1. $\sqrt{(18-1)^2}=17 \quad B$
2. 4y = -3x + 5, m = -3/4 = A, and the y-intercept is (0, 5/4). 5/4 – ¾ = ½ A
3. $m=\frac{81-221}{400-260}=\frac{-140}{140}=-1$. y = -x + b, 221 = -260 + b, b = 481. x + y = 481 C
4. X-intercept is (0, -C/B), y-intercept is (-C/A, 0). Distance = $\sqrt{\frac{C^2}{A^2}+\frac{C^2}{B^2}}=\sqrt{\frac{C^2B^2+C^2A^2}{A^2B^2}}=C\sqrt{\frac{A^2+B^2}{A^2B^2}} \quad A$
5. The midpoint of AB is (-2, 7). The slope of AB is -6/6 = -1, so the slope of the line we want is 1. y – 7 = x + 2. D
6. Since the line is slope of 1, the arctangent of 1 is 45 degrees. B
7. The midpoint is (-2, 7), so take the midpoint of (-2, 7) and (1, 4), which is (-1/2, 11/2)C
8. $x^2+6x+9=4y-13+9 \Rightarrow (x+3)^2=4y-4$, so we have $y=\frac{1}{4}(x+3)^2+1$, of which the vertex is (-3, 1). a = ¼, so p = 1, so the focus is (-3, 2). D
9. $x^2-6x+9+y^2+12y+36=-29+9+36$, so $(x-3)^2+(y+6)^2=16$, radius = 4 A
10. The vertex is (-3, 1), and p = 1, so the directrix is the x-axis. B
11. We make a right triangle with side lengths distance between the vertex and the center, distance of the tangent, and connecting those points through the radius. We have a right triangle with hypotenuse length $\sqrt{85}$, and leg length 4 (the radius). So 85 – 16 = 69, so we take the square root of 69 for the answer, C.
12.
$x^2+18x+81+y^2-18y+81=-162+81+81$
$(x+9)^2+(y-9)^2=0$
The graph is the point (-9, 9) C
13. Three triangles, on the W shaped graph. We have $\frac{1}{2}(2)(2)+\frac{1}{2}(18)(9)+\frac{1}{2}(3)(3)=\frac{175}{2} \quad A$
14. *C*
15. $\begin{vmatrix} i & j & k \\ 3 & 7 & 5 \\ 4 & 3 & -2 \end{vmatrix}=-14i+20j+9k-(28k+15i-6j)=-29i+26j-19k \quad C$
16. D
17. $\begin{vmatrix} i & j & k \\ -29 & 26 & -19 \\ 1 & 0 & 1 \end{vmatrix}=26i-19j-(26k-29j)=26i+10j-26k \quad B$
18. It's the same as the Cartesian distance between the points $\left(\frac{1}{\sqrt{2}},\frac{1}{\sqrt{2}}\right)$ and (-1, 0). So we have

$$\sqrt{\left(\frac{1}{\sqrt{2}}+1\right)^2+\frac{1}{2}}=\sqrt{\frac{1}{2}+1+\sqrt{2}+\frac{1}{2}}=\sqrt{2+\sqrt{2}} \quad A$$

19. We find the area of the sector of the circle, minus the triangle and double that result. The area of the quarter circle is $\frac{1}{4}\pi\left(\frac{a}{2}\right)^2 = \frac{a^2\pi}{16}$. The triangle is a right triangle with legs of length a/2 and a/2. So the area of the triangle is $\frac{1}{2}\left(\frac{a}{2}\right)\left(\frac{a}{2}\right) = \frac{a^2}{8}$. So we subtract and double, for $2(\frac{a^2\pi}{16} - \frac{a^2}{8}) = \frac{a^2\pi}{8} - \frac{a^2}{4} = \frac{a^2}{8}(\pi - 2)$ D

20. We want the center of the hyperbola:

$13(x^2 + 2x + 1) - 7(y^2 - 2y + 1) = 85 + 13 - 7$

$13(x+1)^2 - 7(y-1)^2 = 91$ A

21. We want twice the distance between (x, y) and (4, 5) to be the distance between (x, y) and (-1, 1).

$2\sqrt{(x-4)^2 + (y-5)^2} = \sqrt{(x+1)^2 + (y-1)^2}$

$4\left[x^2 - 8x + 16 + y^2 - 10y + 25\right] = x^2 + 2x + 1 + y^2 - 2y + 1$

$4x^2 + 4y^2 - 32x - 40y + 64 + 100 = x^2 + y^2 + 2x - 2y + 2$

$3x^2 + 3y^2 - 34x - 38y + 162 = 0$ C

22. We subtract the area of the circle from the area of the square. The side lengths of the square are $4\sqrt{2}$, so the area of the square is 32. The radius of the circle is half the side length of the square, or $2\sqrt{2}$. Thus the area of the circle is 8π. A

23. $\pi r^2 + \frac{\sqrt{3}}{4}s^2 = \pi + \sqrt{3}$. Since r and s are integers, r must be equal to 1 and s must be equal to 2. Thus the total perimeter is $2\pi r + 3s = 2\pi + 6$ B

24. $-1+1+1 = \sqrt{3}\sqrt{3}\cos\theta \Rightarrow \cos\theta = \frac{1}{3}$, the cosecant is $\frac{3}{\sqrt{8}} = C$

25. The eccentricity of the polar graph is the number next to the sine, so it is 1, and the conic with eccentricity 1 is a parabola. C

26. Outside the trapezoid we are going to sweep a sector of a circle with 180 + 30 = 210 degrees. So our area is $\frac{1}{2}r^2\theta = \frac{1}{2}(4)\left(\frac{7\pi}{6}\right) = \frac{7\pi}{3}$ A

27. A

28. Since a > b, it has a horizontal major axis, so the foci are on the horizontal axis, so "c" gets added and subtracted from the x-coordinate. And $c = \sqrt{a^2 - b^2}$ A

29.

	-1	8	
24	3	10	-10
50	5	4	12
4	1	1	5
-4	-4	3	3
-3	-1	8	-32

Adding up the columns and subtracting, we have 71 + 22, and dividing by 2 we have 46.5 C.

30. The centroid is the center of the ellipse. We have

$$16\left(x^2+2x+1\right)+4\left(y^2+2y+1\right)=64$$

$$\frac{\left(x+1\right)^2}{4}+\frac{\left(y+1\right)^2}{16}=1$$

So the centroid is (-1, -1). So we need to find the distance between (-1, -1) and the line 5x + 5y = 98.

$$\frac{\left|-5-5-98\right|}{5\sqrt{2}}=\frac{108}{5\sqrt{2}}$$

So, we have $2\pi Ad=2\pi\left(8\pi\right)\left(\frac{108}{5\sqrt{2}}\right)=\frac{864\pi^2\sqrt{2}}{5}$ *A*

ANSWER KEY

1. B	
2. A	
3. C	
4. A	
5. D	
6. B	
7. C	23. D
8. D	24. C
9. A	25. C
10. B	26. B
11. C	27. A
12. C	28. A
13. A	29. C
14. A	30. A
15. C	
16. C	
17. B	
18. A	
19. D	
20. A	
21. C	
22. A	