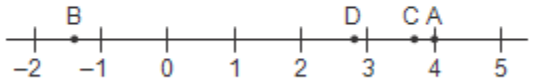
Roots and Powers Review

1. Evaluate each radical

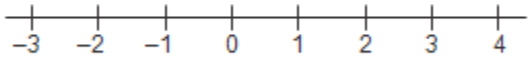
   a) $\sqrt{121}$ b) $\sqrt{400}$ c) $\sqrt[3]{64}$ d) $\sqrt[3]{-125}$

2. Estimate $\sqrt{13}$ to 1 decimal place
3. Identify each number as rational or irrational
   a. $\sqrt{8}$
   b. $\sqrt[3]{343}$
4. Each point on the number line below represents one of these numbers write a letter to identify each number.

   $\sqrt[3]{64}$: _____ $\sqrt[3]{-3}$:_____ $\sqrt{14}$: _____ $\sqrt{8}$:_____



5. Estimate the location of each number on the number line below: $\sqrt{5}$, $\sqrt[3]{-9}$, $\sqrt[3]{35}$



6.
   a. List all the perfect squares that are factors if each number. Do not include 1. Circle the greatest perfect square.
      i. 32: _____
      ii. 63: _____
      iii. 90: _____
   b. Use your answer to part a to simplify each radical.
      i. $\sqrt{32}$
      ii. $\sqrt{63}$
      iii. $\sqrt{90}$
   c. Write the greatest perfect cube that is a factor of each number.
      i. 54: _____
      ii. 60: _____
      iii. 72: _____
   d. Use the answers to part c to simplify each radical, if possible.
      i. $\sqrt[3]{54}$
      ii. $\sqrt[3]{60}$

iii. $\sqrt[3]{72}$

7. Simplify each radical
   a. $\sqrt{52}$
   b. $\sqrt[3]{405}$
8.
   a. Write 1080 as a product of prime factors: _____
   b. Use the factors in part a to simplify each radical.
      i. $\sqrt{1080}$
      ii. $\sqrt[3]{1080}$
9. Write each mixed radical as an entire radical
   a. $3\sqrt{14}$
   b. $5\sqrt[3]{2}$
10. Evaluate each power.
   a. $36^{\frac{1}{2}}$
   b. $125^{\frac{1}{3}}$
   c. $81^{\frac{3}{4}}$
11.
   a. Write each radical as a power, then use a calculator to find the value to 2 decimal places.
      i. $\sqrt[5]{18^2}$
      ii. $\left(\sqrt[4]{21}\right)^3$
   b. Write each power as a radical, then use a calculator to find the value to 2 decimal places
      i. $25^{\frac{4}{3}}$
      ii. $75^{\frac{2}{5}}$
12. Write each power with a positive exponent
   a. 8^{-5}
   b. $6^{-\frac{2}{3}}$
   c. $\frac{1}{3^{-10}}$
   d. $\left(\frac{9}{2}\right)^{-3}$

13. Evaluate each power

a. 3^{-3}

b. $\left(\frac{3}{10}\right)^{-3}$

c. $4^{-\frac{3}{2}}$

14. Evaluate

a. $\left(3^{-2}\right)^{-2}$

b. $\left(4^{\frac{1}{2}} \cdot 4^{\frac{3}{2}}\right)^{-1}$

15. Simplify. Write an expression with a positive exponent where necessary.

a. $x^{\frac{2}{3}} \cdot x^{-2}$

b. $\frac{18x^{\frac{1}{2}}}{24x^{-\frac{3}{2}}}$

Chapter 4 Review, page 245

1. **a)** 11 **b)** 20 **c)** 4 **d)** –5

2. 3.6

3. **a)** Irrational **b)** Rational

4. $\sqrt[3]{64}$: A, $\sqrt[3]{-3}$: B, $\sqrt{14}$: C, $\sqrt{8}$: D

5. **b)** $\sqrt[3]{-9}$, $\sqrt{5}$, $\sqrt[3]{35}$

6. **a)** **i)** 4, 16; 16 **ii)** 9 **iii)** 9

b) **i)** $4\sqrt{2}$ **ii)** $3\sqrt{7}$ **iii)** $3\sqrt{10}$

c) **i)** 27 **ii)** 1 **iii)** 8

d) **i)** $3\sqrt[3]{2}$ **ii)** $\sqrt[3]{60}$ **iii)** $2\sqrt[3]{9}$

7. **a)** $2\sqrt{13}$ **b)** $3\sqrt[3]{15}$

8. **a)** $2 \cdot 2 \cdot 2 \cdot 3 \cdot 3 \cdot 3 \cdot 5$

b) **i)** $6\sqrt{30}$ **ii)** $6\sqrt[3]{5}$

9. **a)** $\sqrt{126}$ **b)** $\sqrt[3]{250}$

10. **a)** 6 **b)** 5 **c)** 27

11. **a)** **i)** 3.18 **ii)** 9.81 **b)** **i)** 73.10 **ii)** 5.62

12. **a)** $\frac{1}{8^5}$ **b)** $\frac{1}{6^{\frac{2}{3}}}$ **c)** 3^{10} **d)** $\left(\frac{2}{9}\right)^3$

13. **a)** $\frac{1}{27}$ **b)** $\frac{1000}{27}$ **c)** $\frac{1}{8}$

14. **a)** 81 **b)** $\frac{1}{16}$

15. **a)** $\frac{1}{x^{\frac{4}{3}}}$ **b)** $\frac{3}{4}x^2$