Math 10

<u>Lesson 1–9</u> Answers

Assignment

1. a) 2, 3, 11; $2 \cdot 3^3 \cdot 11$
   b) 2, 3, 5, 7; $2^2 \cdot 3 \cdot 5^2 \cdot 7$
   c) 3, 5, 13; $3 \cdot 5^3 \cdot 13$
   d) 3, 7, 11, 13; $3^2 \cdot 7 \cdot 11 \cdot 13$

2. a) $2^2 \cdot 5$, or 20
   b) $5 \cdot 7$, or 35
   c) 2^4, or 16
   d) 2^2, or 4

3. a) $2^2 \cdot 3^2 \cdot 5 \cdot 7$, or 1260
   b) $2^3 \cdot 3 \cdot 5 \cdot 13 \cdot 103$, or 160 680
   c) $2^3 \cdot 5^3$, or 1000
   d) $2^4 \cdot 3^2 \cdot 5 \cdot 17$, or 12 240

4. 61 beads

5. a) $\dfrac{7}{9}$ b) $\dfrac{11}{17}$
   c) $\dfrac{13}{15}$ d) $\dfrac{247}{576}$
   e) $\dfrac{20}{27}$ f) $\dfrac{23}{160}$

6. a) 28 in. b) 32 cm

7. a) 12 cm b) 14 ft.

8. a) Perfect square; $\sqrt{256} = 16$
   b) Perfect square; $\sqrt{324} = 18$
   c) Perfect square and perfect cube; $\sqrt{729} = 27$; $\sqrt[3]{729} = 9$
   d) Neither
   e) Perfect square; $\sqrt{1936} = 44$
   f) Perfect cube; $\sqrt[3]{9261} = 21$

9. 540 ft.

10. 44 cm

11. a) 10   b) 0.9

    c) 2   d) $\dfrac{3}{5}$

12. The index tells which root to take.

13. a) 3.3   b) −2.3   c) 2.0

14. a) 25   b) 216   c) 2401
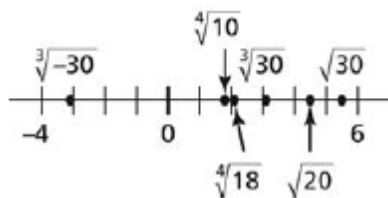
15. Neither

16. a) Rational   b) Rational   c) Rational
    d) Irrational   e) Rational   f) Rational
    g) Rational   h) Irrational   i) Irrational

17. Approximately 4.8 cm

18. a) Rational, the number on the calculator appears to terminate.
    b) Irrational, the number never terminates or repeats

19. $\sqrt[3]{-30}, \sqrt[4]{10}, \sqrt[4]{18}, \sqrt[3]{30}, \sqrt{20}, \sqrt{30}$

20. 1 s

21. a) $5\sqrt{6}$ b) $3\sqrt[3]{5}$
    c) $4\sqrt{7}$ d) $3\sqrt[4]{2}$

22. a) $\sqrt{180}$ b) $\sqrt{126}$
    c) $\sqrt[3]{192}$ d) $\sqrt[4]{32}$

23.

    $\sqrt[3]{32} = 3.1748$ $\sqrt[3]{11} = 2.22398$

    $3.1748 - 2.22398 = \boxed{0.95\,cm}$

24.

    $\begin{aligned} \sqrt{300} \ &= \sqrt{3} \cdot \sqrt{100} \\ &= \sqrt{3} \cdot 10 \\ &= 10\sqrt{3} \end{aligned}$

25. $6\sqrt{2}, 3\sqrt{6}, 5\sqrt{2}, 4\sqrt{3}, 2\sqrt{7}$

26. a) $\sqrt[4]{12}$ b) $\sqrt[3]{(-50)^5}$ or $\sqrt[3]{(-50)}^5$

    c) $\sqrt{1.2}$ d) $\sqrt[3]{\dfrac{3}{8}}$

27. a) $1.4^{\frac{1}{2}}$ b) $13^{\frac{2}{3}}$

    c) $2.5^{\frac{4}{5}}$ d) $\left(\dfrac{2}{5}\right)^{\frac{3}{4}}$

28. a) 2   b) 1.2

    c) −32   d) $\dfrac{27}{64}$

29. Approximately 35%

30.

$$\sqrt[4]{5}, 5^{\frac{2}{3}}, \sqrt[3]{5}, 5^{\frac{3}{4}}, \left(\sqrt{5}\right)^3$$

$$= 5^{\frac{1}{4}}, 5^{\frac{2}{3}}, 5^{\frac{1}{3}}, 5^{\frac{3}{4}}, 5^{\frac{3}{2}}$$

$$5^{\frac{3}{2}}, 5^{\frac{3}{4}}, 5^{\frac{2}{3}}, 5^{\frac{1}{3}}, 5^{\frac{1}{4}},$$

31. a) Approximately 7122 Calories/day
    b) Approximately 4 Calories/day

32. a) The numbers at the left are divided by 3 each time; the exponents in the powers at the right decrease by 1 each time.

    b) $3 = 3^1$; $1 = 3^0$; $\dfrac{1}{3} = 3^{-1}$; $\dfrac{1}{9} = 3^{-2}$; $\dfrac{1}{27} = 3^{-3}$

33. a) $\dfrac{1}{4}$ b) $\dfrac{27}{8}$ c) $\dfrac{125}{8}$

34. 18.0 cm

35. 262 Hz

36. a) $9m^8 n^2$ b) $\dfrac{1}{x^4 y^6}$

    c) $\dfrac{1}{4ab^3}$ d) $\dfrac{1}{r^{\frac{10}{3}} s^{\frac{2}{3}}}$

37. a) $a^2 b^5$ b) $\dfrac{x^2}{y}$

c) $\dfrac{1}{a^5}$

d) $x^{\frac{3}{2}}y^3$

38. a) $\dfrac{9}{4}$

b) 30.25

c) $\dfrac{144}{25}$

d) 0.4

39.

a)

$$\left(s^{-1}t^{\frac{1}{3}}\right)\left(s^4t^3\right) = s^{-1}\cdot s^4 \cdot t^{\frac{1}{3}} \cdot t^3$$

$$= s^3 t^{\frac{10}{3}}$$

b)

$$\left(\dfrac{4c^{\frac{1}{3}}}{d^3}\right)^{-3} = \dfrac{4^{-3}\,c^{\frac{1}{3}\cdot-3}}{d^{3\cdot-3}}$$

$$= \dfrac{4^{-3}\,c^{-1}}{d^{-9}}$$

$$= \dfrac{d^9}{4^3\,c}$$

$$= \dfrac{d^9}{64c}$$