Answer Key

1. a
2. d
3. d
4. b
5. a
6. d
7. a
8. c
9. a
10. c
11. c
12. b
13. b
14. c
15. d
16. c
17. b
18. d
19. c
20. d
21. a
22. d
23. d
24. d
25. a
26. d
27. a
28. b

29. 256

$a^4 = 2^4 = 2 \bullet 2 \bullet 2 \bullet 2 = 16$

$b^2 = 4^2 = 4 \bullet 4 = 16$

$a^4 \cdot b^2 = 16 \cdot 16 = 256$

30. $30\frac{3}{8}$

$v^3 = \left(\frac{1}{2}\right)^3 = \frac{1}{2} \bullet \frac{1}{2} \bullet \frac{1}{2} = \frac{1}{8}$

$w^5 = 3^5 = 3 \bullet 3 \bullet 3 \bullet 3 \bullet 3 = 243$

$v^3 \cdot w^5 = \frac{1}{8} \cdot 243 = 30\frac{3}{8}$

31. 2304

$m^2 = \left(\frac{3}{4}\right)^2 = \frac{3}{4} \bullet \frac{3}{4} = \frac{9}{16}$

$n^4 = 8^4 = 8 \bullet 8 \bullet 8 \bullet 8 = 4096$

$m^2 \cdot n^4 = \frac{9}{16} \cdot 4096 = 9 \cdot 256 = 2304$

32. 10^6 or 1,000,000 times greater
The difference on the Richter scale is 8 – 2 or 6. Use this 6 as the power of 10, or 10^6 times greater.

33. 10^2 or 100 times greater
The difference on the Richter scale is 9.2 – 7.2 or 2.0. Use this 2 as the power of 10, or 10^2 times greater.

34. 10^5 or 100,000 times as intense
130 – 80 = 50
$50 \div 10 = 5$; 10^5

35. 10^2
Divide the width of *E. coli* by the width of poxvirus:
$\frac{10^{-9}}{10^{-11}} = 10^{-9-(-11)} = 10^2$.

36. 68,000,000 more square kilometers

$8.2 \times 10^7 = 8.2 \times 10{,}000{,}000 = 82{,}000{,}000$
82,000,000 – 14,000,000 = 68,000,000