PRELIMINARIES

Find the distance between the following points. Give both an exact answer in simplest form and a decimal approximation rounded to the nearest hundredth.

1. $(1,5)$ & $(4,10)$

2. $(-2,3)$ & $(-5,-8)$

Find the equation in standard form for the circle with the given center and radius.

3. $(1,5)$ & $r=3$

4. $(-2,3)$ & $r=2$

5. $(0,0)$ & $r=1$

Complete the square to write the equation for the circle in standard form. Identify the center and radius. Use exact numbers.

6. $x^2+y^2+4x+10y+12=0$

7. $4x^2+4y^2-16x+32y-24=0$

Graph each ellipse, and give the *x* & *y*-intercepts.

8. $\frac{x^2}{9}+\frac{y^2}{4}=1$

9. $25x^2+9y^2=225$

Graph each hyperbola and the corresponding asymptotes. Give the equations of the asymptotes and label all intercepts.

10. $4x^2-y^2=1$

11. $4y^2-9x^2=1$

Complete the following tables using exact values.

12.

degrees	0	30	45	60	90
cosine					
sine					
tangent					
cotangent					
secant					
cosecant					

13.

radians	0	$\pi/6$	$\pi/4$	$\pi/3$	$\pi/2$
cosine					
sine					
tangent					
cotangent					
secant					
cosecant					

Use the identities $\cos^2\theta+\sin^2\theta=1$ **&** $\cos(a+b)=\cos a\cos b-\sin a\sin b$**, as needed, to verify the following identities.**

14. $1+\tan^2\theta=\sec^2\theta$

15. $\cot^2\theta+1=\csc^2\theta$

16. $\cos^2\theta=\dfrac{1+\cos 2\theta}{2}$

17. $\sin^2\theta=\dfrac{1-\cos 2\theta}{2}$

Give formulas for the following.

18. Area and circumference of a circle

19. Area of a triangle

20. Area of a parallelogram

21. Area of a trapezoid

22. Volume of a sphere

Find equations in slope-intercept form (if possible) for the following.

23. The line of slope 3 that passes through the point (1,5).

24. The line that passes through (-2,8) and (4,-5).

25. The line that passes through (-2,-10) and (-2,-5).

26. The line that passes through (-2,-10) and (2,-10).

27. The line that passes through (-2,-10) and is perpendicular to $3x+2y=10$.

Find the following.

28. $\frac{d}{dx}\cos x$

29. $\frac{d}{dx}\sin x$

30. $\frac{d}{dx}\cos^2 x$

31. $\frac{d}{dx}\sin^2 x$

32. $\frac{d}{dx}\sec x$

33. $\frac{d}{dx}\csc x$

34. $\frac{d}{dx}\tan x$

35. $\frac{d}{dx}\cot x$

36. $\int \cos x\,dx$

37. $\int \sin x\,dx$

38. $\int \cos^2 x\,dx$

39. $\int \sin^2 x\,dx$

40. $\int \sec x\,dx$

41. $\int \frac{1}{x^2-1}\,dx$

42. $\int \tan x\,dx$

43. $\int \cot x\,dx$

44. $\int_{\sin^{-1}\frac{1}{3}}^{\frac{\pi}{2}} \left(9\sin\varphi - \frac{1}{3}\csc^2\varphi\right) d\varphi$

Perform the indicated operations by hand. Show your work!

45. $\begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix}\begin{pmatrix} 5 & 6 \\ 7 & 8 \end{pmatrix}$

46. $\begin{pmatrix} 1 & 2 & 3 \end{pmatrix}\begin{pmatrix} 4 \\ 5 \\ 6 \end{pmatrix}$

47. $\begin{pmatrix} 2 & 3 \\ 4 & 5 \end{pmatrix}\begin{pmatrix} x \\ y \end{pmatrix}$

48. $\begin{vmatrix} 3 & 2 \\ 1 & 4 \end{vmatrix}$

49. $\begin{vmatrix} 2 & 4 & 6 \\ 3 & 0 & 1 \\ 1 & 4 & 5 \end{vmatrix}$

50. $\begin{vmatrix} 2 & 4 & 6 \\ 7 & 8 & 9 \\ 9 & 8 & 8 \end{vmatrix}$