1. 3

2. $e - 1$

3. $R = \dfrac{5}{2}$ and the interval is $[-2, 3)$

4. $R = 3$ and the interval is $(-6, 0]$

5. $f(x) = \ln 3 + \displaystyle\sum_{n=1}^{\infty} \frac{(-1)^{n-1}}{n}(x-1)^n$

6. $f(x) = \displaystyle\sum_{n=0}^{\infty} \frac{(-1)^{n+1}\pi^{2n}}{(2n)!}(x-1)^{2n}$

7. π

8. 3π

9. $V = 35$

10. $V = 2$

11. $\theta = \dfrac{\pi}{4}$

12. $\theta = \dfrac{\pi}{6}$

13. An equation of the plane is $2x - 4y + 9 = 0$

14. An equation of the plane is $21x - 5y + 29z + 124 = 0$

15. An equation of the tangent line is $\mathbf{r} = \langle 1 + \sqrt{3}t, \sqrt{3} + 2t, 2\rangle$

16. An equation of the tangent line is $\mathbf{r} = \left\langle 2 + \dfrac{t}{2}, \ln 4 + \dfrac{t}{2}, 1 + t \right\rangle$

17. $L = \ln(\sqrt{2} + 1)$

18. $L = e - e^{-1}$

19. $\mathbf{T}(t) = \langle -\sin t, \cos t, 0\rangle$, $\mathbf{N}(t) = \langle -\cos t, -\sin t, 0\rangle$, and $\mathbf{B}(t) = \langle 0, 0, 1\rangle$

20. $\mathbf{T}(t) = \langle -\sin t, \cos^2 t, -\sin t\rangle$, $\mathbf{N}(t) = \dfrac{-1}{\sqrt{2 + 4\sin^2 t}}\langle 1, \sin t, 1\rangle$, and $\mathbf{B}(t) = \dfrac{-1}{\sqrt{2 + 4\sin^2 t}}\langle 1, 0, -1\rangle$

21. $\kappa = \pi|t|$