2017-2018 7th Grade (I) Final Mathematics Test paper in Zhongjiang County, Deyang City, Sichuan Province

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

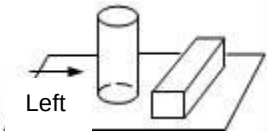
1. (3 points) 3 has an opposite number of ( )

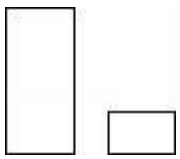
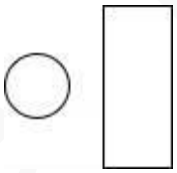
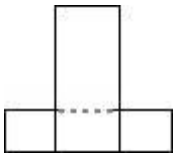
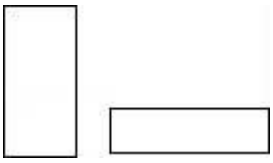
A · -3 B · $-\frac{1}{3}$ C · $\frac{1}{3}$ D · 3

2. (3 points) 680 000 000 written correctly in scientific notation is ( )

A · 6.8×10^{9} B · 6.8×10^{8} C · 6.8×10^{7} D · 6.8×10^{6}

3. (3 points) Put a cuboid and a cylinder on the table, put them together as shown in the picture, then what you can see from the left is the picture in the picture ( )



A ·  B ·  C ·  D · 

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

①There is only one straight line through two points

②The line segment connecting two points is called the distance between the two points

③The line segment connecting two points is always the shortest distance between them

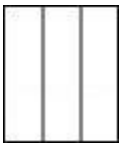
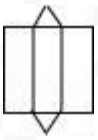
④Point B is on line segment AC, if AB=BC, then point B is the midpoint of line segment AC

A. ① B. ② C. ③ D. ④

5. (3 points) Danielle does the following 4 calculation problems: ① $(-1)^{2010}=2010$; ②$0-(-1)=-1$; ③ $-\frac{1}{2}+\frac{1}{3}=-\frac{1}{6}$; ④$\frac{1}{2}\div(-\frac{1}{2})=-1$. How many problems did she get correct? ( )

A · 1 B · 2 C · 3 D · 4

6. (3 points) Which one of the following is a net of a triangular prism? ( )

A ·  B ·  C ·  D · 

7. (3 points) Which of the following algebraic expressions is written most properly? ( )

A · a48 B · x+y C · $1\frac{1}{2}$ D · a(x+y)

8. (3 points) Function $2-\frac{2x-4}{3}=-\frac{x-7}{6}$, removing the denominators, gets ( )

A · 2-2(2x-4)=-(x-7) B · 12-2(2x-4)=-x-7

C · 12-2(2x-4)=-(x-7) D · 12-(2x-4)=-(x-7)

9. (3 points) Real numbers a and b are shown on the number line as shown. Then, |a+b|+|a-b| equals ( )

A · 2a B · 2b C · 2b ﹣ 2a D · 2b+2a

10. (3 points) The score keeping for a soccer tournament is as follows: Winning a match is 3 points, tying is 1 point, and losing a match is 0 points. A team played 14 matches, lost 5 matches, and ended with a total of 19 points. This team won ( )

A · 3 matches B · 4 matches C · 5 matches D · 6 matches

11. (3 points) If $a^2+2ab=-10$ · $b^2+2ab=16$, then polynomials $a^2+4ab+b^2$ and a^2-b^2 each have a value of ( )

A · 6 · 26 B · ﹣6 · 26 C · 6 · ﹣26 D · ﹣6 · ﹣26

12. (3 points) If two parallel lines intersect a third line, then the bisectors of a set of same-side interior angles are mutually ( )

A · perpendicular B · parallel C · intersecting D · intersecting but not perpendicular

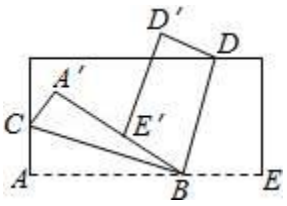
Two, fill in the blanks (8 questions, 3 points per question, full score 24 points)

13. (3 points) Calculate: ﹣3﹣7=_____

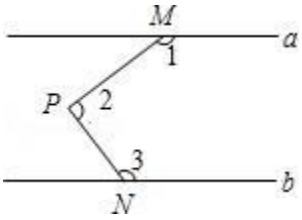
14. (3 points) Given that $|3m-12|+(\frac{n}{2}+1)^2=0$, then 2m﹣n=_____ ·

15. (3 points) If (2m﹣6) $x^{|m|-2}=m^2$ is a linear equation based on x, then m has a value of_____ ·

16. (3 points) Folding a rectangular piece of paper as shown, BC and BD being the creases produced, then ∠CBD has a measure of _____ .



17. (3 points) As shown, a∥b, M and N are each points on lines a and b. P is a point between the two parallel lines. ∠1+∠2+∠3=_____° .



18. (3 points) Rewrite "diagonally equal" to "if...then..." as_____ .

19. (3 points) The sum between the ages of the father and daughter is 91. When the father' s ages were two times the current age of the daughter, the daughter' s age was 1/3 of what she is now. Now, the daughter is $\frac{1}{3}$ of the father' s age. The daughter is _____ years old.

20. (3 points) As shown in the figure, it is known that point A and point B are two points on a straight line. AB=12 cm, point C is on the line segment AB, and BC=4 cm. Point P and point Q are two moving points on a straight line, the speed of point P is 1 cm/sec, and the speed of point Q is 2 cm/sec. If points P and Q start from point C and point B and move on a straight line

at the same time, the length of line segment PQ is 5 cm after _____ seconds.

Three, short answer questions (full score 32 points)

21. (16 points) Calculate

①$3+4\times(-2)$;

②$1-(2-3)^2\times(-2)^3$;

③$|-9|\div3+(\frac{1}{2}-\frac{2}{3})\times12+3^2$;

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

22. (10 points) Solve for x

(1) $3x-7(x-1)=3-2(x+3)$

(2) $\frac{x+1}{0.4}-\frac{0.2x-1}{0.7}=1$

23. (6 points) If monomials $3x^2y^5$ and $-2x^{1-a}y^{3b-1}$ are like terms, find the value of the following algebraic expression: $5ab^2-[6a^2b-3(ab^2+2a^2b)]$

Four, Function Word Problems (full score 8 points)

24. (8 points) A shopping mall launched a Spring Festival promotion to sell two kinds of products, A and B. The two types of ways to pay are as follows:

<table>
<tr><td rowspan="4">Option 1</td><td></td><td>A</td><td>B</td></tr>
<tr><td>Price per product</td><td>90 dollars</td><td>100 dollars</td></tr>
<tr><td>Cashback per item</td><td>30% of the list price</td><td>15% of the list price</td></tr>
<tr><td colspan="3">For example, to buy a product A, you only need to pay 90 (1-30%) dollars</td></tr>
<tr><td>Option 2</td><td colspan="3">20% cash back on all purchases</td></tr>
</table>

（1）A unit buys 30 pieces of A commodity and 20 pieces of B commodity. Which plan is cost-effective to choose? How much more money can it save than the other?

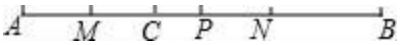
（2）A unit buys x pieces of commodity A (x is a positive integer), and the number of pieces of commodity B purchased is 2 times the number of commodity A, one less. If the actual payment of the two options is the same, find the value of x.

Five, geometry (full score 20 points)

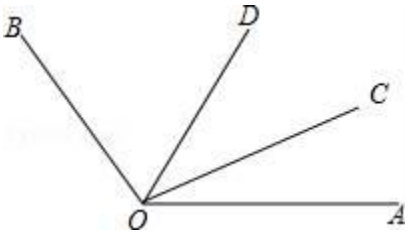
25. (6 points) As shown, Point C is a point on AB. Points M, N, and P are each the midpoints of AC, BC, and AB.

（1）If AB=10cm, then MN=_____cm；

（2）If AC = 3cm, CP = 1cm, find the length of line segment PN.



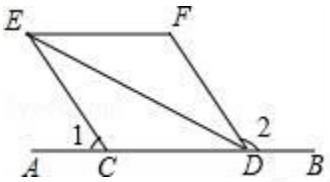
26. (6 points) As shown, ∠AOC：∠BOC=1：4，OD bisects ∠AOB, ∠COD=36°. Find the measure of ∠AOB.



27. (8 points) Given that: As shown, C and D are two points on AB. ∠1+∠2=180°, DE bisects ∠CDF, EF∥AB,

（1）Prove: CE∥DF;

（2）If ∠DCE=130°, find the measure of ∠DEF.



2017-2018 7th Grade (I) Final Mathematics Test paper in Zhongjiang County, Deyang City, Sichuan Province

Solutions and Answers

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

1. (3 points) 3 has an opposite number of ( )

A · ﹣3 B · $-\frac{1}{3}$ C · $\frac{1}{3}$ D · 3

【Solution】3 has an opposite value of ﹣3

Correct answer: A

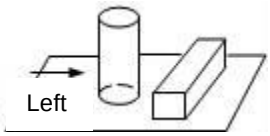
2. (3 points) 680 000 000 written correctly in scientific notation is ( )

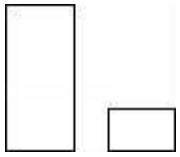
A · 6.8×10^{9} B · 6.8×10^{8} C · 6.8×10^{7} D · 6.8×10^{6}

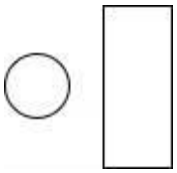
【Solution】S: $680\ 000\ 000=6.8\times10^{8}$.

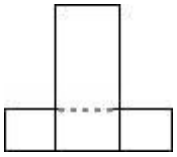
Correct answer: B

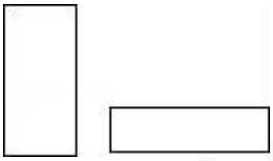
3. (3 points) Put a cuboid and a cylinder on the table, put them together as shown in the picture, then what you can see from the left is the picture in the picture ( )



A · 

B · 

C · 

D · 

【Solution】Looking at the figure from the left, the first is a cylinder, and behind the cylinder is a cuboid.

Correct answer: C

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

①There is only one straight line through two points

②The line segment connecting two points is called the distance between the two points

③The line segment connecting two points is always the shortest distance between them

④Point B is on line segment AC, if AB=BC, then point B is the midpoint of line segment AC

A. ① B. ② C. ③ D. ④

【Solution】①There is only one line between two points, correct;

②The length of a line segment connecting two points is called the distance between the two points, incorrect;

③The line segment between two points is the shortest distance between them, correct;

④Point B is on line segment AC, if AB=BC, then point B is the midpoint of line segment AC, correct;

Correct answer: B

5. (3 points) Danielle does the following 4 calculation problems: ① $(-1)^{2010}=2010$; ②$0-(-1)=-1$; ③ $-\frac{1}{2}+\frac{1}{3}=-\frac{1}{6}$; ④$\frac{1}{2}\div(-\frac{1}{2})=-1$. How many problems did she get correct? ( )

A · 1 B · 2 C · 3 D · 4

【Solution】① $(-1)^{2010}=1$, this option is wrong;

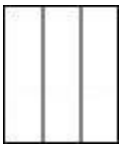
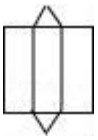
②$0-(-1)=0+1=1$, this option is wrong;

③ $-\frac{1}{2}+\frac{1}{3}=-\frac{3}{6}+\frac{2}{6}=-(\frac{3}{6}-\frac{2}{6})=-\frac{1}{6}$, this option is correct;

④$\frac{1}{2}\div(-\frac{1}{2})=-(\frac{1}{2}\div\frac{1}{2})=-1$, this option is correct.

Correct answer: B

6. (3 points) Which one of the following is a net of a triangular prism? ( )

A ·  B ·  C ·  D · 

【Solution】A triangular prism has three rectangle faces, and two triangular bases.

Correct answer: D

7. (3 points) Which of the following algebraic expressions is written most properly? ( )

A · a48 B · x+y C · $1\frac{1}{2}$ D · a (x+y)

【Solution】A、Coefficients come before their variables, so the more official way of writing a48 is 48a, this option is incorrect;

B、x+y is correct, this option is correct;

C、$1\frac{1}{2}$, usually when written in algebra is its improper form, which is $\frac{3}{2}$, this option is incorrect;

D、a (x+y) simplified is ax+ay, this option is incorrect;

Correct answer: B

8. (3 points) Function 2 - $\frac{2x-4}{3}$ = - $\frac{x-7}{6}$, removing the denominators, gets ( )

A · 2 - 2 (2x - 4) = - (x - 7) B · 12 - 2 (2x - 4) = - x - 7

C．12﹣2（2x﹣4）=﹣（x﹣7） D．12﹣（2x﹣4）=﹣（x﹣7）

【Solution】S: After multiplying both sides of the function by 6, 12﹣2（2x﹣4）=﹣（x﹣7）．

Correct answer: C

9. (3 points) Real numbers a and b are shown on the number line as shown. Then, |a+b|+|a﹣b| equals（　　）

A．2a B．2b C．2b﹣2a D．2b+2a

【Solution】From looking at the positions a and b each have on the number line:

a＜0，b＞0，

∴|a+b|=a+b，|a﹣b|=b﹣a，

∴|a+b|+|a﹣b|=a+b+b﹣a=2b，

Correct answer: B

10. (3 points) The score keeping for a soccer tournament is as follows: Winning a match is 3 points, tying is 1 point, and losing a match is 0 points. A team played 14 matches, lost 5 matches, and ended with a total of 19 points. This team won（　　）

A · 3 matches　　B · 4 matches　　C · 5 matches　　D · 6 matches

【Solution】If they won x matches, then they tied (14 - 5 - x) matches,

3x+ (14 - 5 - x) =19 ,

Simplified: x = 5, this team won 5 matches

Correct answer: C

11. (3 points) If $a^2+2ab=-10$, $b^2+2ab=16$, then polynomials $a^2+4ab+b^2$ and a^2-b^2 each have a value of (　　)

A · 6 , 26　　B · -6 , 26　　C · 6 , -26　　D · -6 , -26

【Solution】 S: ∵$a^2+2ab=-10$, $b^2+2ab=16$,

∴$a^2+4ab+b^2$

= (a^2+2ab) + (b^2+2ab) ,

= -10+16 ,

=6 ;

∴a^2-b^2

= (a^2+2ab) - (b^2+2ab) ,

= - 10 - 16 ·

= - 26 ·

Correct answer: C

12. (3 points) If two parallel lines intersect a third line, then the bisectors of a set of same-side interior angles are mutually ( )

A · perpendicular B · parallel C · intersecting D · intersecting but not perpendicular

【Solution】As shown in the figure,

∵AB∥CD ·

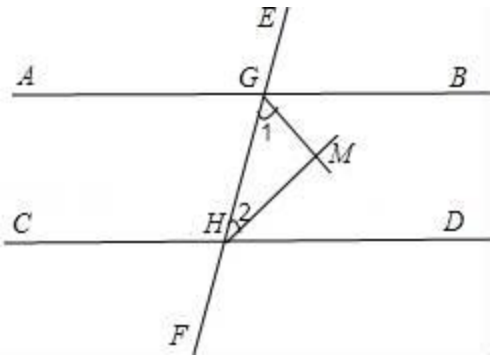
∴∠BGH+∠DHG=180° ·

And MG and MH each bisect ∠BGH and ∠DHG,

∴∠1=$\frac{1}{2}$∠BGH · ∠2=$\frac{1}{2}$∠DHG ·

∴∠1+∠2=90° ·

Correct answer: A



Two, fill in the blanks (8 questions, 3 points per question, full score 24 points)

13. (3 points) Calculate: $-3-7=$____

【Solution】 $-3-7=-3+(-7)=-10$.

Correct answer: -10

14. (3 points) Given that $|3m-12|+(\frac{n}{2}+1)^2=0$, then $2m-n=$____.

【Solution】 $\because |3m-12|+(\frac{n}{2}+1)^2=0$,

$\therefore |3m-12|=0$, $(\frac{n}{2}+1)^2=0$,

$\therefore m=4$, $n=-2$,

$\therefore 2m-n=8-(-2)=10$,

Correct answer: 10

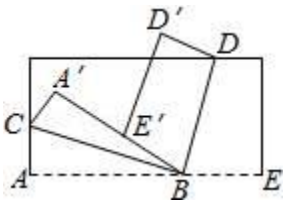
15. (3 points) If $(2m-6)x^{|m|-2}=m^2$ is a linear equation based on x, then m has a value of __-3__ .

【Solution】$|m|-2=1$, 且 $2m-6\neq 0$,

Solved, $m=-3$,

Correct answer: -3.

16. (3 points) Folding a rectangular piece of paper as shown, BC and BD being the creases produced, then $\angle CBD$ has a measure of __90 degrees__ .



【Solution】∵ A rectangular piece of paper folded along the lines BC and BD,

$\therefore \angle ABC=\angle A'BC$, $\angle EBD=\angle E'BD$,

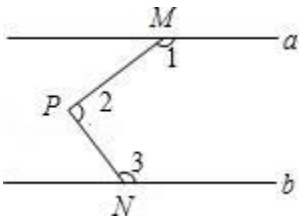
$\angle ABC+\angle A'BC+\angle EBD+\angle E'BD=180°$,

$\therefore \angle A'BC+\angle E'BD=180°\times\frac{1}{2}=90°$,

$\angle CBD=90°$.

Correct answer: 90°

17. (3 points) As shown, a∥b, M and N are each points on lines a and b. P is a point between the two parallel lines. ∠1+∠2+∠3= 360 °.



【Solution】PA∥a.

∵a∥b，PA∥a.

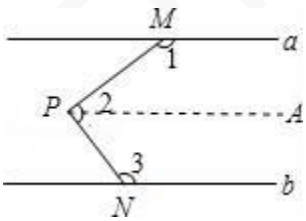
∴a∥b∥PA.

∴∠1+∠MPA=180°，∠3+∠APN=180°.

∴∠1+∠MPA+∠3+∠APN=180°+180°=360°.

∴∠1+∠2+∠3=360°.

Correct answer: 360



18. (3 points) Rewrite "diagonally equal" to "if...then..." as if two line segments are diagonal, then they are equal.

19. (3 points) The sum between the ages of the father and daughter is 91. When the father's ages were two times the current age of the daughter, the daughter's age was 1/3 of what she is now. Now, the daughter is $\frac{1}{3}$ of the father's age. The daughter is __28__ years old.

【Solution】Let the age of the daughter be x years, meaning the age of the father is (91 - x) years,

$91 - x - x = 2x - \frac{1}{3}(91 - x)$,

Solution: x=28 ,

Answer: The daughter is 28 years old.

Correct answer: 28

(3 points) As shown in the figure, it is known that point A and point B are two points on a straight line. AB=12 cm, point C is on the line segment AB, and BC=4 cm. Point P and point Q are two moving points on a straight line, the speed of point P is 1 cm/sec, and the speed of point Q is 2 cm/sec. If points P and Q start from point C and point B and move on a straight line at the same time, the length of line segment PQ is 5 cm after __1/3 or 1 or 3 or 9__ seconds.

【Solution】Let the time be t seconds.

①If point P moves to the left and point Q moves to the right,

t+2t=5﹣4，

Solution: $t=\frac{1}{3}$；

②Points P and Q both move right,

2t﹣t=5﹣4，

Solution: t=1；

③Points P and Q both move left,

2t﹣t=5+4，

Solution: t=9，

④Point P moves right, point Q moves left,

2t﹣4+t=5，

Solution: t=3，

To sum up, the length of line segment PQ is 5 cm after 1 or 3 seconds.

Correct answer: $\frac{1}{3}$ or 1 or 3 or 9 seconds.

Three, short answer questions (full score 32 points)

21. (16 points) Calculate

①3+4×（﹣2）；

②1﹣（2﹣3）^{2}×（﹣2）^{3}；

③|﹣9|÷3+（$\frac{1}{2}$﹣$\frac{2}{3}$）×12+3^2；

④2﹣[1﹣（1﹣0.5×$\frac{1}{3}$）]×[2﹣（﹣3）^{2}]﹣2^2

【Solution】①3+4×（﹣2）

=3+（﹣8）

=﹣5；

②1﹣（2﹣3）^{2}×（﹣2）^{3}

=1﹣（﹣1）^{2}×（﹣8）

=1﹣1×（﹣8）

=1+8

=9 ;

③$|-9|\div 3+(\frac{1}{2}-\frac{2}{3})\times 12+3^2$

$=9\div 3+(-\frac{1}{6})\times 12+9$

$=3+(-2)+9$

=10 ;

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

$=2-[1-(1-\frac{1}{6})]\times[2-9]-4$

$=2-[1-\frac{5}{6}]\times(-7)-4$

$=2-\frac{1}{6}\times(-7)-4$

$=2+\frac{7}{6}-4$

$=-\frac{5}{6}$.

22. (10 points) Solve for x

(1) $3x-7(x-1)=3-2(x+3)$

（2）$\frac{x+1}{0.4}-\frac{0.2x-1}{0.7}=1$

【Solution】（1）After removing the brackets, you get: 3x－7x+7=3－2x－6，

After combining like terms，－2x=－10，

Solution: x=5；

（2）After re-organizing the function, you get: $\frac{5x+5}{2}-\frac{2x-10}{7}=1$，

After removing the denominators, you get: 35ª x+35－4x+20=14，

After combining like terms, you get: 31x=－41，

Solution: x=－$\frac{41}{31}$.

23. (6 points) If monomials $3x^2y^5$ and $-2x^{1-a}y^{3b-1}$ are like terms, find the value of the following algebraic expression: $5ab^2-[6a^2b-3(ab^2+2a^2b)]$

【Solution】∵$3x^2y^5$ and $-2x^{1-a}y^{3b-1}$ are like terms,

∴1－a=2 and 3b－1=5，

Solution: a=－1、b=2，

Original equation=$5ab^2-(6a^2b-3ab^2-6a^2b)$

$=5ab^2 - 6a^2b+3ab^2+6a^2b$

$=8ab^2 \cdot$

When $a=-1$ and $b=2$,

Original Equation$=8\times(-1)\times2^2$

$=-8\times4$

$=-32 \cdot$

Four, Function Word Problems (full score 8 points)

24. (8 points) A shopping mall launched a Spring Festival promotion to sell two kinds of products, A and B. The two types of ways to pay are as follows:

Option 1		A	B
	Price per product	90 dollars	100 dollars
	Cashback per item	30% of the list price	15% of the list price
	For example, to buy a product A, you only need to pay 90 (1-30%) dollars		
Option 2	20% cash back on all purchases		

（1）A unit buys 30 pieces of A commodity and 20 pieces of B commodity. Which plan is cost-effective to choose? How much more money can it save than the other?

（2）A unit buys x pieces of commodity A (x is a positive integer), and the number of pieces of commodity B purchased is 2 times the number of commodity A, one less. If the actual payment of the two options is the same, find the value of x.

【Solution】（1）If paid according to Plan 1: 30×90×（1－30%）+20×100×（1－15%）=3590（dollars）·

If paid according to Plan 2:（30×90+20×100）×（1－20%）=3760（dollars）·

∵3590＜3760，3760－3590=170（dollars）·

∴Plan 1 is more cost-efficient, paying less 170 dollars;

（2）Suppose a unit purchases x pieces of commodity A,

If paid according to Plan 1: 90（1－30%）x+100（1－15%）（2x－1）=233x－85·

If paid according to Plan 2: [90x+100（2x－1）]（1－20%）=232x－80·

When x=a pieces, the two plans can get the same payment, 233x－85=232x－80·

Solution: x=5·

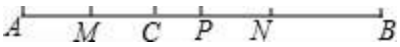
Answer: A unit buys x pieces of A commodity (x is a positive integer), and the number of B commodity purchased is twice the number of A commodity and one less piece. If the actual payment of the two plans is the same, the value of x is 5.

Five, geometry (full score 20 points)

25. (6 points) As shown, Point C is a point on AB. Points M, N, and P are each the midpoints of AC, BC, and AB.

(1) If AB=10cm, then MN=__5__cm;

(2) If AC = 3cm, CP = 1cm, find the length of line segment PN.



【Solution】(1) ∵M、N are each the midpoints of AC and BC,

∴MC=$\frac{1}{2}$AC, CN=$\frac{1}{2}$BC

MN=MC+CN=$\frac{1}{2}$(AC+BC)=$\frac{1}{2}$AB=$\frac{1}{2}\times 10=5$.

Correct answer: 5

(2) ∵AC=3, CP=1,

∴AP=AC+CP=4,

∵P is the midpoint of AB,

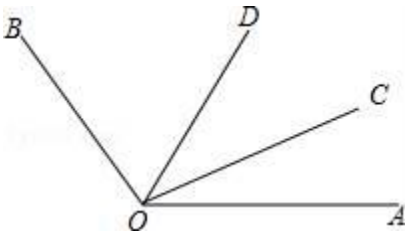
∴AB=2AP=8

∴CB=AB - AC=5 ·

∵N is the midpoint of CB, CN=$\frac{1}{2}$CB=$\frac{5}{2}$ ·

∴PN=CN - CP=$\frac{5}{2}$−1=$\frac{3}{2}$ ·

26. (6 points) As shown, ∠AOC：∠BOC=1：4 · OD bisects ∠AOB, ∠COD=36°. Find the measure of ∠AOB.



【Solution】∵∠AOC：∠BOC=1：4 · OD bisects ∠AOB · and ∠COD=36° ·

∴∠AOC=$\frac{1}{5}$∠AOB · ∠AOD=$\frac{1}{2}$∠AOB ·

∴∠COD=∠AOD - ∠AOC=$\frac{1}{2}$∠AOB−$\frac{1}{5}$∠AOB=$\frac{3}{10}$∠AOB ·

∴$\frac{3}{10}$∠AOB=36° ·

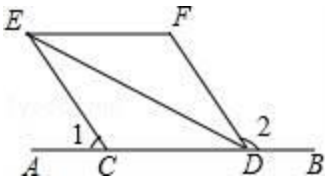
Simplified, ∠AOB=120° ·

The measure of ∠AOB is 120° ·

27. (8 points) Given that: As shown, C and D are two points on AB. ∠1+∠2=180°, DE bisects ∠CDF, EF∥AB,

（1）Prove: CE∥DF;

（2）If ∠DCE=130°, find the measure of ∠DEF.



【Solution】（1）Proof ∵∠1+∠2=180°，C and D are two points on AB,

∴∠1+∠DCE=180°，

∴∠2=∠DCE，

∴CE∥DF；

（2）S: ∵CE∥DF，∠DCE=130°，

∴∠CDF=180°－∠DCE=180°－130°=50°，

∵DE bisects ∠CDF，

∴∠CDE=$\frac{1}{2}$∠CDF=25°，

∵EF∥AB ·

∴∠DEF=∠CDE=25° ·