1. Use completing the square to write the equation of the appropriate conic section. Identify the conic section and its center.
a) $x^{2}+y^{2}+6 x-4 y+2=0$
b) $5 x^{2}-8 y^{2}-20 x+64 y-148=0$
c) $4 y^{2}+7 x^{2}+16 y-56 x+100=0$
2. Eliminate the parameter and indicate the domain of the Cartesian equation.
a) $x=\frac{1}{4} t$ for $-\infty \leq t \leq \infty$

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y=t^{2}
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$$
x=t+1
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b) $y=\frac{t}{t+1} \quad$ for $t \in(-\infty,-1) \cup(-1, \infty)$
c) $\begin{aligned} & x=2 t \\ & y=t+4\end{aligned} \quad$ for $-2 \leq t \leq 3$
d) $\begin{aligned} & x=9 \sin t \\ & y=9 \cos t\end{aligned}$ for $0 \leq t \leq 2 \pi$, what conic section is this? What is the center?
e) $\begin{aligned} & x=5 \tan t \\ & y=3 \sec t\end{aligned}$ for $0 \leq t \leq 2 \pi$, what conic section is this? What is the center?

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\text { f) } \begin{aligned}
& x=2+3 \cos t \\
& y=-5+2 \sin t
\end{aligned} \text { for } 0 \leq t \leq 2 \pi \text {, what conic section is this? What is the center? }
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3. Write a parametric equation for $y=3 x^{2}+6$.
4. Write the first 5 terms of the sequence (assume $n$ begins at 1) $a_{n}=\frac{(-1)^{n+1}}{n^{2}+1}$
5. Write the first 5 terms of the sequence $a_{1}=5$ and $a_{n+1}=-3 a_{n}+2$
6. Write an expression for the $n^{\text {th }}$ term of the sequence (assume $n$ begins at 1 ):
a) $\frac{2}{1}, \frac{3}{3}, \frac{4}{5}, \frac{5}{7}, \frac{6}{9}, \ldots$
b) $1,4,7,10,13, \ldots$
7. Use sigma notation to write the sum $3-9+27-81+243-729$.
8. Let $\sum_{n=1}^{7} a_{n}=51$ and $\sum_{n=1}^{7} b_{n}=-6$. Find $\sum_{n=1}^{7}\left(4 a_{n}-\frac{1}{2} b_{n}\right)$.
9. For the arithmetic sequence $5,16,27,38,49, \ldots$
a)find the common difference $d$
b) the $n^{\text {th }}$ term
c) $S_{150}$
10. The first two terms of an arithmetic sequence are $a_{1}=5$ and $a_{2}=11$, find $a_{n}$ and $a_{10}$.
11. Given the arithmetic sequence $2,11,20, \ldots$ find $n$ so that $a_{n}=533$.
12. Find the common ratio for the geometric sequence $5, \frac{25}{3}, \frac{125}{9}, \frac{625}{27}, \ldots$
13. Write the geometric series using sigma notation and then find the sum of the infinite series.

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15+3+\frac{3}{5}+\frac{3}{25}+\ldots
$$

14. For the geometric series where $a_{1}=2$ and $r=-2$ find $a_{10}$.
15. Find $\sum_{n=0}^{\infty} 40\left(-\frac{2}{7}\right)^{n}$.
16. Find $\sum_{n=1}^{\infty} 5\left(\frac{2}{3}\right)^{n}$
17. Find the domain and range for :
a) $f(x)=\left(\frac{1}{2}\right)^{x}-3$
b) $f(x)=3+\log (x-1)$
18. Write the following in exponential form.
a) $\log 10=1$
b) $\ln x=y$
19. Write in logarithmic form.
a) $e^{2}=x$
b) $10^{2}=100$
20. Simplify the following completely without the use of a calculator.
a) $\ln \frac{1}{e}$
b) $\ln \sqrt[5]{e^{3} x}$
21. Write the following as a sum, difference, or multiple of logarithms: $\ln \frac{5 x}{\sqrt[3]{x^{2}+1}}$
22. Write the following as a sum, difference, or multiple of logarithms: $\ln \frac{x^{2} \sqrt{5 x+1}}{(3 x-2)^{3}}$
23. Write the following as the logarithm of a single quantity: $\frac{1}{3}\left[2 \log \left(x^{2}+1\right)-3 \log (x-3)-\log 4\right]$ Solve the following for $x$. Round answers to three decimal places where needed.
24. $2=5^{3 x-1}$
25. $e^{2 x}-3 e^{x}=4$
26. $\log (7-x)-\log (3 x+2)=1$
27. $\ln (7-x)+\ln (3 x+5)=\ln (24 x)$
28. $-x^{2} e^{-x}+2 x e^{-x}=0$
29. Write the partial fraction decomposition of: $\frac{x+7}{x^{2}-x-6}$
30. Write the partial fraction decomposition of: $\frac{3 x^{2}+4 x+4}{x^{3}+4 x}$
31. Write the partial fraction decomposition of: $\frac{2 x^{2}+7 x+4}{(x+1)^{3}}$
32. Write the partial fraction decomposition of: $\frac{x+2}{x\left(x^{2}-9\right)}$
33. Write the partial fraction decomposition of: $\frac{2 x^{3}-x^{2}+x+5}{x^{2}+3 x+2}$
