Practice information for Fractions, Square Roots and Powers

The following pages are taken from a book called *Complete Canadian GED Preparation* by Steck and Vaughan.

"Exponents" and "Powers" mean the same thing. Answers to the practise questions are below.

Page	Question	Answer
529	1	3
	2	4
	3	4
	4	2
	5	3
	6	4
530	7	2
	8	1
	11	3
	12	1
532	8	5
	9	4
533	13	2
	14	1
	15	2
574	1	4
	2	0
	3	3
	4	7
	5	5
	6	1
	7	6 cm
	8	4 m
	9	9 m

1. At the end of the first quarter, the *Gazette* had 3450 employees. In the second quarter, 12% more employees were hired. How many new employees did the *Gazette* hire in the second quarter?

   (1) 41
   (2) 404
   (3) 414
   (4) 424
   (5) 4140

2. The Smith family went to dinner at a restaurant and had a total bill of $120. If they left a tip of $21.60, what percent of the total bill did they leave?

   (1) 15%
   (2) 16%
   (3) 17%
   (4) 18%
   (5) 19%

3. The vice president of a bank contributed $8\frac{3}{4}\%$ of her salary to a retirement plan. If she contributed $4375 to the plan in one year, what was her annual salary that year?

   (1) $42 000
   (2) $43 750
   (3) $49 383
   (4) $50 000
   (5) $50 383

4. The office expenses at Delta Products were reduced from $1400 last month to $1225 this month. What was the percent of reduction in office expenses?

   (1) 12.0%
   (2) 12.5%
   (3) 13.0%
   (4) 13.5%
   (5) 14.0%

5. Axelle bought a microwave oven regularly priced at $394. If the oven was on sale for 40% off the regular price, how much did she pay for the microwave?

   (1) $226.95
   (2) $232.60
   (3) $236.40
   (4) $240.25
   (5) $250.00

Question 6 refers to the following table.

Daly's Pharmacy		
Item	April Sales	May Sales
Toothpaste	$4200	$4956
Soap	$3980	$4293
Shampoo	$3420	$3290

6. Toothpaste sales in May were what percent higher than the toothpaste sales in April?

   (1) 15%
   (2) 16%
   (3) 17%
   (4) 18%
   (5) 19%

Questions 7 and 8 refer to the following table.

Company Sales (Millions of Dollars)	
Month	**Sales**
Jan.	$ 2
Feb.	$ 6
Mar.	$ 8
Apr.	$ 8
May	$14
June	$18

7. The sales in February were what percent of the total sales for the six months listed? Round to the nearest whole percent.

(1) 10%

(2) 11%

(3) 12%

(4) 13%

(5) 14%

8. Between which two consecutive months was the percent of increase in company sales the greatest?

(1) January to February

(2) February to March

(3) March to April

(4) April to May

(5) May to June

9. Larry borrows $12 500 at 16% simple annual interest for $3\frac{1}{2}$ years. How much interest will he owe on the loan at the end of that period?

(1) $2 000

(2) $3 000

(3) $4 000

(4) $5 000

(5) $7 000

11. Jim buys a coat for $136 and pays sales tax of $8\frac{1}{4}$%. Which expression shows the amount that Jim paid for the coat, including the sales tax?

(1) $136 + 0.0825

(2) $136 × 0.0825

(3) ($136 × 0.0825) + $136

(4) ($136 + $136)0.0825

(5) $\frac{\$136}{0.0825}$

12. Attendance at a craft show dropped from 1420 last year to 1209 this year. What was the percent of decrease in attendance, rounded to the nearest percent?

(1) 15%

(2) 16%

(3) 17%

(4) 18%

(5) 19%

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8. Last year, Anne paid $13 600 in taxes, which was 32% of her gross annual salary. What was her gross annual salary?

(1) $30 000

(2) $34 500

(3) $36 000

(4) $38 500

(5) $42 500

9. In its current catalogue, Sheridan Office Supplies lists an electric stapler for $69.95. If it offers a discount of 35%, what is the price after the discount, rounded to the nearest cent?

(1) $24.48

(2) $34.47

(3) $42.43

(4) $45.47

(5) $94.43

10. The value of the inventory at Sam's Sporting Goods store increased from $46 400 to $52 200 during the first quarter of the year. What is the percent of increase in the value of the inventory?

(1) 10.5%

(2) 12.0%

(3) 12.5%

(4) 58.3%

(5) Not enough information is given.

11. In a recent company survey, $\frac{3}{4}$ of the employees said they drove to work. Of those who drive to work, $\frac{3}{5}$ said they drive in a carpool. What fraction of the employees drives in a carpool?

Question 12 refers to the following table.

Monthly Budget	
Expense	**Fraction Budgeted**
Rent	$\frac{3}{8}$
Salaries	$\frac{1}{4}$
Advertising	$\frac{1}{5}$
Supplies	$\frac{1}{8}$
Miscellaneous	$\frac{1}{20}$

12. Which of the expenses received the highest amount of the monthly budget?

(1) Rent

(2) Salaries

(3) Advertising

(4) Supplies

(5) Miscellaneous

Questions 13 through 15 refer to the following table.

Company Profit	
Region	**Fraction of Profit**
Northeast	$\frac{1}{8}$
Southeast	$\frac{1}{4}$
Northwest	$\frac{1}{8}$
Southwest	$\frac{1}{5}$
Central	$\frac{3}{10}$

13. Which region had the highest fraction of the company's profit?

   (1) Northeast

   (2) Southeast

   (3) Northwest

   (4) Southwest

   (5) Central

14. The fraction of combined profit from the Northeast and Northwest regions is how much greater than the fraction of profit from the Southwest region?

   (1) $\frac{1}{20}$

   (2) $\frac{3}{20}$

   (3) $\frac{1}{5}$

   (4) $\frac{1}{4}$

   (5) $\frac{2}{5}$

15. If the total company profit last year was $1 987 865, how much profit came from the Southwest region?

   (1) $ 248 483

   (2) $ 397 573

   (3) $ 496 966

   (4) $ 596 966

   (5) $9 939 325

Exponents and Roots

Exponents

Exponents are used to simplify problems that call for repeated multiplication. The expression 5^3, which is read "five to the third power" or "five cubed," has a base of 5 and an exponent of 3. The exponent tells how many times the base should appear in the multiplication problem.

Examples

$$5^3 = 5 \times 5 \times 5 = 125$$
$$12^2 = 12 \times 12 = 144$$
$$2^5 = 2 \times 2 \times 2 \times 2 \times 2 = 32$$

An exponent can also be 1, 0, or a negative number.

Remember: • Any number with an exponent of 1 equals itself.
          • Any number (except 0) with an exponent of 0 equals 1.

Examples

$2^1 = 2$	$9^1 = 9$	$7^1 = 7$
$4^0 = 1$	$3^0 = 1$	$10^0 = 1$

Our number system is based on the idea of grouping by tens. Powers of 10 are especially important.

$$10^1 = 10$$
$$10^2 = 10 \times 10 = 100$$
$$10^3 = 10 \times 10 \times 10 = 1000$$
$$10^4 = 10 \times 10 \times 10 \times 10 = 10\ 000$$

Negative powers of 10 are useful for writing very small numbers. Any number to a negative power represents a fraction or decimal.

$$10^{-1} = \frac{1}{10} = 0.1$$

$$10^{-2} = \frac{1}{10} \times \frac{1}{10} = 0.01$$

$$10^{-3} = \frac{1}{10} \times \frac{1}{10} \times \frac{1}{10} = 0.001$$

Scientific notation is a method that uses powers of ten to write very small and very large numbers. A number in scientific notation is expressed as a product of a number between one and ten and a power of ten.

Square Roots

Raising a number to the second power is also called squaring the number. You have already seen that to find the area of a square, you multiply the length of one side of the square by itself. In other words, you square the length of one side to find the area.

The square root of a number is the number that when multiplied by itself equals the given number. The symbol for square root is $\sqrt{\ }$. To find the square root of a certain number, ask yourself: "What number times itself equals this number?"
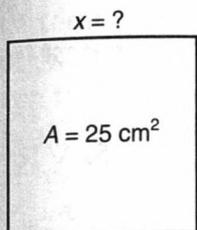
Example 1 What is the measure of a side of a square if the area of the square is 25 square centimetres?

Step 1 The area of the square is found by multiplying the length of one side by itself. Ask: What number times itself equals 25?

Step 2 Since $5 \times 5 = 25$, the square root of 25 is 5.

Each side of the square measures **5 cm.**

$x = ?$

$A = 25 \text{ cm}^2$

Memorize the following list of squares to help you find square roots.

$1^2 = 1$	$4^2 = 16$	$7^2 = 49$	$10^2 = 100$
$2^2 = 4$	$5^2 = 25$	$8^2 = 64$	$11^2 = 121$
$3^2 = 9$	$6^2 = 36$	$9^2 = 81$	$12^2 = 144$

Example 2 What is $\sqrt{81}$?
The problem asks, "What is the square root of 81?"
Since $9^2 = 81$, $\sqrt{81} = $ **9.**

Most square roots are not whole numbers. You can use the list of common squares above to help you estimate an answer, or you can find a more exact answer using your calculator.

Example 3 What is $\sqrt{55}$?
What number times itself equals 55? You know that 7^2 equals 49 and 8^2 equals 64. Therefore, the square root of 55 must be **between 7 and 8** because 55 is between 49 and 64.

> **Tip**
>
> It is always a good idea to estimate an answer. A good estimate can help you decide whether the number in your calculator's display makes sense.

Some square roots are whole numbers or have a limited number of decimal digits. Some are repeating decimals. Others continue without repeating a pattern of digits. Read problems carefully to see whether you should round to a particular decimal digit.

A. Write the square roots. Do not use a calculator.

1. $\sqrt{16}$ 3. $\sqrt{9}$ 5. $\sqrt{25}$

2. $\sqrt{0}$ 4. $\sqrt{49}$ 6. $\sqrt{1}$

B. Find the length of the side of each square.

7. $x = ?$

$A = 36$ cm^2

8. $x = ?$

$A = 16$ m^2

9. $x = ?$

$A = 81$ m^2

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