2017-2018 School Mid-Term Math Exam for Grade 7 (I) Ulanqab, Inner Mongolia

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

1. (3 points) The correct statement from the following is ( )

A. 0 isn't an integer nor a fraction B. Integers and fractions are collectively called rational numbers

C. Any number's absolute value is always positive D. Any number's absolute value that equals itself is 0 and 1

2. (3 points) Which pair of expressions are equal to each other ( )

A. 2^3 and 3^2 B. -5^3 and $(-5)^3$ C. -| - 5| and – (- 5) D. $(-\frac{2}{3})^3$ and $-\frac{2^3}{3}$

3. (3 points) After rounding 2.05446, the incorrect from the following is ( )

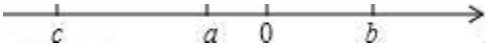
A. 2.1 (precise to 0.1) B. 2.05 (precise to 0.01)

C. 2.054 (precise to 0.001) D. 2.0544 (precise to 0.0001)

4. (3 points) After finding 2 on the number line and moving 3 whole units, you get ( )

A. 5 B. - 1 C. 5 or -1 D. Not sure

5. (3 points) Given that a, b, c is each placed on the number line as shown, simplify |a - b| - |c|, and you get ( )



A. -a + b + c B. a + b + c C. a – b - c D. a + b - c

6. (3 points) If on a number line the points representing -1 and 3 are points A and B, then A and B are how many units from each other? ( )

A. -4 B. -2 C. 2 D. 4

7. (3 points) Given that □ × (- $\frac{1}{2017}$) = -1, then □ equals ( )

A. $\frac{1}{2017}$ B. 2016 C. 2017 D. 2018

8. (3 points) If 0 < x < 1, then x and x^2 's relationship is ( )

A. $0 < x < x^2$ B. $x < x^2$ C. $x^2 < x$ D. $0 < x^2 < x$

9. (3 points) If |a - 1| = a – 1, then a's range of possible values is ( )

A. a≥1 B, a≤1 C. a < 1 D. a > 1

10. (3 points) The correct from the following statements is ( )

A. The difference between two numbers always has to be less than the minuend

B. When subtracting a negative number, the result is always greater than the minuend

C. When subtracting a positive number, the result is always greater than the minuend

D. 0 minus any number is always a negative number

11. (3 points) 13 世纪数学家斐波那契的《计算书》中有这样一个问题："在罗马有 7 位老妇人，每人赶着 7 头毛驴，每头驴驮着 7 只口袋，每只口袋里装着 7 个面包，每个面包附有 7 把餐刀，每把餐刀有 7 只刀鞘"，则刀鞘数为（　　）

A．42 B．49 C．7^6 D．7^7

12. (3 points) Observe the following equations:

$2^1 = 2$, $2^2 = 4$, $2^3 = 8$, $2^4 = 16$, $2^5 = 32$, $2^6 = 64$, $2^7 = 128$, $2^8 = 256$, ... from the pattern, the units digit for the result of 2^{20} would be（　　）

A. 2　B. 4　C. 6　D. 8

Two, fill in the blanks (2 points per blank, full score 22 points)

13. (2 points) If traveling 3 meters is recorded as +3 meters, then traveling 6 meters west should be recorded as _____.

14. (2 points) 3500000 expressed in scientific notation form is _____ .

15. (2 points) After removing the brackets on (-8) – (-10) + (-6) – (+4), it looks like: _____.

16. (6 points) $(-\frac{4}{5})^5$ has a base number of _____, index of _____, and represents _____.

17. (4 points) There are _____ integers that don't have an absolute value exceeding 4. They are _____.

18. (4 points) When a ＞ 0, $\frac{|a|}{a}$ =_____; When a < 0 时, $\frac{|a|}{a}$ =_____ .

19. (2 points) $(-0.125)^{2006} \times 8^{2005} =$ _____ .

Three, calculation problems (8 per question, full score 16 points)

20 (16 points)

(1) $8 + (-36) \times \left(\frac{7}{9} - \frac{11}{12} + \frac{1}{6}\right)$;

(2) $-1^4 - (1 - 0.5) \times \frac{1}{3} \times [2 - (-3)^2]$.

Four, short answer questions (full score 46 points)

21. (11 points) Plot the following terms onto the number line, and then use the '<' sign to compare them

$(-1)^{2016}$, + (-3.5), -(-1.5), -|-2.5|, -2^2.

22. (11 points) If $(a - 2)^2 + |b + 3| = 0$, find $(a + b)^{2009}$.

23. (12 points) Given that a and b are opposite numbers, and that c and d are reciprocals, and that m's absolute value is 2, find $\frac{|a+b|}{2m^2+1}$ + 4m - 3cd.

24. (12 points) Mailman Michael is delivering messages. He goes around the neighborhood, dropping off the packages. If his starting point was 0 and when he moved west it was negative and when he moved east it was positive, this is a record of his traveling:

+15 · - 4 · +13 · - 10 · - 12 · +3 · - 13 · - 17

（1）When Mailman Michael reached his last stop, how many units away was he from his firs

（2）If his gas tank uses up 0.4 liters of gas per unit he travels, then for the entire journey, how many liters of gas did he travel?

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Answer Key

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

1. (3 points) The correct statement from the following is ( )

A. 0 isn't an integer nor a fraction B. Integers and fractions are collectively called rational numbers

C. Any number's absolute value is always positive D. Any number's absolute value that equals itself is 0 and 1

【Solution】

A, 0 isn't an integer nor a fraction (wrong)

B, Integers and fractions are collectively called rational numbers (correct)

C, any number's absolute value is always positive (wrong, because 0's absolute value is 0)

D, any number's absolute value that equal's itself is 0 and 1 (wrong, all positive numbers' absolute values equal themselves)

Correct answer: B

2. (3 points) Which pair of expressions are equal to each other ( )

A. 2^3 and 3^2 B. -5^3 and $(-5)^3$ C. $-|-5|$ and $-(-5)$ D. $(-\frac{2}{3})^3$ and $-\frac{2^3}{3}$

【Solution】

A, $2^3 = 8$, $3^2 = 9$, wrong

B, $-5^3 = -125$, $(-5)^3 = -125$, correct

C, $-|-5| = -5$, $-(-5) = 5$, wrong

D, $(-\frac{2}{3})^3 = -\frac{8}{27}$, $\frac{2^3}{3} = \frac{8}{3}$, wrong

Correct answer: B

3. (3 points) After rounding 2.05446, the incorrect from the following is ( )

A. 2.1 (precise to 0.1) B. 2.05 (precise to 0.01)

C. 2.054 (precise to 0.001) D. 2.0544 (precise to 0.0001)

【Solution】

A, 2.05446 precise to 0.1 is 2.1, correct

B, 2.05446 precise to 0.01 is 2.05, correct

C, 2.05446 precise to 0.001 is 2.054, correct

D, 2.05446 precise to 0.001 is 2.0545, incorrect

Correct answer: D

4. (3 points) After finding 2 on the number line and moving 3 whole units, you get ( )

A. 5 B. -1 C. 5 or -1 D. Not sure

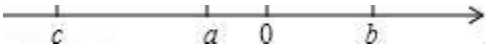
【Solution】

S: If the point 2 is shifted right 3 units it can be 2 + 3 = 5;

When shifted left 3 units it becomes 2 - 3= - 1 .

Correct answer: C

5. (3 points) Given that a, b, c is each placed on the number line as shown, simplify |a - b| - |c|, and you get ( )



A. -a + b + c B. a + b + c C. a – b - c D. a + b - c

A . - a+b+c B . a+b+c C . a - b - c D . a+b - c

【Solution】

S: ∵ a < b , a - b < 0 , c < 0 ,

Original Equation = b - a - (- c) =b - a+c .

Correct answer: A

6. (3 points) If on a number line the points representing -1 and 3 are points A and B, then A and B are how many units from each other? ( )

A. -4 B. -2 C. 2 D. 4

【Solution】

S: AB = | - 1 - 3| = 4 .

Correct answer: D

7. (3 points) Given that □ × (- $\frac{1}{2017}$) = -1, then □ equals ( )

A. $\frac{1}{2017}$ B. 2016 C. 2017 D. 2018

【Solution】

S: ∵ 2017× (- $\frac{1}{2017}$) = - 1 ,

∴□ equals - 1÷ (- $\frac{1}{2017}$) =2017 ,

Correct answer: C

8. (3 points) If 0 < x < 1, then x and x^2 's relationship is ( )

A. $0 < x < x^2$ B. $x < x^2$ C. $x^2 < x$ D. $0 < x^2 < x$

【Solution】

S: x=$\frac{1}{2}$, then x^2=$\frac{1}{4}$,

So, $0 < x^2 < x$,

Correct answer: D

9. (3 points) If |a - 1| = a – 1, then a's range of possible values is ( )

A. a≥1 B, a≤1 C. a < 1 D. a > 1

【Solution】

S: Because |a - 1| = a - 1, then a - 1≥0,

So: a≥1 ·

Correct answer: A

10. (3 points) The correct from the following statements is ( )

A. The difference between two numbers always has to be less than the minuend

B. When subtracting a negative number, the result is always greater than the minuend

C. When subtracting a positive number, the result is always greater than the minuend

D. 0 minus any number is always a negative number

【Solution】

A, for example, 3 - (- 1) = 4 > 3, so this is incorrect;

B, for example, 3 - (- 1) = 4 > 3, so this is correct;

C, for example 6 - 3 = 3 < 6, so this is incorrect;

D, for example, 0 - (- 1) = 1, so this is incorrect

Correct answer: B

11．（3 分）13 世纪数学家斐波那契的《计算书》中有这样一个问题："在罗马有 7 位老妇人，每人赶着 7 头毛驴，每头驴驮着 7 只口袋，每只口袋里装着 7 个面包，每个面包附有 7 把餐刀，每把餐刀有 7 只刀鞘"，则刀鞘数为（　　）

A．42 B．49 C．7^6 D．7^7

【Solution】

依题意有，刀鞘数为 7^6．

故选：C．

12. (3 points) Observe the following equations:

$2^1 = 2$, $2^2 = 4$, $2^3 = 8$, $2^4 = 16$, $2^5 = 32$, $2^6 = 64$, $2^7 = 128$, $2^8 = 256$, ... from the pattern, the units digit for the result of 2^{20} would be（　　）

A. 2　B. 4　C. 6　D. 8

【Solution】

∵ $2^1 = 2$，$2^2=4$，$2^3=8$，$2^4=16$，

$2^5=32$，$2^6=64$，$2^7=128$，$2^8=256$，...

∴2^{20} ends in a 6.

Correct answer: C

Two, fill in the blanks (2 points per blank, full score 22 points)

13. (2 points) If traveling 3 meters is recorded as +3 meters, then traveling 6 meters west should be recorded as___-6 meters___ .

【Solution】

According to the problem, going west (opposite of east) should be recorded as -6 meters.

Correct answer: -6

14. (2 points) 3500000 expressed in scientific notation form is__3.5×10^6__ .

【Solution】

3500000 written in scientific notation form is 3.5×10^6 .

Correct answer: 3.5×10^6

15. (2 points) After removing the brackets on (-8) – (-10) + (-6) – (+4), it looks like:___-8+10-6-4__ .

【Solution】

(-8) - (-10) + (-6) - (+4) can be simplified as -8+10-6-4;

Correct answer: -8+10-6-4 .

16. (6 points) $(-\frac{4}{5})^5$ has a base number of ___$\frac{4}{5}$___, index of ___5___, and represents ___5 · $\frac{4}{5}$ being multiplied___.

【Solution】

$(-\frac{4}{5})^5$ has a base number of $-\frac{4}{5}$, an index of 5, and represents 5 · $-\frac{4}{5}$ being multiplied

Correct answer: $-\frac{4}{5}$; 5; 5 · $-\frac{4}{5}$ being multiplied.

17. (4 points) There are ___9___ integers that don't have an absolute value exceeding 4. They are ___-4, 4, -3, 3, -2, 2, -1, 1, and 0___

【Solution】

There are 9 integers whose absolute values aren't exceeding 4. They are: ±4, ±2, ±1, 0.

Correct answer: 9; ±4, ±3, ±2, ±1, 0.

18. (4 points) When a > 0, $\frac{|a|}{a}$ =___1___; When a < 0 时, $\frac{|a|}{a}$ =___-1___.

【Solution】

When a > 0, $\frac{|a|}{a} = \frac{a}{a} = 1$; When a < 0, $\frac{|a|}{a} = \frac{-a}{a} = -1$.

Correct answer: 1, -1

19. (2 points) $(-0.125)^{2006} \times 8^{2005}$ = ___0.125___.

【Solution】

$8^{2005} \times (-0.125)^{2006}$

$=8^{2005} \times (-0.125)^{2005} \times (-0.125)$

$=(-8 \times 0.125)^{2005} \times (-0.125)$

$=0.125$ ·

Correct answer: 0.125

Three, calculation problems (8 per question, full score 16 points)

20 (16 points)

(1) $8 + (-36) \times \left(\frac{7}{9} - \frac{11}{12} + \frac{1}{6}\right)$;

(2) $-1^4 - (1 - 0.5) \times \frac{1}{3} \times [2 - (-3)^2]$ ·

【Solution】

(1) Original Equation = 8 - 28+33 - 6

=7 ;

(2) Original Equation = $-1 + \frac{1}{2} \times \frac{1}{3} \times (2 - 9)$

$= -1 - \frac{7}{6}$

$= -\frac{13}{6}$ ·

Four, short answer questions (full score 46 points)

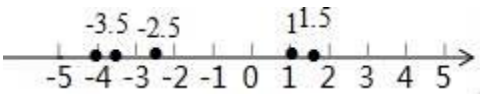
21. (11 points) Plot the following terms onto the number line, and then use the '<' sign to compare them

$(-1)^{2016}$, + (-3.5), -(-1.5), -|-2.5|, -2^2.

【Solution】

$(-1)^{2016}=1$, $+(-3.5)=-3.5$, $-(-1.5)=1.5$, $-|-2.5|=-2.5$, $-2^2=-4$,

Plotted on the number line:



Compared from least to greatest, it's $-2^2 < +(-3.5) < -|-2.5| < (-1)^{2016} < -(-1.5)$.

22. (11 points) If $(a-2)^2 + |b+3| = 0$, find $(a+b)^{2009}$.

【Solution】

From the problem, $a-2=0$, $b+3=0$,

Simplified, $a=2$, $b=-3$,

So $(a+b)^{2009}=-1$.

23. (12 points) Given that a and b are opposite numbers, and that c and d are reciprocals, and that m's absolute value is 2, find $\frac{|a+b|}{2m^2+1} + 4m - 3cd$.

【Solution】

∵a、b are opposite numbers, and c、d are reciprocals, and m has an absolute value of 2,

∴a + b = 0，cd=1，m=±2，

When = 2, $\frac{|a+b|}{2m^2+1}$ + 4m - 3cd = 0 + 8 - 3 = 5；

When m= - 2, $\frac{|a+b|}{2m^2+1}$ + 4m - 3cd = 0 - 8 - 3 = - 11，

24. (12 points) Mailman Michael is delivering messages. He goes around the neighborhood, dropping off the packages. If his starting point was 0 and when he moved west it was negative and when he moved east it was positive, this is a record of his traveling:

+15，- 4，+13，- 10，- 12，+3，- 13，- 17

（1）When Mailman Michael reached his last stop, how many units away was he from his firs

（2）If his gas tank uses up 0.4 liters of gas per unit he travels, then for the entire journey, how many liters of gas did he travel?

【Solution】

∵（1）15 - 4+13 - 10 - 12+3 - 13 - 17= - 25，

∴ When he reaches his last stop, Mailman Michael is 25 units from the first stop.

（2）|+15|+| - 4|+|+13|+| - 10|+| - 12|+|+3|+| - 13|+| - 17|=87，

87×0.4=34.8 liters.

Answer: Mailman Michael used up a total of 34.8 liters of gas.