1.	A	One exterior angle of a regular polygon = $360/n$; $360/20 = 18$
2.	C	Can't draw a diagonal to the two consecutive vertices or to the vertex itself. # of diagonals from one vertex = n -3 = 10-3=7
3.	D	Original right triangle: If vertical leg = 8, hypotenuse = 10, then horizontal leg = 6 New right triangle: If horizontal leg = 7, hypotenuse = 10, then vertical leg $=\sqrt{10^2-7^2}=\sqrt{51}$ Change in vertical leg: $8-\sqrt{51}$
4.	A	2 inches are removed from each side (4 inches total) of the length and width of the cardboard. The height of the box is the side of one of the squares. The dimensions of the box are 4 x 6 x 2. Volume = lwh = (4)(6)(2) =48
5.	E	Not enough information to answer. Non-intersecting lines: 1) If the lines are coplanar then they are parallel. 2) If the lines are not coplanar then the lines are skew.
6.	C	Let A= $1st\ \angle$; B = 2nd$\angle$. Complementary: A + B = 90; Vertical: A=B; A+A=90; 2A=90; A=45
7.	A	A sketch shows A, B, & C are all 3 units away from point O (2,-4) therefore $(x-2)^2+(y+4)^2=3^2$; $x^2-4x+4+y^2+8y+16=9$; $x^2+y^2-4x+8y+11=0$
8.	B	3 subsets: 1) points outside the sphere; 2) points on the sphere; 3) points inside the sphere.
9.	A	If $A\cap B=\emptyset$ then, $A\cup(A\cap B)=A$. If $A=B$ then, $A\cup(A\cap B)=A\cup A=A$. If $A\neq B$, and $A\cap B\neq\emptyset$ then a venn diagram has areas: 1) elements in A but not in B 2) elements in A & B 3) elements in B but not is A A = areas 1 + 2; $(A\cap B)$ = area 2 ; $A\cup(A\cap B)=(areas\ 1+\ 2)\cup area\ 2)=areas\ 1+2=A$
10.	C	2(360) + 2(1440) - 2(360) = 2(1440) = 2880
11.	D	A plane parallel to and between the bases has a circular cross section tilting it creates an ellipse.
12.	A	$x=5-x/2$; $2x=10-x$; $3x=10$; $x=10/3$
13.	A	Volume of frustum: $V=(1/3)h(B+b+\sqrt{Bb})$; $b=4\pi$; $B=\pi R^2$; $h=4$; $V=52\pi$ $52\pi=(1/3)4\left(\pi R^2+4\pi+\sqrt{\pi R^2\cdot 4\pi}\right)=(4/3)(\pi R^2+4\pi+2R\pi)$ $(3/4)52\pi=\pi(R^2+4+2R)$ $39=R^2+2R+4$

		$39 - 3 = R^2 + 2R + 4 - 3$ $36 = R^2 + 2R + 1 = (R+1)^2$ $6 = R + 1$ $5 = R$
14.	B	Volume of frustum: $V = (1/3)h(B + b + \sqrt{Bb})$; $b = 4\pi$; $B = 9\pi$; $h = 6$; $V = ?$ $V = (1/3)h(B + b + \sqrt{Bb}) = (1/3)(6)(9\pi + 4\pi + \sqrt{9\pi \cdot 4\pi}) = (2)\left(13\pi + \sqrt{36\pi^2}\right)$ $= (2)(13\pi + 6\pi) = (2)(19\pi) = 38\pi$
15.	B	The line represented by the equation has a y-intercept of -3 and an x-intercept of 4 meaning that the 3-4-5 right triangle formed by the axes and the equation has horizontal leg 4 and a vertical leg length 3 and therefore, an area of 6. The vertical leg is to be moved it to form a larger similar triangle which has an area 4 times the original. Since the ratio of their areas is 1:4 the ratio of similitude between is 1:2. Therefore, the new triangle is 6, 8, 10 and the vertical side must move 4 spaces to the left to create the side length 8. X = -4
16.	D	"if" identifies the hypothesis so the conclusion is "An angle is a right angle"
17.	C	The porch is a 7 x 3 rectangle surmounted by a trapezoid $B = 9, b = 7, h = ?$. Area of the porch: 53 $A = lw + h(b+B)/2$; $53 = (7)(3) + h(7+9)/2$; $2(53 - 21) = 16h$; $2(32) = 16h$; $4 = h$ The median of the trapezoid is 5 feet from the door. $median = (b+B)/2 = (16)/2 = 8$
18.	D	A central angle of the original octagon forms a triangle with sides 2.6, 2.6, and 2. The same central angle of the new octagon forms a similar triangle with sides $2.6 - \sqrt{2}$, $2.6 - \sqrt{2}$, and x (the side of the new octagon). The ratio of corresponding sides must be equal $2.6/(2.6 - \sqrt{2}) = 2/x$; $2.6x = 5.2 - 2\sqrt{2}$; $x = (5.2 - 2\sqrt{2})/2.6$; perimeter: $8x = 8(5.2 - 2\sqrt{2})/2.6$. Since $\sqrt{2} \approx 1.4$, $8x \approx 8(5.2 - 2.8)/2.6 \approx 8(2.4)/2.6 \approx 19.2/2.6 \approx 7.4$
19.	C	The volume formula for a prism like shape is $V = Bh$. The height is 5 the base is a segment of a circle. $B = sector - triangle$. Since the sector angle is 90° the sector is $90^\circ/360^\circ = 1/4$ of its circle's area and the sector's arc length is $1/4$ the circumference of its circle. $C/4 = 2\pi r/4$; $5 = 2\pi r/4$; $20 = 2\pi r$; $10/\pi = r$ $A = \pi r^2 = \pi(10/\pi)^2 = 100/\pi$;

		sector: $A/4 = 25/\pi$ triangle: 45-45-90; leg =r ; A=$1/2\,(leg)^2 = 1/2\left(100/\pi^2\right) = 50/\pi^2$ $B = sector - triangle = 25/\pi - 50/\pi^2 = (25\pi - 50)/\pi^2$ $V = Bh = (25\pi - 50)/\pi^2 \cdot 5 = (125\pi - 250)/\pi^2 = 125(\pi - 2)/\pi^2$
20.	B	Using right triangle trigonometry, the longer base has length $6 + \frac{4\sqrt{3}}{3} + 4\sqrt{3}$, so the enclosed area is $\frac{1}{2}\left(6 + 6 + \frac{4\sqrt{3}}{3} + 4\sqrt{3}\right)4 = 24 + \frac{32\sqrt{3}}{3}$.
21.	A	Form an isosceles triangle by using the anchor points of the twine as vertices. The vertex angle of the triangle is at Todd's foot a base angle is at Paul's foot. The width of the atrium is the altitude drawn from the vertex angle. The altitude divides the isosceles triangle into two congruent right triangles, the hypotenuse of each is half the length of twine 50 feet and the vertical leg of each is the distance between the levels of the mall 25 feet. Since this measure is half the hypotenuse the triangle is a 30-60 right triangle and the long leg and the width of the atrium is $25\sqrt{3}$
22.	A	Dodecagon = 12 sides; perimeter = 36; side = $36 \div 12 = 3$; central angle= $360^\circ \div 12 = 30^\circ$. Consider the isosceles triangle formed by two consecutive radii and a side of the dodecagon. The base angles of the triangle = $(180^\circ - 30) \div 2 = 150^\circ \div 2 = 75^\circ$. Since an angle measure (30°) and the length of the side (3) opposite the angle are known the Law of Sines can be used to find the length of the radii. $radius/\sin(75^\circ) = 3/\sin(30^\circ) = 3/\left(1/2\right) = 6$; $radius/\sin(75^\circ) = 6$ or solving: $radius = 6\sin(75^\circ)$
23.	D	Central angle equals $360^\circ \div number\ of\ sides$. Therefore, $360^\circ \div 15$ = 24°.
24.	A	Using right triangle trigonometry, from the top of the pole straight to the ground is a distance of 7 feet, and because the ribs are 8 feet, the distance between the point on the ground for that vertical distance and the end of a rib is $\sqrt{15}$ feet. Therefore, double that length to get the distance between the tips of the ribs.
25.	E	Ratio of volumes: $r^3/R^3 = 8/27$ Ratio of radii: $r/R = 2/3$ If area of smaller sphere = $4\pi r^2 = 64\pi$ then $r^2 = 16$ and $r = 4$ and $4/R = 2/3$; $2R = 12$; $R = 6$
26.	C	If the arcs come within 2 inches of each other it would happen on a side of the square and would mean that 12 inches of the 14 inch side are divided between the radii of two of the arcs. Therefore, the radius of each arc is 6 inches. Since four ninety degree arcs are removed from the square a total of one complete circle has been removed leaving a perimeter that is the circumference of the circle plus 2 inches left between the arcs on each side of the square. $P = 2\pi r + 4 \cdot 2 = 2\pi 6 + 8 = 12\pi + 8$
27.	A	Radius, apothem, and half side form a 30-60 right triangle. Radius = hypotenuse; apothem = short leg. Therefore, apothem = $1/2\,radius = 1/2 \cdot 10 = 5$.

28.	B	Area of Hexagon = Area 6 equilateral triangles so $24\sqrt{3} = 6 \cdot {s^2\sqrt{3}}/_4$ which simplifies to side = 4 and perimeter = 24. To find the height write ${}^1/_3 = {}^4/_h$ and see h = 12. $A = 2B + ph = 2 \cdot 24\sqrt{3} + 24 \cdot 12 = 48\sqrt{3} + 288$
29.	C	A 45° arc is ${45^\circ}/_{360^\circ} = {}^1/_8$ of a circle's length $(circumference = 2\pi r)$ meaning that $4\pi = ({}^1/_8)2\pi r$ Divide by 2π to get $2 = {}^r/_8$ and r = 16. (Since this is the radius of a great circle it is also the radius of the sphere.) Ratio of Volume of Sphere to Area of the sphere is ${{}^4/_3 \pi r^3}/_{4\pi r^2} = {}^1/_3 r = {}^1/_3 \cdot 16 = {}^{16}/_3$
30.	B	V=Bh; The radius (5 in) and apothem (2.5 in) of the base form a 30-60 right triangle with half the side $(2.5\sqrt{3})$ of the base. Therefore, a side of the base is $5\sqrt{3}$ and the area of the base is $B = {s^2\sqrt{3}}/_4 = {(25)(3)\sqrt{3}}/_4 = {75\sqrt{3}}/_4$; $V = Bh = {75\sqrt{3}}/_4 \cdot 40 = 75\sqrt{3} \cdot 10 = 750\sqrt{3}$