

Answer Key Chapter 1. Section 2

Exponents

1. An exponent indicates the number of times the base is used as a factor. A power is the entire expression (base and exponent). A power is a product of repeated factors.

2. no; yes; 10 is not the square of a whole number, so it is not a perfect square. $100 = 10^2$, so it is a perfect square.

3. $3 + 3 + 3 + 3 = 3(4)$ does not belong because it shows a product as a sum of repeated addends, whereas the other three show powers as products of repeated factors.

4. 9^2

5. 13^2

6. 15^3

7. 2^5

8. 14^3

9. 8^4

10. 11^5

11. 7^6

12. 16^3

13. The base is written as the exponent and the exponent is written as the base.
 $4 \cdot 4 \cdot 4 = 4^3$

14. 25

15. 64

16. 32

17. 196

18. 117,649

19. 65,536

20. 20,736

21. 1,419,857

22. The exponent is written as a factor, but it should have been used to indicate the number of times the base is used as a factor.
 $8^3 = 8 \cdot 8 \cdot 8 = 512$

23. 8,000,000 people

24. 2^4 ; 16 in.

25. not a perfect square

26. perfect square

27. perfect square

28. not a perfect square

29. perfect square

30. not a perfect square

31. not a perfect square

32. perfect square

33. 40,000 cm²

34. See *Taking Math Deeper*.

35. 8 squares

36. a. 9 by 9 tile arrangement,
10 by 10 tile arrangement, or 11 by
11 tile arrangement

b. in the 9 by 9 arrangement: 44 tiles;
in the 10 by 10 arrangement: 25
tiles; in the 11 by 11 arrangement:
4 tiles

37.

Power	4 ⁶	4 ⁵	4 ⁴	4 ³	4 ²	4 ¹
Value	4096	1024	256	64	16	4

As the exponent decreases, the value of the
power is divided by 4. $4^0 = 1$

38. 7 and 8

39. 13 blocks; add $7^2 - 6^2$ blocks; 19
blocks; add $10^2 - 9^2$ blocks; 39 blocks;
add $20^2 - 19^2$ blocks

40. 84

41. 165

35. 8 squares

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43. 7

44. C

34. *Sample answer:* Start with a base of 2. Stop writing
powers when the value is greater than 130. Then,
increase the base.

$$2^2 = 4, 2^3 = 8, 2^4 = 16, 2^5 = 32, 2^6 = 64,$$

$$2^7 = 128, 2^8 = 256$$

$$3^2 = 9, 3^3 = 27, 3^4 = 81, 3^5 = 243$$

$$4^2 = 16, 4^3 = 64, 4^4 = 256$$

$$5^2 = 25, 5^3 = 125, 5^4 = 625$$

$$6^2 = 36, 6^3 = 216$$

$$7^2 = 49, 7^3 = 343$$

$$8^2 = 64, 8^3 = 512$$

$$9^2 = 81, 9^3 = 729$$

$$10^2 = 100, 10^3 = 1000$$

$$11^2 = 121, 11^3 = 1331$$

Three powers with values greater than 120 and less than
130 are 2^7 , 5^3 , and 11^2 .