

2017-2018 Anhui Province Hefei No. 50 Middle School and Western School

Grade 7 (I) Mid-term Mathematics Test

One, multiple choice questions (3 points per question, full score 30 points)

1. (3 points) - 2 had an opposite value of ()

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

2. (3 points) Which of the following expressions has the same value as $8 - (+4) - (-5) + (-3)$ ()

A · $8 - 4 - 5 - 3$ B · $-8 - 4 + 5 - 3$ C · $8 - 4 + 5 - 3$ D · $8 + 4 - 5 - 3$

3. (3 points) Which of the following sets of numbers is the opposite of each other? ()

A · 3^2 and -2^3 B · 3^2 and $(-3)^2$ C · 3^2 and -3^2 D · -2^3 and $(-2)^3$

4. (3 points) Which of the following statements is correct? ()

A · x^2+1 is a quadratic monomial B · $-m^2$ has a degree of 2 and a coefficient of 1

C · $-23\pi ab$ has a coefficient of - 23 D · The number 0 is also a monomial

5. (3 points) In the following equations, the number of linear equations with one variable are:

① $3x - y = 2$ ② $x + \frac{1}{x} - 2 = 0$ ③ $\frac{1}{2}x - \frac{1}{2} = 0$ ④ $x^2 + 3x - 2 = 0$ ()

A · 1 B · 2 C · 3 D · 4

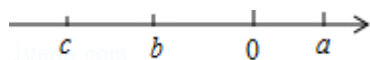
6. (3 points) If $x^{n+2}y^3$ and $-3x^3y^{2m+1}$ are like terms, then the values of m and n is ()

A · $m=1$ 、 $n=2$ B · $m=0$ 、 $n=2$ C · $m=2$ 、 $n=1$ D · $m=1$ 、 $n=1$

7. (3 points) Given that $b - a = 3$ 、 $c + d = 2$, then $(b + c) - (a - d)$ has a value of ()

A · -1 B · -5 C · 5 D · 1

8. (3 points) Rational numbers a, b, and c is plotted on the number line. Which of the following conclusions is incorrect? ()



A · $c < b < a$ B · $ab > 0$ C · $b + c < 0$ D · $b - c > 0$

9. (3 points) Karen's weight is 56.4 kilograms. If this number is rounded up, then the range of Karen's weight M kilogram is ()

A · $56.35 \leq M < 56.45$ B · $56.39 < M \leq 56.44$

C · $56.41 < M < 56.50$ D · $56.44 < M < 56.59$

10. (3 points) Observe the following series of monomials: $-x$ 、 $2x^2$ 、 $-4x^3$ 、 $8x^4$ 、 $-16x^5$ 、... according to the pattern you found, what would be the 10th term? ()

A · -2^9x^{10} B · 2^9x^{10} C · -2^9x^9 D · 2^9x^9

Two, fill in the blanks (3 points per question, full score 18 points)

11. (3 points) If a location that is 8844m above sea level is recorded as +8844m, and a location that is 392m below sea level can be recorded as _____m .

12. (3 points) Compare: $-\frac{4}{5}$ _____ $-\frac{9}{11}$.

13. (3 points) 160 billion recorded in scientific notation is _____ .

14. (3 points) Given that $(a+5)^2 + |b-3| = 0$, then $a^b =$ _____ .

15. (3 points) The two numbers on the number line that is 4 unit lengths from the number - 1 is _____ .

16. (3 points) Given that $a \otimes b = a(1 - b)$, out of the following calculations

① $2 \otimes (-2) = 6$; ② $2 \otimes 3 = 3 \otimes 2$; ③ If $a=0$, then $a \otimes b=0$; ④ If $2 \otimes x + x \otimes (-\frac{1}{2}) = 3$, then $x = -2$

Which of them are correct?

Three, (3 questions, full score 25 points)

17. (10 points) Calculate:

$$(1) -13\frac{2}{3} + (-1.23) + (+7\frac{2}{3}) - 2.77 ;$$

$$(2) -1^{2017} - 6 \div (-2) \times \left| -\frac{1}{3} \right|.$$

18. (7 points) Solve: $\frac{x-3}{2} - 1 = \frac{4x+1}{5}.$

19. (8 points) First simplify, then substitute: $2a^2 - \left[\frac{1}{2}(ab - 4a^2) + 8ab \right] - \frac{1}{2}ab$, among them $a = -1$ · $b =$

$$\frac{1}{3}$$

Four (8 points)

20. (8 points) The charging standard for taxis in Inquisitive City is as follows: the starting fare within 2.5 kilometers (including 2.5 kilometers) is 8 dollars, and the fare for each kilometer outside 2.5 kilometers is 1.4 dollars. A passenger takes a taxi for x kilometers (x is greater than 2.5).

(1) Write an algebraic expression, including x , that represents the total fare the passenger needs to pay.

(2) If the passenger takes a taxi for 10 kilometers, how much dollars should he pay (the final charge is rounded to the nearest dollar)?

Five, (9 points)

21. (9 points) The goalkeeper of a certain school's soccer team practiced running back and forth. Starting from the goalkeeper position, moving forward is recorded as a positive number, and going backward is recorded as a negative number. His practice records are as follows : (Unit: m)

$+5 \cdot -3 \cdot +10 \cdot -8 \cdot -6 \cdot +12 \cdot -10 \cdot$

(1) Did goalkeeper return to his original position in the end?

(2) How far is the goalkeeper from the goal at the end?

(3) How many meters did goalkeeper run in this practice?

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Answers and Solutions

One, multiple choice questions (3 points per question, full score 30 points)

1. (3 points) - 2 had an opposite value of ()

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

【Analyze】 If two numbers that differ only in sign are opposites of each other, the opposite of a number can be obtained.

【Solution】 S: - 2 has an opposite number of 2

Correct answer: C

2. (3 points) Which of the following expressions has the same value as $8 - (+4) - (-5) + (-3)$ ()

A · $8 - 4 - 5 - 3$ B · $-8 - 4 + 5 - 3$ C · $8 - 4 + 5 - 3$ D · $8 + 4 - 5 - 3$

【Analyze】 Addition can be omitted, and adding a negative number is equal to adding the opposite of that number.

【Solution】S: $8 - (+4) - (-5) + (-3)$

$$= 8 + (-4) + (+5) + (-3)$$

$$= 8 - 4 + 5 - 3$$

故选：C。

3. (3 points) Which of the following sets of numbers is the opposite of each other? ()

A · 3^2 and -2^3 B · 3^2 and $(-3)^2$ C · 3^2 and -3^2 D · -2^3 and $(-2)^3$

【Analyze】Simplify and compare

【Solution】S: A · $3^2=9$ 、 $-2^3=-8$, so they are not opposite numbers;

B · $3^2=9$ 、 $(-3)^2=9$, so they are not opposite numbers;

C · $3^2=9$ 、 $-3^2=-9$, are opposite numbers;

D · $-2^3=-8$ 、 $(-2)^3=-8$, so they are not opposite numbers;

Correct answer: C

4. (3 points) Which of the following statements is correct? ()

A · x^2+1 is a quadratic monomial B · $-m^2$ has a degree of 2 and a coefficient of 1

C ∙ $-23\pi ab$ has a coefficient of -23 D ∙ The number 0 is also a monomial

【Analyze】 According to the definition of monomial coefficient and degree, each option can be analyzed one by one.

【Solution】 S: A ∙ x^2+1 is a polynomial, so A is not the correct answer;

B ∙ $-m^2$ has a degree of 2 and has a coefficient -1 , so B is not the correct answer;

C ∙ $-23\pi ab$ has a coefficient of -23π , so C is not the correct answer;

D ∙ 0 is a monomial, so D is the correct answer;

Correct answer: D

5. (3 points) In the following equations, the number of linear equations with one variable are:

① $3x - y = 2$ ② $x + \frac{1}{x} - 2 = 0$ ③ $\frac{1}{2}x = \frac{1}{2}$ ④ $x^2 + 3x - 2 = 0$ ()

A ∙ 1 B ∙ 2 C ∙ 3 D ∙ 4

【Analyze】 Each equation is judged according to the definition of linear equations.

【Solution】 S: Among the following functions: ① $3x - y = 2$ ② $x + \frac{1}{x} - 2 = 0$ ③ $\frac{1}{2}x = \frac{1}{2}$ ④ $x^2 + 3x - 2 = 0$

the only linear equation is ③ $\frac{1}{2}x = \frac{1}{2}$.

Correct answer: A

6. (3 points) If $x^{n+2}y^3$ and $-3x^3y^{2m-1}$ are like terms, then the values of m and n is ()

A · $m=1$ 、 $n=2$ B · $m=0$ 、 $n=2$ C · $m=2$ 、 $n=1$ D · $m=1$ 、 $n=1$

【Analyze】 The definition of like terms: The variable part of each monomial is the same.

【Solution】 S: $\because x^{n+2}y^3$ and $-3x^3y^{2m-1}$ are like terms,

$$\therefore n+2=3 \quad 2m-1=3$$

$$\therefore m=2 \quad n=1$$

Correct answer: C

7. (3 points) Given that $b-a=3$ and $c+d=2$, then $(b+c) - (a-d)$ has a value of ()

A · -1 B · -5 C · 5 D · 1

【Analyze】 Substitute using order of operations to solve.

【Solution】 S: When $b-a=3$ and $c+d=2$,

$$\text{Original Equation} = b+c - a+d$$

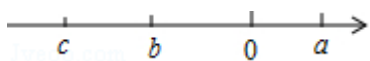
$$= (b-a) + (c+d)$$

$$= 3+2$$

=5 .

Correct answer: C

8. (3 points) Rational numbers a , b , and c is plotted on the number line. Which of the following conclusions is incorrect? ()



A · $c < b < a$ B · $ab > 0$ C · $b + c < 0$ D · $b - c > 0$

【Analyze】 First, use the number line to combine the positions of c , b , and a to get the answer.

【Solution】 S: From the number line, we know:

$c < b < 0 < a$.

A · $c < b < a$ · is correct, so this is not the answer;

B · $ab < 0$ · is incorrect, so this is the answer;

C · $b + c < 0$ · is correct, so this is not the answer;

D · $b - c > 0$ · is correct, so this is not the answer;

Correct answer: B

9. (3 points) Karen's weight is 56.4 kilograms. If this number is rounded up, then the range of Karen's weight M kilogram is ()

A · $56.35 \leq M < 56.45$ B · $56.39 < M \leq 56.44$

C · $56.41 < M < 56.50$ D · $56.44 < M < 56.59$

【Analyze】 The method of taking approximate numbers: to which digit is accurate, just round the next digit.

【Solution】 S: According to the method of estimating numbers, we know:

When the hundredth place is greater than or equal to 5, the tenth place should be 3; when the hundredth place is less than 5, the tenth place should be 4.

Correct answer:A

10. (3 points) Observe the following series of monomials: $-x$ 、 $2x^2$ 、 $-4x^3$ 、 $8x^4$ 、 $-16x^5$ 、... according to the pattern you found, what would be the 10th term? ()

A · -2^9x^{10} B · 2^9x^{10} C · -2^9x^9 D · 2^9x^9

【Analyze】 By observing the meaning of the question, we can get: when n is odd, the monomial is negative. When the exponent of x is n , the exponent of 2 is $(n - 1)$. This solves the problem.

【Solution】 S: From the problem, we know: (1) If n is odd, the monomial is: $-2^{(n-1)}x^n$;

(2) When n is even, the monomial is: $2^{(n-1)}x^n$.

Combining (1) and (2), the general formula of this sequence is: $2n - 1 \cdot (-x)^n$,

\therefore The 10^{th} monomial would be: 2^9x^{10}

Correct answer: B

Two, fill in the blanks (3 points per question, full score 18 points)

11. (3 points) If a location that is 8844m above sea level is recorded as +8844m, and a location that is 392m below sea level can be recorded as -392 m .

【Analysis】 We can apply the method of using positive and negative numbers to represent two quantities with opposite meanings.

【Solution】 S: \because 8844m above sea level is recorded as +8844m;

\therefore 392m below sea level is recorded as - 392m .

Correct answer: - 392

12. (3 points) Compare: $-\frac{4}{5}$ > $-\frac{9}{11}$.

【Analyze】 Comparison of rational numbers

【Solution】S: $-\frac{4}{5} > -\frac{9}{11}$.

Correct answer: $>$

13. (3 points) 160 billion recorded in scientific notation is 1.6×10^{11} .

【Solution】S: 160 billion written in scientific notation 1.6×10^{11} .

Correct answer: 1.6×10^{11} .

14. (3 points) Given that $(a+5)^2 + |b-3| = 0$, then $a^b =$ 125.

【Analyze】According to the properties of non-negative numbers, we can find the values of a and b , and then substitute them into the algebraic formula to get the solution.

【Solution】S: From the problem, $a+5=0$ · $b-3=0$.

Solutions: $a = -5$ · $b = 3$.

Therefore, $a^b = (-5)^3 = -125$.

Correct answer: -125

15. (3 points) The two numbers on the number line that is 4 unit lengths from the number -1 is -5 or 3 .

【Analyze】 According to the meaning of the question, there are two situations: when the point is on the left side of the point representing -1, and when the point is on the right side of the point representing -1, just list the formula to find it.

【Solution】 S: There are two separate situations: ①When the point to the left is -1, the number would be $-1 - 4 = -5$;

②When the left to the right is -1, the number is $-1 + 4 = 3$;

Correct answer: 3 or -5

16. (3 points) Given that $a \otimes b = a(1 - b)$, out of the following calculations

① $2 \otimes (-2) = 6$; ② $2 \otimes 3 = 3 \otimes 2$; ③ If $a = 0$, then $a \otimes b = 0$; ④ If $2 \otimes x + x \otimes (-\frac{1}{2}) = 3$, then $x = -2$

Which of them are correct?

【Solution】 S: $\because a \otimes b = a(1 - b)$

$\therefore 2 \otimes (-2) = 2[1 - (-2)] = 2 \times 3 = 6$, so ① is correct,

$2 \otimes 3 = 2(1 - 3) = 2 \times (-2) = -4$, $3 \otimes 2 = 3(1 - 2) = -3$, so ② is incorrect,

If $a = 0$, then $a \otimes b = 0 \times (1 - b) = 0$, so ③ is correct,

$$\therefore 2 \otimes x + x \otimes \left(-\frac{1}{2} \right) = 3 \text{ .}$$

$$\therefore 2 \left(1 - x \right) + x \left[1 - \left(-\frac{1}{2} \right) \right] = 3 \text{ .}$$

Solution: $x = -2$.

So ④ is correct,

Correct answer: ①③④

Three, (3 questions, full score 25 points)

17. (10 points) Calculate:

$$(1) -13\frac{2}{3} + (-1.23) + (+7\frac{2}{3}) - 2.77 ;$$

$$(2) -1^{2017} - 6 \div (-2) \times \left| -\frac{1}{3} \right| .$$

【Analyze】 (1) This problem can be solved by adding and subtracting rational numbers;

(2) This problem can be solved in terms of absolute values, exponentiation of powers, multiplication, division, and subtraction of rational numbers.

【Solution】S: $(1) -13\frac{2}{3} + (-1.23) + (+7\frac{2}{3}) - 2.77$

$$= \left(-13\frac{2}{3} + 7\frac{2}{3} \right) + (-1.23 - 2.77)$$

$$= (-6) + (-4)$$

$$= -10 ;$$

$$(2) -1^{2017} - 6 \div (-2) \times \left| -\frac{1}{3} \right|$$

$$= -1 + 3 \times \frac{1}{3}$$

$$= -1 + 1$$

$$= 0$$

18. (7 points) Solve: $\frac{x-3}{2} - 1 = \frac{4x+1}{5}$.

【Analyze】 First remove the denominator, then remove the parentheses, combine like terms, so as to obtain the solution of the equation

【Solution】 S: $5(x-3) - 10 = 2(4x+1)$

$$5x - 15 - 10 = 8x + 2$$

$$5x - 8x = 2 + 10 + 15$$

$$-3x = 27$$

$$x = -9$$

19. (8 points) First simplify, then substitute: $2a^2 - [\frac{1}{2}(ab - 4a^2) + 8ab] - \frac{1}{2}ab$, among them $a = -1$ · $b = \frac{1}{3}$

【Analyze】 The original formula can be obtained by removing the parentheses and combining like terms to obtain the simplest result. Substitute the values of a and b into the calculation to obtain the value.

【Solution】 S: Original Expression = $2a^2 - \frac{1}{2}ab + 2a^2 - 8ab - \frac{1}{2}ab = 4a^2 - 9ab$ ·

When $a = -1$, and $b = \frac{1}{3}$, original equation = $4 + 3 = 7$.

Four (8 points)

20. (8 points) The charging standard for taxis in Inquisitive City is as follows: the starting fare within 2.5 kilometers (including 2.5 kilometers) is 8 dollars, and the fare for each kilometer outside 2.5 kilometers is 1.4 dollars. A passenger takes a taxi for x kilometers (x is greater than 2.5).

(1) Write an algebraic expression, including x, that represents the total fare the passenger needs to pay.

(2) If the passenger takes a taxi for 10 kilometers, how much dollars should he pay (the final charge is rounded to the nearest dollar)?

【Analyze】 (1) Taxi charging standard: the starting fare is 8 dollars within 2.5 kilometers (including 3 kilometers), and the fare is 1.4 dollars per kilometer outside 2.5 kilometers.

Within the range of 2.5 kilometers, the taxi fare = 8 (dollars)

Outside the range of 2.5 kilometers, the taxi fare = starting price + unit price \times distance beyond 2.5 kilometers

(2) Substitute 10 into (1) outside the range of 2.5 kilometers to solve.

【Solution】 S: (1) From the problem,

When $x \leq 2.5$ kilometers, the algebraic expression is equal to 8

When $x > 2.5$ kilometers, the algebraic expression would be $8 + 1.4 \times (x - 2.5) = 1.4x + 4.5$;

Therefore, the taxi fare was $1.4x + 4.5$ dollars;

(2) When the taxi is ridden for 10 kilometers, the taxi fare is $1.4 \times 10 + 4.5$ or $8 + 1.4 \times (10 - 2.5)$

≈ 19 (dollars)

Five, (9 points)

21. (9 points) The goalkeeper of a certain school's soccer team practiced running back and forth. Starting from the goalkeeper position, moving forward is recorded as a positive number, and going backward is recorded as a negative number. His practice records are as follows : (Unit: m)

$+5 \cdot -3 \cdot +10 \cdot -8 \cdot -6 \cdot +12 \cdot -10 \cdot$

(1) Did goalkeeper return to his original position in the end?

(2) How far is the goalkeeper from the goal at the end?

(3) How many meters did goalkeeper run in this practice?

【Analyze】 (1) After adding up all the records, you can know whether the goalkeeper has returned to the goalkeeper position;

(2) The position after each movement is obtained separately, and it can be obtained accordingly;

(3) The definition and properties of absolute values

【Solution】 S: (1) $5 - 3 + 10 - 8 - 6 + 12 - 10 = 0 \cdot$

Therefore, the goalkeeper did return to his original position;

(2) $5 - 3 = 2 \cdot 2 + 10 = 12 \cdot 12 - 8 = 4 \cdot 4 - 6 = -2 \cdot -2 + 12 = 10 \cdot 10 - 10 = 0 \cdot$

∴ Therefore the goalkeeper was 12 meters from the goal;

(3) Total distance ran = $|+5| + |-3| + |+10| + |-8| + |-6| + |+12| + |-10| = 54$ meters.

The goalkeeper ran a total of 54 meters.