Hefei No. 42 Middle School 2017-2018 First Semester 7th Grade Mathematics Midterm Exam

Full score: 117 points

Time: 120 points

Section/ question	One	Two	Three							Total
			17	18	19	20	21	22	23	
Points earned										

One, multiple choice (12 questions, 3 points per question, full score 36 points)

1 · $-\frac{1}{2}$ has an absolute value of ( )

(A) $\frac{1}{2}$ (B) $-\frac{1}{2}$ (C)2 (D) -2

2 · 16800m can be rewritten as ( ) .

(A)1.68×10^4m (B)16.8×10^3 m (C)0.168×10^4m (D)1.68×10^3m

3 · If the income of 15 dollars is recorded as +15 dollars, then the expenditure of 20 dollars is recorded as ( ) dollars.

(A)+5 (B)+20 (C)-5 (D)-20

4 · Out of the rational numbers $(-1)^2$, $(-1)^3$, -1^2, $|-1|$, -(-1), and $-\frac{1}{-1}$ how many of them equal 1? ( )

(A)3 (B)4 (C)5 (D)6

5 · Given that p and q are opposite numbers, with p≠0, then which of the following is correct? ( ) ·

(A) $p.q=1$ (B) $\frac{q}{p}=1$ (C) $p+q=0$ (D) $p-q=0$

6 · The solution to the function 5-3x=8 is ( ) ·

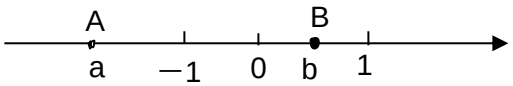
(A) x=1 (B) x=-1 (C) x=$\frac{13}{3}$ (D) x=-$\frac{13}{3}$

7 · Which of the following is *invalid*? ( ) .

(A) a + (b + c - d) = a + b + c - d (B) a - (b - c + d) = a - b + c - d

(C) a - b - (c - d) = a - b - c - d (D) a + b - (- c - d) = a + b + c + d

8 · As shown, the points A and B each represents the two numbers a and b. Which of the following conclusions is correct? ( ) ·



(A) b - a>0 (B) a - b>0 (C) ab > 0 (D) a + b>0

9 · Which of the following estimations of the value of 1022.0099 is incorrect? ( ) .

(A)1022.01(accurate to 0.01) (B)1.0×10^3(keeping 2 significant digits)

(C)1020(accurate to the place value of 10) (D)1022.010(accurate to 0.0001)

10 · "A number is greater than its opposite by -4", if the number is x, the equation for x can be listed as ( ) .

(A)x=-x+4 (B)x=-x+ (-4) (C)x=-x- (-4) (D)x- (-x) =4

11. Out of the following, ①If $a=b$, then $\frac{a}{x}=\frac{b}{x}$; ②If $\frac{a}{x}=\frac{b}{x}$, then $a=b$; ③If $4a=7b$, then $\frac{a}{b}=\frac{7}{4}$; ④If $\frac{a}{b}=\frac{7}{4}$, then $4a=7b$. How many of them are correct? ( ) .

(A)1 (B)2 (C)3 (D)4

12. Given that a and b are opposite numbers, c and d are reciprocals. x is equal to the 2nd power of -4, then what is the value of $(cd-a-b)x-\frac{1}{2}x$? ( )

(A)2 (B)4 (C)-8 (D)8

Two, fill in the blanks (3 questions, 3 points per question, full score 9 points)

13. Write a whole number that is less than $-\frac{1}{2}$:_____.

14. Given that point A is 300m above sea level, point B 50m below sea level, then the distance between point A and B would be_____m.

15. Karen used a computer to design a calculation program. The input and output data are as follows:

Input	...	1	2	3	4	5	...

Output	...	$\frac{1}{2}$	$\frac{2}{5}$	$\frac{3}{10}$	$\frac{4}{17}$	$\frac{5}{26}$	...

If the input value is 8, the output is_____ .

Three, short answer questions (8 questions, full score 72 points)

16. (10 points) Calculate (1) $(1-\frac{1}{6}+\frac{3}{4})\times(-48)$ (2) $(-1)^{10}\times 2+(-2)^3\div 4$

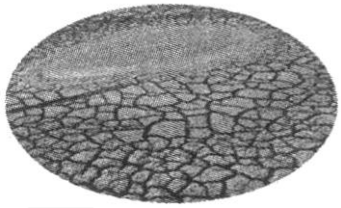
S : S :

17. (10 points) Solve for x: (1) $3x+7=32-2x$ (2) $1-\frac{1}{2}x=3-\frac{1}{6}x$

S : S:

18. (7 points) Statistics show that cities in my country can be divided into three categories according to their water resources: cities with no water shortage temporarily, cities with ordinary water shortages and cities with severe water shortages. Among them, the number of cities with no water shortage is 52 times more than the number of cities with severe water shortage, and the number of cities with general water shortage is twice the number of cities with severe water shortage. How many cities are there with severe water shortage?

S:



19. (9 points) Observe the following series of numbers: 1、2、4、8、16、...The proportion of each term and the one before the previous one is 2. All number sequences like this one, when the second term and every term after that is multiplied by the same number to get the next term is called a proportional sequence.

(1) The 4^{th} term of this number sequence 5、-15、45、... is_____. (2 points)

(2) If the number sequence a_1, a_2, a_3, a_4 is a proportional sequence, with the common ratio as q, then: $a_2 = a_1 q$ · $a_3 = a_2 q = (a_1 q) q = a_1 q^2$ · $a_4 = a_3 q = (a_1 q^2) q = a_1 q^3$. Then: a_5 =_____ · (Write an algebraic expression including a_1 and q) (2 points)

(3) Find the common ratio of a proportional sequence where the second term is 10 and the fourth term is 40. (5 points)

S:

20. (8 points) The two different ways to bill mobile phones

(1) How many minutes of local calls in a month cost the same for both communication methods? (5 points)

(2) If someone expects to use a local call cost of 180 dollars within a month, which communication method should be chosen more cost-effectively? (3 points)

S:

	Global pass	City pass
Monthly Fee	50 dollars/min	0
Local Call Charges	0.40 dollars/min	0.60 dollars/min

21. (10 points) Out of the two functions about x, $x-2m=-3x+4$ and $2-m=x$ have solutions that are opposite numbers.

(1)Find the value of m; (6 points)

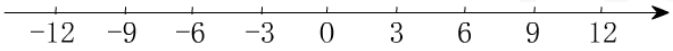
(2)Find the value of x; (4 points)

S:

22. (8 points) As shown in the figure, point A starts from the origin and moves to the left along the number axis. At the same time, point B also starts from the origin and moves to the right along the

number axis. After 3 seconds, the two points are separated by 15 unit lengths. It is known that the speed of point B is 4 times the speed of point A (speed unit: unit length/second).

(1) Find the speed of each of the points A and point B, and mark the position of the two points A and B on the number axis when they move from the origin after 3 seconds; (4 points)



S:

(2) If the two points A and B start from their positions from question (1), after how many seconds of more moving would the origin be directly in the middle of points A and B? (4 points)

S:

23. (10 points) The school needs to go to the printing house to print x copies of materials. Printing House A proposes: each copy of the material will be charged 0.2 dollars for printing, and another 500 dollars for plate-making; printing house B proposes: each copy of material will be charged 0.4 dollars for printing, and no plate-making fee.

(1)How much are the charges for the two printing houses? (Write algebraic expression containing x)

(2)The school has to print 2,400 copies of materials. If other factors are not considered, which printing factory is more cost-effective to choose? Try to explain why.

S:

Answer Key

One, multiple choice (12 questions, 3 points per question, full score 36 points)

1.A 2.C 3.D 4.B 5.C 6.B 7.C 8.A 9.A 10.B 11.B 12.D

Two, fill in the blanks (3 questions, 3 points per question, full score 9 points)13.-1 (there are multiple answers)

14. 350 15. $\frac{8}{65}$

Three, short answer questions (8 questions, full score 72 points)

16.(1)S: $(1-\frac{1}{6}+\frac{3}{4})\times(-48)$

= -48+8-36 .....3 points

=-76 .....5 points

(2)S: $(-1)^{10}\times 2+(-2)^3\div 4$

=1×2 +(-8)÷4 .....2 points

=2-2=0 .....5 points

17.(1) S: $3x+7=32-2x$

3x+2x=32-7 .....2 points

5x=25 .....4 points

x=5 .....5 points

(2) S:$1-\frac{1}{2}x=3-\frac{1}{6}x$

$-\frac{1}{2}x+\frac{1}{6}x=3-1$ .....2 points

$-\frac{1}{3}x=2$ .....4 points

x=-6 .....5 points

18. S: (1)7-(-10)=17 .....3 points

(2) (-1+3-2+4+7-5-10)+100×7=696 .....6 points

19. S: Suppose there are x cities with severe water shortage, according to the meaning of the question: .....1 point

$3x+52+2x+x=664$ .....4 points

Solved, x=102 .....6 points

A: There are 102 cities with severe water shortage. .....7 points

20. (1)81.....2 points (2) a_1q^4 .....4 points

(3) From the problem, $a_4 = a_2 q^2$ .....6 points

$\therefore 40=10\times q^2 \ \therefore q^2=4$ .....7 points

$\therefore q=\pm 2$ .....9 points

21.(1) When a local call is set for t minutes within a month, the two communication methods have the same cost.

According to the problem: 50+0.4t=0.6t ..... 3 points

Solved, t=250 .....4 points

（2）If someone expects to use a local call fee of 180 dollars within a month, the use of the global pass includes:

50+0.4t=180 $\therefore t_1=325$ .....6 points

If someone expects to use a local call fee of 180 dollars within a month, the use of the city pass has: 0.6t=180 $\therefore t_2=300$

$\therefore$ It is more cost-effective to use the global communication method. .....8 points

22. S: (1) If $x-2m=-3x+4$, then solved we have x=$\frac{1}{2}m+1$ .....2 points

From the problem, $\frac{1}{2}m+1$+2-m=0 solved, m=6 .....6 points

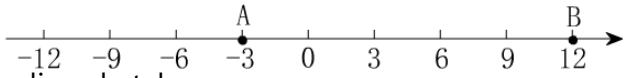
(2) If m=6, the solution to the function $x-2m=-3x+4$ is x=4 .....8 points

The solution to $2-m=x$ is x=-4 .....10 points

24. (1) Let the speed of point A be t unit length per second, then the speed of point B is 4t unit length per second.

From the problem, 3t+3×4t=15, solved we have t=1 .....2 points

$\therefore$ The velocity of point A is 1 unit length per second, and the velocity of point B is 4 unit lengths per second. ...3 points



Number line sketch .....4 points

(2) In x seconds, the origin is exactly in the middle of point A and point B. .....5 points

From the problem, 3+x=12-4x .....7 points

Solved, x=1.8

That is, when after moving for 1.8 more seconds, the origin is exactly in the middle of the two points A and B. .....8 points

(3) When they have moved for y more seconds, point B catches up with point A

From the problem, 4y-y=15,

Solved, y=5 .....10 points

That is, it takes 5 seconds for point B to catch up with point A, and this time is exactly the time it takes for point C to move from starting to stopping, so the distance traveled by point C is: 20×5=100(unit lengths) .....12 points