1. C ${}_5C_5 + {}_5C_4 + {}_5C_3 = 16$

2. D Sum of arcs must equal 360, making x = 25, $m\overset{\frown}{ABC} = 325$

3. D Triangle MCS is right with hypotenuse 10, and one leg = 8, CM=6, BM = 10+6=16

4. C ACEG is a square so to find a side of ACEB, extend segments BC, DE, FG, and AH to form a square. Use the triangle that has $\overline{CE}$ as a hypotenuse. Let the right angle be point M. Since CD=1, CM=$\frac{\sqrt{2}}{2}$ and ME = $\frac{\sqrt{2}}{2}+1$. Use Pythag to find $(CE)^2$. This is the area $2+\sqrt{2}$.

5. A $2x \bullet 3x = 3(x+3)$. Solving makes x=1.5. Lengths of chords are 7.5 and 7.5. Product is 56.25.

6. B Let $m\overset{\frown}{AC} = a, m\overset{\frown}{BD} = b, m\angle BKD = \frac{b-a}{2}$, $m\angle BMD = \frac{a+b}{2}, \left(\frac{a+b}{2}\right) = 2\left(\frac{b-a}{2}\right)$, makes $3a = b$, substituting makes $\frac{\frac{2a}{2}}{3a} = \frac{a}{3a} = \frac{1}{3}$.

7. C Let a side of the square = 8 with points of tangency of the circle, isosceles right triangles are formed with legs 4 and hypotenuse $4\sqrt{2}$ - also the side of the inscribed square. Original square has area 64, remaining square has area 32. $\frac{1}{2}$ of the original was cut off.

8. E
$m\angle OBA = m\angle OAB = 50, m\angle OBC = 130,$
$180 - (130 + 30) = 20$

9. C Divide all terms by 4 and completing the square gives $(x+3)^2 + (y-2)^2 = 19$, area = 19π

10. B Let AB be the diameter of circle O. OB=4, O'B=2, area of circle O' = 4π

11. D Let arc AD = x and arc CB = y then $\frac{x+y}{2} = 95$ and $\frac{x-y}{2} = 25$. Solving the system gives x=120 and y=70. Let arc AC=a and arc BD=b. a+b=360-190=170. a+70=2x and b+70=3x making a+b+140=5x, since a+b=170, 310=5x making x=62. Arc BD=186 so arc BCD = 360-186 = 174.

12. B The measure of one exterior angle is 3 degrees, divide 360 by 3 to get the number of sides which is 120. Diagonals = $\frac{n(n-3)}{2} = \frac{120 \bullet 117}{2} = 7020$.

13. A AB=AC=20. Let M be the point of tangency of segment DE. BD=DM so AD+DM=20. CE=EM so AE+EM=20, making the perimeter 40.

14. B Central angle = 60 since triangle is equilateral. area of sector – area of triangle = π. $\left(\frac{1}{6}\pi r^2 - \frac{r^2\sqrt{3}}{4} = \pi\right)$ solving gives $r^2 = \frac{12\pi}{2\pi - 3\sqrt{3}}, r = 5.89$

15. D $6 \bullet \left(\frac{s^2}{\sqrt{3}}4\right) = \sqrt{108}$, solving gives s=2 so the diameter is 4.

16. D Using the 2 chord power theorem, $(2x+1)(5x+2) = (3x-1)(5x-2)$, solving gives x=4. Triangles are similar by AA, AB=10, BK=11, CD=22, $\frac{10}{x} = \frac{11}{22}, x = 20$.

17. B Distance from center is perpendicular bisector of chord. Draw right triangle. Legs are 5 and 5 so hypotenuse = $5\sqrt{2}$, area = 50π.

18. B $119 = \frac{n(n-3)}{2}, 238 = n^2 - 3n$, solving gives n=17.

19. C In triangle ABP, draw the altitude from P to segment AB, label the foot of the altitude M. Using one of the right triangles formed and Pythagorean theorem , PM= $\sqrt{x^2-36}$. PM +(P to segment DC) equals a side of the square. $\sqrt{x^2-36}+x=12$. Solving x=7.5.

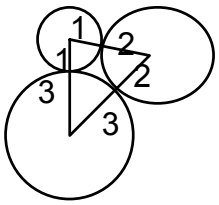
20. B Let the side of the square be s. radius of one circle is $\frac{1}{4}$s. Area of the four circles is $4\bullet\left(\frac{1}{4}s\right)^2\pi=\frac{1}{4}s^2\pi$. Area of square is s^2, so ratio is $\frac{\pi}{4}$.

21. E Measure of central $\angle POQ=108$. Area of sector is $\frac{108}{360}\bullet 100\pi=30\pi$.

22. B $\frac{2}{5}\bullet 20\pi=8\pi$

23. D Side of triangle is 12 so area of the triangle is $36\sqrt{3}$ so $36\sqrt{3}=6\bullet\frac{s^2\sqrt{3}}{4}$ makes s= $2\sqrt{6}$.

24. A Sides of triangle are 3, 4, 5, so it's a right triangle and area is 6.



25. C Interior angle of a regular pentagon is 108, regular decagon is 144, ratio is 3:4

26. D m $\angle EFA=120, m\angle FAE=m\angle FEA=30$, $m\angle AFG=30$ since AG=AF, $m\angle AGF=120$, m $\angle AGB=60$.

27. D Diagonals are perpendicular and bisect each other making 6,8,10 right triangles. P=40.

28. B 2x+3x+4x+6x=360, x=24. Smallest interior angle is 48, largest exterior angle is 132.

29. C Angle of hexagon =120, angle of square = 90. Since the sum of the angles at one vertex must be 360: 360-(120+90)=150. Dodecagon.

30. C Diagonals are perpendicular and bisect forming 30-60-90 triangles. Ratio of diagonals is $x\sqrt{3}:x=\sqrt{3}:1$.