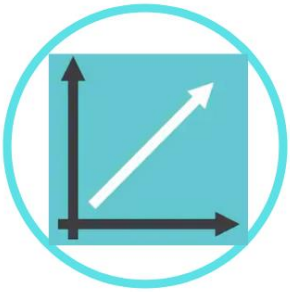
MATH

GRADE 7

Revision

GRADE 7: SUMMARY & REVIEW QUESTIONS

RATES & PROPORTIONAL REASONING



- Rates
- Complex Fractions and Unit Rates
- Convert Unit Rates
- Proportional and Non proportional Relationships
- Graph Proportional Relationships
- Solve Proportional Relationships
- Constant Rate of Change
- Slope
- Direct Variation

PERCENTS

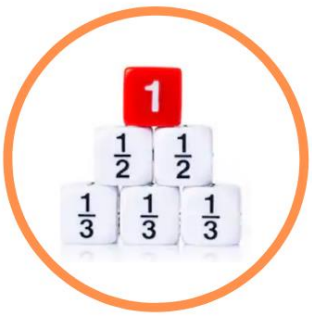
- Percent of a Number
- Percent and Estimation
- The Percent Proportion
- The Percent Equation
- Percent of Change
- Sales Tax, Tips and Markup
- Discount
- Simple Interest

INTEGERS

- Integers and Absolute Values
- Add Integers
- Subtract Integers
- Multiply Integers
- Divide Integers

RATIONAL NUMBERS

- Terminating and Repeating Decimals
- Compare and Order Rational Numbers
- Add and Subtract Like Fractions
- Add and Subtract Unlike Fractions
- Add and Subtract Mixed Numbers
- Multiply Fractions
- Convert Between Systems
- Divide Fractions



RATES SUMMARY

UNIT RATE

To express a rate, as a unit rate, ensure the denominator of the unit fraction is 1.

$$\frac{90\ kg}{3\ people} = \frac{90\ kg \div 3}{3\ people \div 3} = \frac{30\ kg}{1\ person}$$

rate → unit rate

COMPLEX FRACTION

Complex fractions consist of fractions in the numerator, denominator or both.

$$\frac{\frac{3}{4}}{5} \qquad \frac{\frac{3}{5}}{\frac{1}{4}} \qquad \frac{12}{\frac{1}{10}}$$

CONVERT FRACTIONS

When simplifying complex fractions, it is useful to remember how to convert from a mixed number to an improper fraction, and vice versa.

$$\frac{5}{3} = 5 \div 3 = 1\frac{2}{3}$$

improper fraction → mixed number

$$1\frac{2}{3} = \frac{3 \times 1 + 2}{3} = \frac{5}{3}$$

mixed number → improper fraction

RECIPROCAL

To find a fraction's reciprocal, flip the fraction - the denominator will be the numerator, and the numerator will be the denominator.

The reciprocal of one quarter, is four.

$\frac{1}{4}$ and $\frac{4}{1}$

$\frac{11}{15}$ and $\frac{15}{11}$

RATES SUMMARY

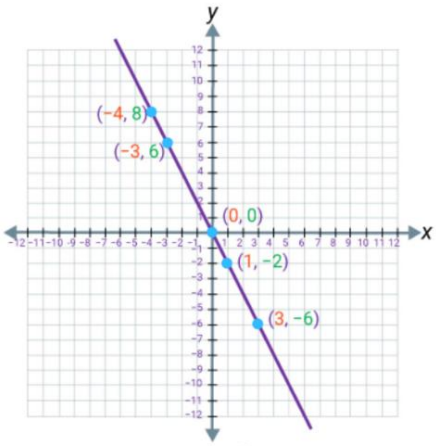
PROPORTIONAL

Two quantities are proportional if the ratios are constant, or equivalent to each other.

$$\frac{3}{6} = \frac{1}{2}$$

To identify a proportional relationship on a graph,

- The points must lie on a straight line.
- The straight line must intersect at the origin (0, 0).



NON PROPORTIONAL

Two quantities are not proportional if the ratios are not constant, or equivalent to each other.

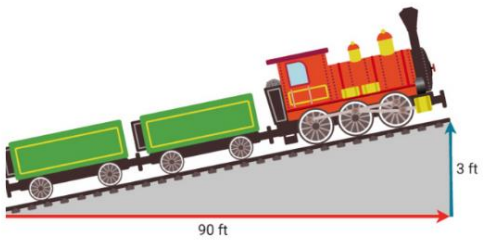
SLOPE

The slope of a line is the ratio of the vertical change (rise), over the horizontal change (run)

$$slope = \frac{change\ in\ y}{change\ in\ x} = \frac{y_2 - y_1}{x_2 - x_1}$$

For example, the slope of the line can be calculated;

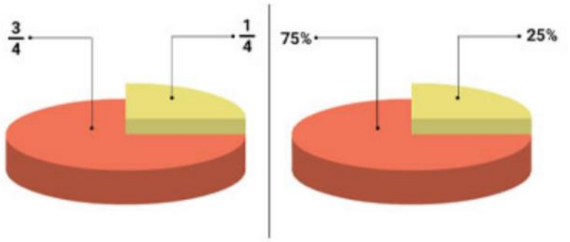
$$slope = \frac{rise}{run} = \frac{3}{90} = \frac{1}{30}$$



PERCENTS SUMMARY

PERCENT

A ratio of a number with 100 in the denominator. The percent can be expressed as a decimal and fraction.



PERCENT PROPORTION

A percent proportion is two equivalent ratios, in which of the ratios has a denominator of 100.

$$\frac{Part}{Whole} = \frac{\%}{100}$$

CROSS PRODUCT

The cross product is the product of the numerators and denominators of opposite fractions, in a proportion.

The cross product is used to simplify and evaluate a proportion.

$$\frac{12}{150} = \frac{8}{100}$$

SALES, TAXES AND TIPS

- The original price is the price of an item before tax.
- A tax is a fee added to the price of goods and services, usually as a percent of the total price.
- A tip (or gratuity) is an additional amount of money given for a service.

PERCENTS SUMMARY

PERCENT CHANGE

A percent of change is the ratio that compares the change in quantity to the original amount in the ratio.

$$Percent\ of\ change = \frac{Amount\ of\ change}{Original\ value}$$

- A negative percent of change indicates a decrease from the original value to the second value.
- A positive percent of change indicates an increase from the original value to the second value.

PERCENT EQUATION

The percent equation is directly related to the percent proportion, and is used to solve percent problems.

$$part = percent \times whole$$

12 is 50% of 24

part percent whole

SIMPLE INTEREST

- Simple interest (I) is the amount of interest that will be earned.
- The principal (p), or the initial amount that is borrowed or invested
- The annual rate. The rate (r) is a percent, and we write it as a decimal when we put it in the formula
- Time (t). This is usually given as years when calculating interest annually.

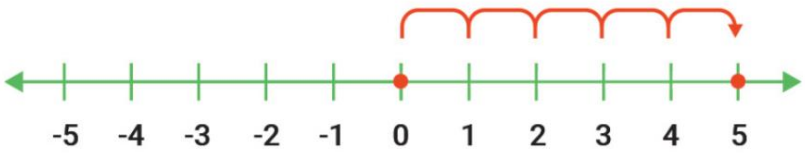
$$I = prt$$

INTEGERS SUMMARY

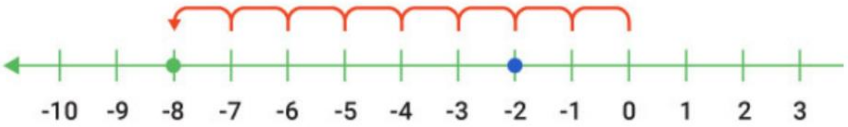
ABSOLUTE VALUE

The absolute value of a number is its distance from zero. It is always positive.

- Bars are placed on either side to indicate the absolute value.



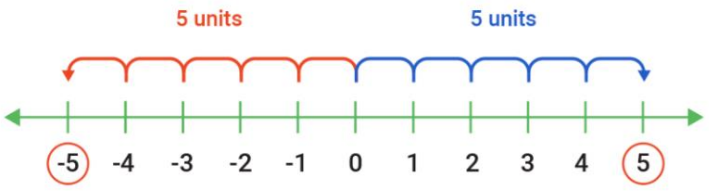
- The absolute value of 5, |5| is 5.
- The absolute value of -8, |-8| is 8.



ADDITIVE INVERSE

The inverse of a number is the opposite of the number.

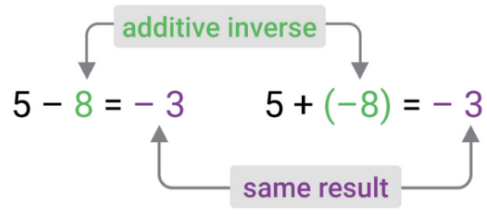
For example, 5 is the additive inverse of -5.

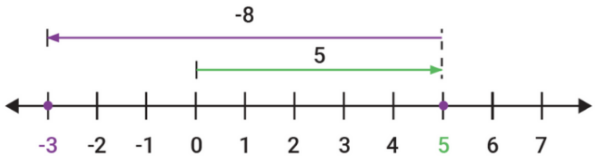


INTEGERS SUMMARY

SUBTRACTING INTEGERS

We can use the additive inverse to solve simple subtraction problems, by changing the subtraction problem into addition.





MULTIPLYING PROPERTIES

Multiplicative Property of Zero

The product of a number and zero, is zero.
3 × 0 = 0
0 x -5 = 0

Associative Property of Multiplication

Numbers can be grouped in any way.
(2 × 3) × 4 = 2 × (3 × 4)

Commutative Property of Multiplication
Two numbers can be multiplied in either order to get the same answer.
3 × 4 = 4 x 3

DIVIDING INTEGERS

Consider the sign of the divisor and dividend to determine the sign of the quotient.

4 ÷ 2 = 2 -4 ÷ -2 = 2 4 ÷ -2 = -2 -4 ÷ 2 = -2

RATIONAL NUMBERS SUMMARY

DECIMALS

- Repeating decimals involve a decimal that has one or more digits that continue to repeat.
- A bar is placed above the repeating digits.

8.333333... and
5.329329329329... → $5.\overline{329}$ *(with a bar above)*
are examples of repeating decimals

FRACTIONS: ADD AND SUBTRACT

Like fractions are fractions that have the same denominator.

$\frac{3}{4}$ $\frac{2}{4}$

Unlike fractions are fractions that have a different denominator.

$\frac{2}{7}$ $\frac{2}{11}$

When adding and subtracting unlike fractions, rename the fractions to have the same denominator.

$$\frac{1}{2} + \frac{1}{3} + \frac{1}{5} \rightarrow \frac{15}{30} + \frac{10}{30} + \frac{6}{30}$$

DIVIDING FRACTIONS

Remember to convert the mixed number to an improper fraction, before dividing.

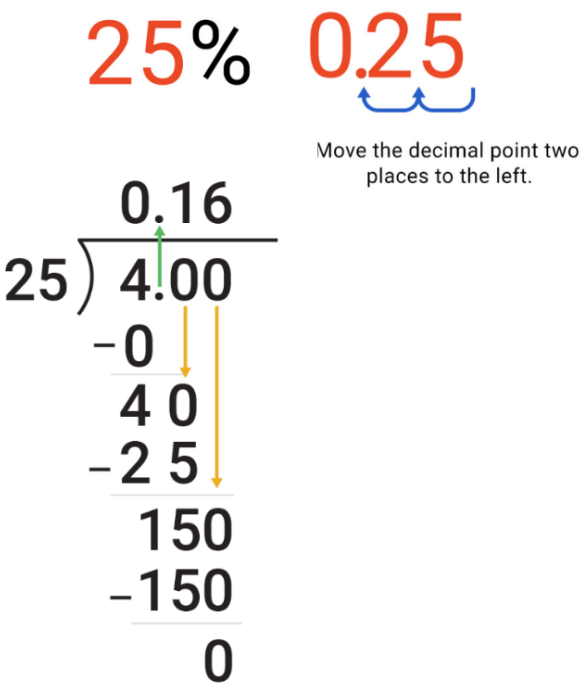
Keep Change Flip

$\frac{a}{b}$ ÷ → × $\frac{x}{y}$ → $\frac{y}{x}$

RATIONAL NUMBERS SUMMARY

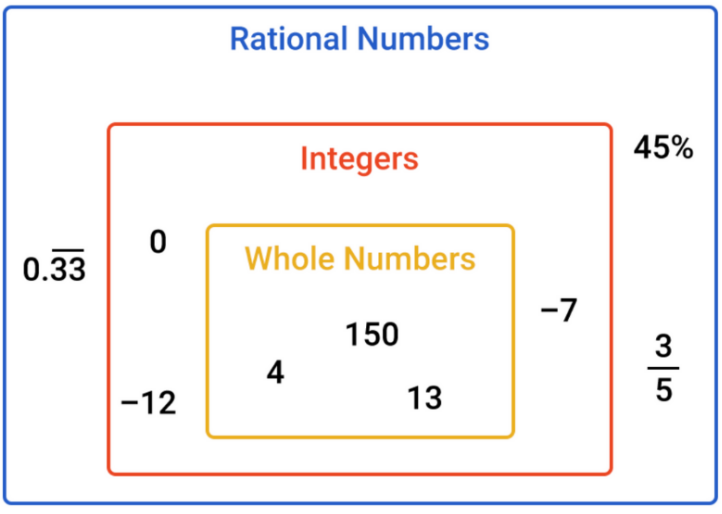
FRACTIONS AND PERCENTS

- To convert a percent to a decimal, move the decimal two places to the left, or divide by 100. For example, 25% = 0.25.
- To convert a fraction to a decimal, divide. For example, the fraction 4 over 25 is equal to 0.16.



RATIONAL AND IRRATIONAL

- A rational number is a number that can be expressed as the ratio of two integers.
- An irrational number is a number that cannot be written as a fraction.
- An integer is a whole number that can be written without a fractional component.
- When comparing numbers, convert them into the same form.



Mock Test 1
Part 1: Multiple Choice

Choose **one** correct answer.

1. Find the unit rate. Round to the nearest hundredth, if necessary.
   AED 8.43 for 3 kilograms

   a) AED 2.81/kg b) AED 2.18/kg c) AED 3.18/kg d) AED 3.81/kg

2. Given $x = -2$, $y = 3$, and $z = -9$, evaluate the expression, $|x - z|$.

   a) 11 b) 7 c) -11 d) -7

3. Write an addition expression for the situation; Saif owes his mom AED 75. He borrows another AED 50 from her.

   a) -75 + (-50) b) 175 + (-50) c) -50 + (-50) d) 75 + (-50)

4. Find the quotient of $-52 \div (-13)$.

   a) -3 b) 3 c) 4 d) -4

5. Write an integer for the situation "a gain of AED 69".

   a) -69 b) -31 c) 69 d) 0

6. Evaluate the following expression $|9| - |-9|$.

   a) 0 b) 9 c) -9 d) 18

7. Estimate 303% of 500

   a) 1,500 b) 2,000 c) 500 d) -1,000

8.Evaluate the following; $\left(\frac{4}{9}-\frac{7}{9}\right)+\frac{1}{9}$.

a) $\frac{1}{9}$ b) $-\frac{1}{9}$ c) $-\frac{2}{9}$ d) $\frac{2}{9}$

9. Simplify the following complex fraction; $\frac{\frac{6}{7}}{\frac{9}{14}}$.

a) $\frac{1}{3}$ b) $\frac{5}{3}$ c) $\frac{4}{3}$ d)) $\frac{7}{3}$

10. Find the sale price, given a tie costs AED 52, and there is a 50% discount.

a) AED 26 b) AED 5.2 c) AED 2.6 d) AED 52

11. What is 12% of 12.

a) 14.4 b) 1.44 c) 0.144 d) 144

12. Write the fraction $\frac{7}{9}$ as a decimal. Use bar notation if the decimal is a repeating decimal.

a) 0.7 b) 0.77 c) 7.7 d) $0.\overline{7}$

13. Find the constant rate of change for the given table.

Time Spent Mowing (h)	Money Earned (AED)
1	10
3	30
5	50
7	70

a) 5 b) 10 c) 15 d) 20

14. Find the simple interest earned to the nearest fils for each principal, interest rate, and time; AED 530, 6%, 1 year

a) AED 318 b) AED 31.80 c) AED 0.32 d) AED 3.18

Part 2: Problem Solving

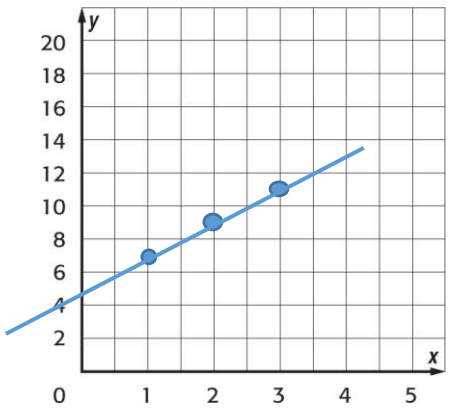
Show your full working out when answering these questions.

15. Sheikha reads $7\frac{1}{2}$ pages of a book in 12 minutes. What is her average reading rate in pages per minute?

$$\frac{7\frac{1}{2}}{12} = \frac{7.5 \div 12}{12 \div 12} = \frac{0.625}{1} = 0.625$$

16. Determine whether the relationship between the two quantities shown in each table are proportional by graphing on the coordinate plane.

DVD Rental	
Number of DVDs	Cost (AED)
1	7
2	9
3	11



For the relationship between the two quantities to be proportional:
The points must line on a straight line (Yes)
The straight line must intersect at the origin (0,0) (No)

17. Fahd is painting a fence that is 26 feet long and 7 feet tall. A gallon of paint will cover 350 square feet. Assuming the situation is proportional, write and solve a proportion to determine how many gallons of paint Fahd will need.

q

First, find the area of the fence.

Area = 26 feet * 7 feet
Area = 182 square feet

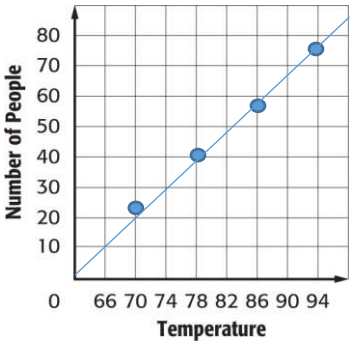
Then set the proportion. where x is the number of gallons of paint for the fence.

$$\frac{182}{350} = \frac{x}{1} \quad = \quad \frac{182}{350} = x = 0.52$$

So little bit more than half a gallon.

18. Graph the data, and then find the slope. Explain what the slope represents.

Temperature (°F)	70	78	86	94
Number of People on Beach	24	40	56	72



The slope is the ratio of:

The vertical change (rise) over the horizontal change(run).

Slope = $\frac{change\ in\ y}{change\ in\ x} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{40-24}{78-70} = \frac{16}{8} = 2$

.

19. A meteorologist reported that in the month of April there were 3 cm more rainfall than normal. Write an integer to represent the amount of rainfall above normal in April.

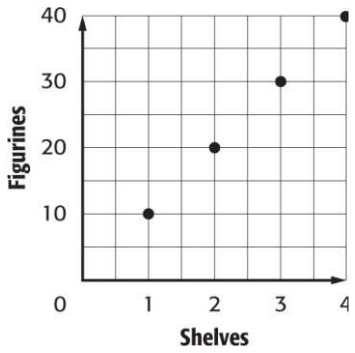
The amount of rainfall above normal in April = +3 cm

20. The memory card on Saleh's digital camera can hold about 430 pictures. Saleh used 18% of the memory card while taking pictures at a family reunion. About how many pictures did Saleh take at the family reunion? Round to the nearest whole number

18% of 430 = $18\% \times 430 = 77.4$

Round to the nearest whole number = 77 pictures

21. Majid is arranging figurines on shelves. The number of figurines varies directly with the number of shelves. Given the graph, what is the constant of proportionality?



Constant of proportionality = k

$$k = \frac{y}{x} = \frac{20}{2} = 10$$

22. Salem used 2.8 pounds of sugar in a recipe. About how many grams is the mass of the sugar?
Use 1 lb ≈ 453.6 g.

1 lb → 453.6 g
2.8 lb → x g

$$x = \frac{(2.8)(453.6)}{1} = x = 1270.08\ g$$

Mock Test 2

Part 1: Multiple Choice

Choose **one** correct answer.

1. Find the unit rate. Round to the nearest hundredth, if necessary.
   357 miles in 6.3 hours.

   a) 56.67 miles b) 156.67 miles c) 105.67 miles d) 136.67 miles

2. Evaluate the following expression $|-14| \div 2 \times |-3|$.

   a) -21 b) 21 c) 42 d) -42

3. Simplify the following complex fraction; $\frac{\frac{3}{8}}{\frac{7}{12}}$.

   a) $\frac{21}{80}$ b) $\frac{1}{3}$ c) $\frac{3}{4}$ d) $\frac{9}{14}$

4. Evaluate the expression $-7(2)(5)$.

   a) -70 b) 100 c) 70 d) 70

5. Given the table, identify the ratio between each set of values.

Number of Classrooms	1	2	3	4
Total Students	24	48	72	92

a) $\frac{24}{3}$ b) $\frac{24}{4}$ c) $\frac{24}{1}$ d) $\frac{24}{2}$

6. Given the table, describe the relationship between the number of lunches bought, and the total cost of lunches.

Number of Lunches	1	2	3	4
Total Cost (AED)	2.75	5.50	8.25	11

a) complex b) proportional c) simple d) non proportional

7. Find the value of *k* given the proportion, $\frac{3.6}{k} = \frac{0.2}{0.5}$

a) 9 b) 900 c) 0.9 d) 90

8. Evaluate the expression $\frac{-84}{12}$

a) -7 b) 8 c) 6 d) 9

9. Write an integer for the situation "10°C below zero"

a) -10 b) 0 c) -20 d) 20

10. Evaluate the expression $(-3)^2$

a) 9 b) -9 c) 3 d) 27

11. The table shows the weight in kilograms of some cats in a Zoo. What is the mean weight of these cats?

Cat	Cheetah	Cougar	Lion	Tiger
Weight	65	100	250	350

a) 191.50 b) 191.75 c) 191 d) 191.25

12. What is 45% of 156?

a) 70.2 b) 65.7 c) 56.7 d) 56

13. Order the following values from greatest to least; $2\frac{7}{8}$, 2.98, 2.4, 2.5

a) $2\frac{7}{8}$, 2.98, 2.4, 2.5 b) 2.98, $2\frac{7}{8}$, 2.5, 2.4 c) $2\frac{7}{8}$, 2.98, 2.5, 2.4 d) $2\frac{7}{8}$, 2.5, 2.98, 2.4

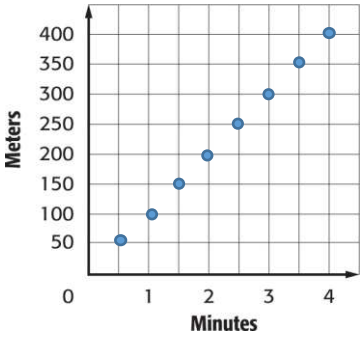
14. Evaluate the following; $4 - \frac{3}{4}$.

a) $3\frac{1}{8}$ b), $4\frac{1}{8}$ c) $3\frac{1}{4}$ d) $2\frac{3}{4}$

Part 2: Problem Solving

Show your full working out when answering these questions.

15. Latonya swims 50 meters every $\frac{1}{2}$ minute. Graph this situation. Find the slope, and explain what the slope represents.



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The vertical change (rise) over the horizontal change(run).

Slope $= \frac{change\ in\ y}{change\ in\ x} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{200 - 100}{2 - 1} = \frac{100}{1} = 100$

16. You need 2 yards of fabric to cover 3 pillows, and 6 yards to cover 9 pillows. How much fabric do you need to cover 15 pillows?

2 → 3
6 → 9
x → 15

(6) (15) = 90 / 9 = 10 = x

17. The value of a share of stock in an electronics company increased by $\frac{2}{3}$ % during one week.
If the value of a share of stock was AED 141 at the beginning of the week, estimate the increase in value of a share of stock at the end of the week ?

I = (p)(r)(t) = (141)($\frac{2}{3}$ %)(1) = 0.94 AED
In other words:
1% of 141 = 0.01 · 141 = 1.41; 2 · 1.41 = 2.82; 2.82 ÷ 3 ≈ 0.94; The increase of a share of stock is about AED 0.94.

18. Mohamed is buying a computer that normally sells for AED 890. The sales tax rate is 6%. What is the total cost of the computer including sales tax?

$890 \times 6\% = 53.4$

$890 + 53.4 = 943.4\ AED$

19. The length of a yard is 2.43 kilometers. Use a mixed number to represent this length?

Length = $2.43 = \frac{2.43}{1} = \frac{2.43 \times 100}{1 \times 100} = \frac{243}{100} = 2\frac{43}{100}$

20. Nadia knitted two scarves for her teddy bears. One was $10\frac{3}{4}$ cm long. The other was $3\frac{1}{8}$ cm shorter than the first. How long was the second scarf?

$1^{st} = 10\frac{3}{4} = \frac{43}{4}$

The 2^{nd} is $3\frac{1}{8} = \frac{25}{8}\ cm$ shorter than the 1^{st}

$2^{nd} = \frac{43}{4} - \frac{25}{8} = \frac{86}{8} - \frac{25}{8} = \frac{61}{8} = 7\frac{5}{8}$