12; 6x + 4y + 3z = 12 (D)

19. $V=\frac{4}{3}\pi(4)^3=\frac{1}{3}\pi(2)^2h$; $(4)^3=h$; $h=64$ (B)

20. $V=\frac{h}{3}\left(B+b+\sqrt{Bb}\right)$; $V=\frac{15}{3}\left(20+5+\sqrt{(20)(5)}\right)=5(25+10)=175$ (D)

21. $PQ=\frac{1}{2}(AB-DC)$; $30=\frac{1}{2}(100-DC)$; $60=100-DC$; $DC=40$ (C)

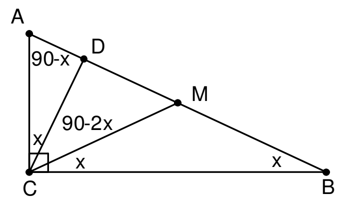
22.



$$Area\ \Delta ADC = \frac{1}{2}\ area\ isosceles\Delta$$
$$Area\ \Delta ADC = Area\ \Delta ABC + Area\ \Delta BDC$$
$$Area\ \Delta ADC = \frac{1}{2}(1)(1) + \frac{1}{2}(1)(.5)$$
$$Area\ \Delta ADC = \frac{1}{2} + \frac{1}{4} = \frac{3}{4}$$
$$\therefore\ area\ \ isosceles\Delta = 2\left(\frac{3}{4}\right) = \frac{3}{2} = 1.5$$

(B)

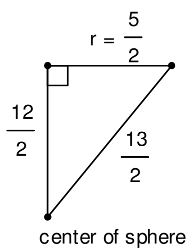
23.



$$90 - 2x = \frac{1}{2}(90 - x)$$
$$180 - 4x = 90 - x$$
$$90 = 3x$$
$$30 = x \qquad m\measuredangle MCD = 90 - 2(x) = 90 - 2(30) = 30°$$

(B)

24.



d = 5

(B)

25. Let x = area of overlap. $(400\pi - x) - (225\pi - x) = 400\pi - 225\pi = 175\pi$ (A)

26. 8,10,12 $\Delta = \frac{1}{4}$ (area ▱). Area ▱ = $4\sqrt{15(15-8)(15-10)(15-12)} = 4\sqrt{15(7)(5)(3)} = 4 \cdot 15\sqrt{7} = 60\sqrt{7}$ (C)

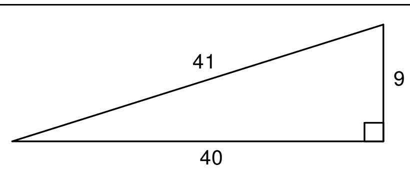
27. A ray drawn from a vertex of a triangle through the midpoint of a median of the triangle divides the side opposite the vertex, into two unequal segments. The longer of these segments is twice the length of the shorter segment. In this situation BP = 2PC. $\therefore BP = 8$ and CB = 12. (D)

28. Extend $\overline{AB}$ & $\overline{DE}$ to intersect at C. Draw $\overline{FO}$ to create three $\sim rt\Delta s$. $\frac{AD}{FO} = \frac{FO}{EB}$; $\therefore FO^2 = AD \cdot EB$ and by substitution $FO^2 = FD \cdot FE$ (B)

29. $m\measuredangle 1 = 70°$, $m\measuredangle XTD = 70°$, $m\measuredangle 12 = 110°$, $110° = 70° + m\measuredangle 2$, $\therefore m\measuredangle 2 = 40°$ & $m\overset{\frown}{TD} = 80°$.

$360° - (140° + 80° + 50°) = 90° = m\overset{\frown}{XY}$. $m\measuredangle 5 = \frac{1}{2}\left(m\overset{\frown}{XDT} - m\overset{\frown}{XY}\right) = \frac{1}{2}(220° - 90°) = 65°$ (E)

30.



Roll the cylinder 10 times so that all of the wire has touched the ground. The path of the wire on the ground, the path of the bottom edge of cylinder, and the length of the cylinder in final position forms a rt. Δ whose horizontal leg = 10(4) and whose vertical leg is the length of the cylinder (9). $\therefore$ the hypotenuse (and the length of the wire) is 41. (C)