11. Find the midpoint of the two points.
(9, –5, 1), (9, –2, –4)

$\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}, \frac{z_1+z_2}{2}\right)$

$\frac{9+9}{2}, \frac{-5+-2}{2}, \frac{1-4}{2}$

$\frac{18}{2}, \frac{-7}{2}, \frac{-3}{2}$ $\langle 9, -3.5, -1.5 \rangle$

12. Find the value of each variable.

$$\begin{bmatrix} 16 & 4 & 5 & 4 \\ -3 & 13 & 15 & 12 \\ 0 & 2 & 4 & 0 \end{bmatrix} = \begin{bmatrix} 16 & 4 & 2x+7 & 4 \\ -3 & 13 & 15 & 3y \\ 0 & 2 & 3z-14 & 0 \end{bmatrix}$$

$5 = 2x+7$
$12 = 3y$
$4 = 3z-14$

$x = -1$
$y = 4$
$z = 6$

13. Find the determinant.

$$\begin{bmatrix} 7 & -2 & 1 \\ 0 & 4 & 3 \\ 9 & -1 & -5 \end{bmatrix}$$

-209

7 -2 1 7 -2
0 4 3 0 4
9 -1 -5 9 -1

$[(7\cdot4\cdot-5)+(-2\cdot3\cdot9)+(0)] - [0-21-36]$
$(-140+54+0) - (0-21-36)$
$-194 - 15 = -209$

14. Find the sum.

$\sum_{i=0}^{5} 3i^2$

Geometric

$3(0^2) = 0$
$3(1^2) = 3$
$3(2^2) = 12$
$3(3^2) = 27$
$3(4^2) = 48$
$3(5^2) = 75$

$0+3+12+27+48+75$
$= 165$

165

15. Find the 100th partial sum of the arithmetic sequence.
$a_1 = 15,\ a_{100} = 307$

Sum = $\frac{100}{2}(307+15)$

$50(322)$

16,100

16. Find the sum of the infinite geometric series.

$-\frac{1}{4} - \frac{1}{8} - \frac{1}{16} - \frac{1}{32} - \cdots$

$\frac{a_1}{1-r}$

$\frac{-\frac{1}{4}}{1-\frac{1}{2}} = \frac{-\frac{1}{4}}{\frac{1}{2}} = -\frac{2}{4}$

$= -\frac{1}{2}$

17. Determine whether the sequence is arithmetic or geometric, and then find the common difference or the common ratio.
$-\frac{1}{4}, -\frac{1}{8}, -\frac{1}{16}, -\frac{1}{32}, \cdots$

Geometric

$r = \frac{1}{2}$

18. Find the limit.

$\lim_{x\to -1} \frac{2x^2-x-3}{x+1}$

$\frac{(2x-3)(x+1)}{(x+1)} = \frac{2x-3}{1}$

$2(-1)-3 = -2-3$
$= -5$

19. Find the limit.

$\lim_{x\to -\infty} \frac{3x^3+2}{9x^3-2x^2+7}$

0

$\frac{\frac{3x^3}{x^3} + \frac{2}{x^3}}{\frac{9x^3}{x^3} - \frac{2x^2}{x^3} + \frac{7}{x^3}} = \frac{3}{9} =$

0 0

$\frac{1}{3}$

20. Solve the system of equations. Use any method but all work must be shown.

$$\begin{cases} 2x-y+5z=16 \\ y+2z=2 \\ z=2 \end{cases}$$

$y+2(2)=2$
$y+4=2$
$y-4=2-4$
$y=-2$

$2x-(-2)+5(2)=16$
$2x+2+10=16$
$2x+12=16$
$-12 \quad -12$
$\frac{2x}{2} = \frac{4}{2}$
$x=2$

2, -2, 2