GRADE 4

UNIT 1

Lesson 8

Review

In this lesson we will review all the topics that were learned in the previous seven lessons.

A. Numbers

In Lesson 1 you learnt about the various types of numbers. Numbers are placed into groups based on how they are alike. The types of numbers that you learnt about in that lesson are: odd and even numbers, square numbers, and multiples of numbers.

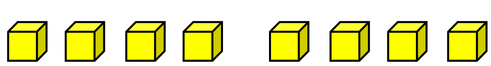
Odd Numbers

A number is odd if there is a remainder when it is divided into two equal groups. The first ten odd numbers are 1, 3, 5, 7, 9, 11, 13, 15, 17, and 19. All these numbers have one thing in common. They have a remainder when they are divided into two equal groups.

For example, when the thirteen circles above are divided into two equal groups there are two groups of six with one extra. This tells us that 13 is an odd number.

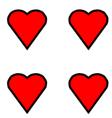
Even Numbers

An even number is any number that can be divided into two equal groups. The first ten even numbers are 2, 4, 6, 8, 10, 12, 14, 16, 18, and 20. For example the eight yellow cubes below are divided into two equal groups of four with no remainder. Therefore 8 is an even number.

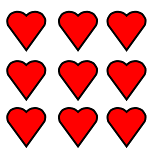


Square Numbers

A square number represents a set of items which can be arranged in a square. For example, the four hearts below are arranged as a square. This is a 2 by 2 square. We may also



have a 3 by 3 square. That means that we have arranged nine things in a square.



From this we can see that both 4 and 9 are square numbers. Some other square numbers are 16, 25, and 36.

Multiples of Numbers

When you do what is sometimes called skip counting you are using multiples. If you count 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, then you are counting using the multiples of two. When you count 5, 10, 15, 20, 25, 30, you are counting using the multiples of 5. Here are some examples of multiples.

Multiples of 2 are: 2, 4, 6, 8, 10, 12

Multiples of 3 are: 3, 6, 9, 12, 15, 18

Multiples of 4 are: 4, 8 12, 16, 20, 24

Multiples of 5 are: 5, 10, 15, 20, 25, 30

Multiples of 6 are: 6, 12, 18, 24, 30, 36

B. Place Value

In Lesson 2 you learnt about **place value**. Place value is best understood by using what is sometimes referred to as a **place value chart**. Below is an example of how we could read the number **5,746,304** by using a place value chart. From the chart we can see that the number represents **5 million, 7 hundred thousand, 4 ten thousand, 6 thousand, 3 hundred, zero tens, 4 ones**. This could also be written differently as, **5,000,000 + 700,000 + 40,000 + 6,000 + 300 + 4**. This is called the expanded form of writing the number. Another way of writing numbers is in word form. For example, the number in the chart would be written as: **five million, seven hundred forty-six thousand, three hundred four**.

PLACE VALUE						
Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones
5	**7**	**4**	**6**	**3**	**0**	**4**

<u>Writing numbers from standard form to word form</u>

Example 1: Two hundred five million, six hundred fifteen thousand, eight hundred and one. Written in standard form this would be **205,615,801**.

Example 2: Fifty million, three hundred thousand, sixty-three. Written in standard form this would be 50,300,063.

<u>Use of place value to do addition</u>

We may use place value to perform addition. To do this we must write the number in what is called the **Expanded Form**. The expanded form of the number in the first-place value chart above is, 5, 000,000 + 700,000 + 40,000+ 6000 + 300 +4.

Example 3 Add using expanded form: 1,543+426.

```
1543 = 1000+500+40+3
  426 =        400+20+6
       ===========
       1000+900+60+9
```

When we add the parts of the expanded form we obtain, 1000+900+60+9 = 1969.

Example 4 Add using expanded form: 2135+4623.

```
2135 = 2000+100+30+5
4623 = 4000+600+20+3
----------------------------
       6000+700+50+8
```

Adding the parts of the expanded form we obtain, 6000+700+50+8 = 6758.

Use of place value to do subtraction

We also use place value to do subtraction. We proceed in the same manner as addition the only difference is that instead of adding we subtract.

Example 5 Subtract using expanded form: 865 – 732.

```
865 = 800+60+5
732 = 700+30+2
-------------------
      100+30+3.
```

Adding the parts of the expanded form we obtain, 100+30+3 = 133.

Example 6 Subtract using expanded form: 3468 – 1253.

```
3468 = 3000+400+60+8
1253 = 1000+200+50+3
----------------------------
       2000+200+10+5
```

Adding the parts of the extended form we obtain, 2000+200+10+5 = 2215.

C. Addition and Subtraction of Whole Numbers

In Lesson 3 you learnt when to use addition and when to use subtraction. Very often when we have a word problem it may not be clear which operation to use. In Lesson 3 you were guided through many word problems to help you to develop your ability to determine when to add and when to subtract.

However, before we start adding and subtracting or trying to solve word problems, we should learn **estimation**. For example, if we are asked to add, 59+31, we could use estimation to arrive at an answer that is close to the actual sum.

Example 7: Use estimation to add: 59+31.

$59 \rightarrow 60$ (59 is rounded to 60 because it is the nearest convenient number to add)
$+\underline{31} \rightarrow \underline{30}$ (31 is rounded to 30 for the same reason)
$\underline{90} \rightarrow \underline{90}$

By estimation we were able to quickly obtain the sum. The answers may not always be the same as in this case, but it is usually very close.

Example 8: Use estimation to subtract: 103−78.

$102 \rightarrow 100$ (102 is rounded to 100)
$-\ \underline{79} \rightarrow \underline{80}$ (79 is rounded to 80)
$\underline{23} \rightarrow \underline{20}$ The actual difference is 23 and estimated difference is 20.

<u>Word problems</u>

Example 9: There are 20 children in Tommy's class. This morning 12 of them came early, 6 were late, and 2 were absent. How many children were in the class today?

Steps to solve the problem

1. First determine what the question asks, "How many students were in the class today?"

2. We are not concerned with the number of children in the class, 20, or those who are absent, 2.

3. We must add the number of children who came in early, 12, and the number of those who came in late, 6.

4. 12+6 = 18.

Answer to the problem is 18.

Another method is to subtract the number of students who are absent, 2, from the total number of students in the class, 20. 20 −2 = 18.

Example 10: Janie is 6 years old. Her sister Ally is 2 years older. Their brother Ray is 4 years older than Ally. How old is Ray?

Steps to solve the problem

1. Janie is 6 years old
2. Ally is 2 years older. 6+2 = 8
3. Ally is 8 years old
4. Ray is 4 years older than Ally. 8+4 = 12
5. Ray is 12 years old

Answer to the problem is 12.

Example 11: Natasha must read a book with 89 pages. She has already read 57 pages. How many more pages does she have to read?

Steps to solve the problem

1. Natasha must read 89 pages
2. She has read 57
3. Find the difference between 89 and 57, 89−57 = 32
4. She has 32 more pages to read

Answer to the problem is 32.

D. Multiplication and Division

In the first part of Lesson 4 you learnt how to estimate products and then you learnt how to multiply a whole number by another whole number. In the second part of the lesson you learnt what it means to divide into equal parts.

Estimating Products

We can use estimation when we do not need the exact product or when we need to check the reasonableness of an answer. Let us look at an example of an estimated product.

Example 12: Ace Hiking Club has 49 members for whom the club wishes to buy shirts. The budget for shirts is $1600 and each shirt costs $31. Will there be enough money to buy shirts for all the members?

Solution: 49 → 50 (49 rounds to 50)
×31 → ×30 (31 rounds to 30)
1519   1500

Since 1519 is very close to 1500 then the estimate is quite good. From the estimate it could be seen immediately that there was enough money to buy the shirts.

Example 13: Eddy works in a store packing boxes. He has 22 shelves empty and each shelf holds 9 boxes. What is the total number of boxes Eddy could pack on the shelves?

Solution: 22 → 20 (22 rounds to 20)
×9 → ×10 (9 rounds to 10)
198   200

Since 198 is very close to 200 the estimate is very good. According to the estimate Eddy could pack about 200 boxes.

Multiplying by Whole Numbers

Multiplication is repeated addition. Consider the question, “How many days are there in 6 weeks?” Since there are seven days in a week we could easily answer this question by adding. 7+7+7+7+7+7 = 42. On the other hand, if we know our multiplication facts we could multiply, 7×6 = 42. This is the same answer we obtained by adding.

Another important point to remember is that when multiplying by two or more digits you may have to regroup.

Example 14: Multiplying without regrouping.

Step 1 $\begin{array}{r} 32 \\ \underline{\times 23} \\ 96 \end{array}$ (multiply the ones)

Step 2 $\begin{array}{r} 32 \\ \underline{\times 23} \\ 96 \end{array}$ (multiply the tens)

Step 3 Add $\begin{array}{r} \underline{+640} \\ \underline{736} \end{array}$

Example 15: Multiplying with regrouping.

Step 1 $\begin{array}{r} {}^{2}57 \\ \underline{\times 34} \\ 228 \end{array}$ (multiply the ones and regroup)

Step 2 $\begin{array}{r} {}^{2}57 \\ \underline{\times 34} \\ 228 \end{array}$ (multiply the tens and add the extra tens from regrouping)

Step 3 Add $\begin{array}{r} +\underline{1710} \\ \underline{1938} \end{array}$

Division

Just as the answer to a multiplication problem could be found by repeated addition, so too the answer to a division problem can be found by repeated subtraction.

Example 16: Divide 36÷6.

$\begin{array}{r} 36 \\ \underline{-6} \\ 30 \\ \underline{-6} \\ 24 \\ \underline{-6} \\ !8 \\ \underline{-6} \\ 12 \\ \underline{-6} \end{array}$

$$\begin{array}{r} 6 \\ \underline{-6} \\ \underline{0} \end{array}$$

We now count the number of times we subtracted 6 from 36, we see it is 6 times. Therefore, we see that $36 \div 6 = 6$.

It is important to remember that when we divide we are sharing into equal groups. If we have 20 apples to divide by 4, then we must have 4 groups each containing 5 apples. The division sentence would be, $20 \div 4 = 5$.

<u>Division with no remainder</u>

Example 17: $64 \div 8 = ?$

Here we could use our multiplication facts to help us. What times 8 is equal to 64? Our multiplications facts tell us that $8 \times 8 = 64$. Therefore $64 \div 8 = 8$.

<u>Division with remainder</u>

Example 18: $46 \div 9 = ?$

Using our multiplication facts, we see that $9 \times 5 = 45$. Therefore $46 \div 9 = 5$ with a remainder of 1.

Answer: 5R1

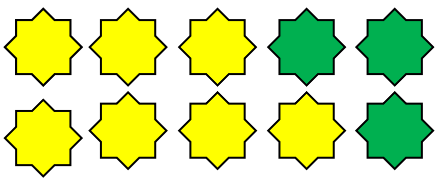
E. Fractions

In Lesson 5 you learnt what a fraction is and how to write fractions. Fractions can name parts of a whole, or parts of a set. For example, if we take one egg from a crate containing twelve eggs, then it could be said that 1/12 of the crate was taken, that is one egg was removed from a set of twelve. Similarly, if a pizza is divided into eight equal slices and Dad eats three of those slices, then we could say that Dad ate 3/8 of the pizza.

What is a Fraction?

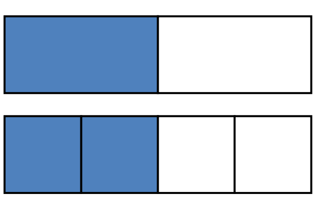
A fraction is a number that names a part of a whole or a set. Look at the rectangle below. It is divided into four equal parts, and if I take one part of the rectangle then I will be taking 1/4 and leaving 3/4. This is an example of a fraction as part of a whole.

Let us look at a fraction as a part of a set. Below is is a set of ten stars, seven are yellow and three are green. We could say that 7/10 of the set is yellow and 3/10 is green.



Equivalent Fractions

A fraction can have many different names. Fractions that name the same amount are called **equivalent fractions**. From the diagrams below, you can see that one part out of two is the same as two parts out of four, or in other words 1/2=2/4. There are many other fractions that are also equal to 1/2. Fractions such as 3/6, 4/8, 5/10, and 6/12 are all equal to 1/2 and are called equivalent fractions.



To obtain equivalent fractions we need to multiply the numerator and denominator by the same (not zero) number. For example, $\frac{1}{2} \times \frac{2}{2} = \frac{2}{4}$. If we multiply both numerator and denominator by two we obtain, $\frac{2}{4}$ which is equivalent to $\frac{1}{2}$.

Comparing Fractions

Fractions can be compared in many ways. One useful way to compare fractions is by examining the numerators and denominators of the fractions. The steps are as follows.

1. **If the fractions have numerators of 1**, check the denominators. The greater fraction has the smaller denominator. For example, 1/2 > 1/3.
2. **If the fractions have the same numerators**, check the denominators. The greater fraction has the smaller denominator. For example, 3/5 > 3/7.
3. **If the fractions have the same denominators,** check the numerators. The greater fraction has the greater numerator. For example, 5/7 > 3/7.

   Note: This sign**, >** means greater than; this sign, < means less than, and this sign, **=** means equal to.

Ordering Fractions

We can order fractions from least to greatest by comparing them as we did in the previous section. For example, 1/3, 1/5, 1/4, and 1/2 can be ordered from least to greatest by comparing them and then putting them in order. By inspecting the fractions, we see they all have numerators of 1, therefore we must compare the denominators. The fraction with the greatest denominator is the smallest fraction and the fraction with the second greatest denominator goes next. Thus, ordered from least to greatest the fractions will be, 1/5, 1/4, 1/3, 1/2.

Using Fractions

We can use fractions to solve various problems. If we have a $100 and we are told that 1/5 of it will be needed to pay for food, we can use the fraction, 1/5 to calculate how much money will be needed for food. To find 1/5 of $100 we divide $100 by 5, $100 ÷ 5 = $20. Similarly, if we needed to find 2/5 of $100 we would divide $100 by 5, and then multiply the answer by 2.

Example 19: Find 1/3 of 27.

Solution: Divide 27 by 3, 27 ÷ 3 = 9.

Therefore, 1/3 of 27 = 9

Example 20: Find 3/7 0f 49.

Solution: Divide 49 by 7, 49 ÷ 7 =7. Now we must multiply the answer by 3, 7× 3 =21.

Therefore, 3/7 of 49 = 21

Note: When finding a fraction of any quantity, divide that quantity by the denominator of the fraction and multiply by the numerator.

F. Decimals

In Lesson 6 you learnt what a decimal is and how to write decimals. Decimals, or decimal fractions as they are sometimes called, are another way of writing regular fractions. For example, the fraction, 3/10, may be written as a decimal, 0.3. Both the fraction and the decimal would be read as "**three-tenths**." Similarly, the fraction, 3/100, could be written as, 0.03 and both could be read as, "**three-hundredths**." In the place value chart below, the 6 in the tenths column could be written 6/10 or 0.6, and it is read "**six- tenths**." The 3 in the hundredths place could be written

3/100 or 0.03 and is read “**three-hundredths**,” also the 4 in the thousandths place could be written 4/1000 or 0.004 and is read “**four-thousandths.**”

PLACE VALUE CHART

Hundreds	Tens	Ones	.	Tenths	Hundredths	Thousandth
5	**7**	**4**	**·**	**6**	**3**	**4**

Comparing and Ordering Decimals

We may compare decimals by putting them in a place value chart and inspecting them starting with the first digit after the decimal. For example, if we are asked to compare the numbers 0.357, 0.352, and 0.348, and then place them from least to greatest, we start by putting them in the place value chart below.

PLACE VALUE CHART

Hundreds	**Tens**	**Ones**	**.**	**Tenths**	**Hundredths**	**Thousandths**
		0	**.**	**3**	**5**	**7**
		0	**.**	**3**	**5**	**2**
		0	.	3	4	8

The next step is to inspect the first digit after the decimal in each number, in this case they are all 3's so they are equal. Next, we inspect the second set of digits, 5, 5, and 4. If we are looking for the smallest number, then the third number, 0.348, is the one because its second digit after the decimal is smaller than the second digit of the other two numbers. We must now inspect the third digit of the other two numbers, which are 7 and 2. Since 2 is smaller than 7 then the number, 0.352 is the smaller of the two numbers. Therefore, we can now put the numbers in order from least to greatest: 0.348, 0.352, and 0.357.

Example 21: Compare and Order from least to greatest: 0.54, 0.508, and 0.531.

As explained above we start by putting them in a place value chart and comparing the digits. In the place value chart below the first digit after the decimal point in the numbers are all 5's, so they are equal. Comparing the next set of digits, we have 4, 0, and 3. Since 0 is the smallest of the three digits, then the number, 0.508 is the least.

PLACE VALUE CHART

Hundreds	**Tens**	**Ones**	**.**	**Tenths**	**Hundredths**	**Thousandths**
		0	**.**	**5**	**4**	
		0	**.**	**5**	**0**	8
		0	.	5	3	1

We next compare the other two numbers 0.54, and, 0.531. When we compare the second digits after the decimal, 4, and 3, we see that 3 is the smaller digit and that tells us that the number, 0.531 is the smaller of the two numbers. Therefore, the numbers when placed in order from least to greatest are: 0.508, 0.531, 0.54.

Rounding Decimals

Numbers are rounded to make them easier to work with or when only an estimate is needed. If we have a decimal such as 0.8962847, we can round this decimal to the nearest tenth or the nearest hundredth. To round to the nearest tenth, which in the case of the decimal, 0.<u>8</u>762847, would be the 8 (which is underlined), we must examine the digit to the right of the 8. If this digit is 5 or greater than 5, then we must increase the 8 by 1 to make it 9. If the digit to the right of 8 is less than 5, then the 8 remains as it is. In this case the decimal 0.8762847 when rounded to the nearest tenth is **0.9**. Similarly, to round 0.8762847 to the nearest hundredth we follow the same rule and examine the digit to the right of 7, which is 6. Since 6 is greater than 5 we add 1 to the 7 to make it 8. Therefore, the decimal 0.8762847 rounded to the nearest hundred is **0. 88.**

Adding Decimals

There are two basic steps to follow when adding decimals.

Example 22: Add 2.54 + 5.32

$$\begin{array}{rl} \text{Step 1:} \quad 2.54 & \text{Line up the decimal points} \\ \underline{+5.32} & \\ \underline{7.86} & \text{Step 2 Add and place the decimal point.} \end{array}$$

Example 23: Add 4.6+ 3.15

$$\begin{array}{rl} 4.60 & \text{Write a zero as a place holder.} \\ \underline{+3.15} & \\ \underline{7.75} & \text{Add} \end{array}$$

Subtracting Decimals

Subtracting decimals is like adding decimals. Just as in adding decimals we must first line up the decimal points and then subtract.

Example 24: Subtract 7.56−4.32

$$\begin{array}{rl} 7.56 & \text{Line up the decimal point} \\ \underline{-4.32} & \text{Subtract} \\ \underline{3.24} & \text{Answer} \end{array}$$

Example 25: Subtract 9.48−5.37

$$\begin{array}{rl} 9.48 & \text{Line up the decimal point} \\ -\underline{5.37} & \text{Subtract} \\ \underline{4.11} & \text{Answer} \end{array}$$

G. <u>Percents</u>

In Lesson 7 you learnt about percents. The word percent means "per hundred" or "out of a hundred." When someone says, "My rent is 20% of my salary," she means that \$20 out every \$100 that she earns goes towards her rent. If her salary is \$5000 then her rent is 50×\$20 = \$1000.

Example 26: Andy has interviewed 100 people about the color of their car. The following table lists the results of the survey.

Color of Cars

Color of car	Number of people
Black	20
White	25
Grey	12
Blue	10
Red	8
Silver	25
Total	100

What percent of the people interviewed had a red car? What percent had a white car? What percent had a silver car? Remember that percent means “out of a hundred.” The number of people who had a red car is 8 or 8 out of 100 (8/100), which is 8%. Similarly, the number of people who had a white car is 25% and the number of people who had a silver car is also 25%.

It may be noticed that there is a connection between fractions and percents. Since 25% is equal to 25/100, and this is equivalent to 1/4 then 25% is equivalent to 1/4. Here are some conversions from fractions to percent with which you should be familiar.

Fraction	**Percent**
1/8	12½%
1/4	25%
3/8	37½%
1/2	50%
5/8	62½%
3/4	75%
7/8	87½%

Writing percent as a fraction

Just as we could write a fraction as a percent so too a percent could be written as a fraction. For example, 20% could be written as. $\frac{1}{5}$ Remember that 20% is, $\frac{20}{100}$, and if we divide both numerator and dominator by 20 we will obtain the equivalent fraction, $\frac{1}{5}$.

Example 27: Write 40% as a fraction.

Remember 40%=$\frac{40}{100}$, therefore if we divide both numerator and denominator by 20, we obtain, 40÷20=2, and 100÷20=5. The equivalent fraction is, $\frac{2}{5}$.

How to Find the Percent of a Number

Earlier in this lesson you learnt that percent means "out of a hundred." Very often however, we are required to find a percent of a number other than a hundred. For example, if we want to find 35% of 200 we could be a little confused. Here is one simple method.

Since we know that 35% of 100= 35, therefore 35% of 200 =2 × 35 = 70. We could have also done $\frac{35}{100} \times \cdot 200 = 70$.

Example 28: Find 22% of 350. (You may use a calculator).

Solution: $\frac{22}{100} \times 350 = 77$.

Example 29: Find 15% of 270.

Solution: $\frac{15}{100} \times 270 = 40.5$.

Unit 1Test

(1) Which is an odd number?

(A)32

(B)45

(C)50

(D)54

(2) Six students are placed in a row. How many rows of six students each must there be to form a square?

(A) 2

(B) 4

(C) 6

(D) 8

(3) Sara is counting buttons. After putting them in groups of four there are no buttons left over. Which is most likely the total number of buttons Sara had?

(A) 14

(B) 18

(C) 24

(D) 30

(4) Write in standard form: three hundred seventy-five thousand, two hundred one.

(A) 3,750,201

(B) 300,075,201

(C) 375,021

(D) 375,201

(5) Write in word form: 107,353.

(A) One hundred seven, three hundred fifty-three.

(B) One hundred seven, thirty-five three.

(C) One hundred seven thousand, three hundred fifty-three.

(D) One hundred seventy thousand, three hundred fifty-three.

(6) Ray is 9 years old. His sister is 5 years older than him. What is the sum of their ages?

(A) 14

(B) 23

(C) 4

(D) 9

(7) Karl went to the mall with $79. After purchasing a few items, he went home and counted how much money he had left. He found that he had $17 left. How much money did he spend at the mall?

(A) 96

(B) 79

(C) 62

(D) 17

(8) Multiply: 84 x 32.

(A) 420

(B) 2688

(C) 2580

(D) 2588

(9) Divide: 78 ÷ 7

(A) 11

(B) 11r1

(C) 10r8

(D) 12

(10) Tim is stacking his baseball cards in piles of 12. He has made 23 stacks of 12 with 2 cards left over. How many cards does Tim have?

(A) 274

(B) 69

(C) 71

(D) 278

(11) Give three equivalent fractions for 1/3.

(A) 1/3, 2/3, 3/3

(B) 2/6, 3/9, 4/12

(C) 2/6, 3/6, 4/6

(D) 1/3, 1/4, 1/5

(12) Compare the following fractions. use >, <, or =. 1/6 $\square$ 1/5

(A) 1/6 < 1/5

(B) 1/6 > 1/5

(C) 1/6 = 1/5

(D) None of the above

(13) Sherri had 75 friends on facebook, 2/5 of them are school friends. How many of Sherri's facebook friends are school friends?

(A) 43

(B) 30

(C) 15

(D) 75

(14) Bob read for 48 minutes, 3/8 of that time he listened to his iPod. How many minutes did Bob listen to his iPod?

(A) 18

(B) 24

(C) 30

(D) 42

(15) Order from least to greatest: 0.53, 0.6, 0.58, 0.55

(A) 0.53, 0.55, 0.58, 0.6

(B) 0.55, 0.6, 0.58, 0.53

(C) 0.6, 0.58, 0.55, 0.53

(D) 0.58, 0.55, 0.6, 0.53

(16) Find the difference: 0.87 – 0.3

(A) 1.17

(B) 5.7

(C) 0.57

(D) 0.84

(17) Add: 2.341 + 5.05

(A) 73,91

(B) 0.7391

(C) 7.391

(D) 2.846

(18) Write as a percent: 1/5

(A) 1%

(B) 5%

(C) 20%

(D) 50%

(19) Write as a fraction: 40%

(A) 40/100

(B) 4/100

(C) 1/4

(D) 3/4

(20) What is 50% of 60?

(A) 50

(B) 60

(C) 5

(D) 30

Answers: (1) B; (2) C; (3) C; (4) D; (5) C; (6) B; (7) C; (8) B; (9) B; (10) D; (11) B; (12) A; (13) B; (14) A; (15) A; (16) C; (17) C; (18) C; (19) A; (20) D.