2025 Feb AMC 10 AR Daily Practice

Day 1

1 (6分) Define $a※b=\dfrac{a-b}{a+b}$ for all real numbers a and b. Find the value of $5※(4※3)$.

A. $\dfrac{16}{17}$ B. $\dfrac{17}{18}$ C. $\dfrac{18}{19}$ D. $\dfrac{19}{20}$ E. $\dfrac{21}{22}$

2 (6分) Real numbers x,y, and z satisfy the inequalities $0<x<1$,$-1<y<0$, and $1<z<2$. Which of the following numbers is necessarily positive?

A. $y+x^2$ B. $y+xz$ C. $y+y^2$ D. $y+2y^2$ E. $xy+z^2$

3 (6分) Jason walks from his home to school. If he walks 75 meters per minute, he will be 8 minutes late; if he walks 80 meters per minute, he will be 6 minutes late. In order to arrive on time, how fast should Jason walk in meters per minute?

A. 90 B. 100 C. 110 D. 120 E. 130

4 （6分）A rectangle $ABCD$ has $AB = 8$ and $BC = 4$. Points P and Q lie on sides $\overline{AB}$ and $\overline{BC}$, respectively, such that $AP = CQ$ and the area of $\triangle BPQ$ is 6. What is PQ^2?

A. 32 B. 34 C. 36 D. 38 E. 40

5 （6分）In the coordinate system, the x and y coordinates of the intersection point between lines $y = x - k$ and $y = kx + 2$ are both integers. How many possible values of k are there?

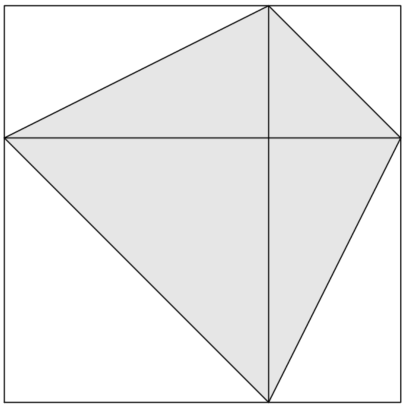
A. 4 B. 5 C. 6 D. 7 E. 8

Day 2

6 （6分）A bicycle has two wheels, while a tricycle has three wheels. There are a 17 such vehicles with 41 wheels. Find the number of bicycles.

A. 10 B. 11 C. 12 D. 13 E. 14

7 （6分）Two squares of side lengths 2 and 3 lie within a third square of side length 5, as shown below. What is the area of the shaded region?



A. 11 B. 11.5 C. 12 D. 12.5 E. 13

8 （6分）Which of the following numbers is a perfect square?

A. $\frac{23!24!}{3}$ B. $\frac{24!25!}{3}$ C. $\frac{25!26!}{3}$ D. $\frac{26!27!}{3}$ E. $\frac{27!28!}{3}$

9 （6分）Cards labeled from 1 to 9 are distributed to students A, B, and C, three cards each person without repetition. The following are the conversations between the students.

A: The three numbers on my cards form an arithmetic sequence.

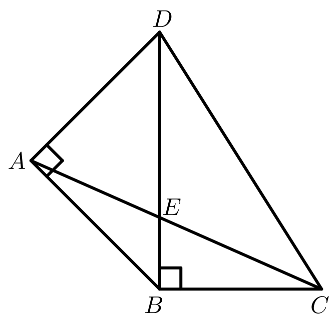
B: Me too.

C: Only my cards do not form an arithmetic sequence.

Suppose that everyone is telling the truth, find the minimum of the sum of the numbers in three cards of C.

A. 6 B. 7 C. 8 D. 9 E. 10

10 （6分）Let $ABCD$ be a convex quadrilateral such that $\angle DAB = \angle DBC = 90°$ and $DA = AB = 6$. Let E be the intersection of the diagonals AC and BD. If $BE = 2\sqrt{2}$, find the area of $ABCD$.



A. 30 B. 36 C. 48 D. 54 E. 60

Day 3

11 （6分）A palindrome is a number that has the same value when read from left to right or from right to left. (For example, 12321 is a palindrome.) Determine the number of palindromes between 1000 and 2023.

A. 10 B. 11 C. 12 D. 13 E. 14

12 （6分）Consider the Fibonacci Sequence 1, 1, 2, 3, 5, 8, $\cdots$. Starting the third number, each succeeding number is the sum of the previous two numbers. Among the first 2023 numbers in the sequence, how many of them are multiples of 5?

A. 403 B. 404 C. 405 D. 505 E. 506

13 （6分）Consider positive integers a, b, c, d such that $ab = cd$, which of the following is a possible value of $a + b + c + d$?

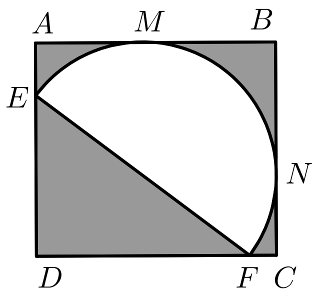
A. 97 B. 101 C. 301 D. 401

E. None of the above

14 （6分）Circles A, B, and C each have radius 1. Circles A and B share one point of tangency. Circle C has a point of tangency with the midpoint of $\overline{AB}$. One side of rectangle D is tangent to both circles A and B, and its opposite side is tangent to circle C. The other two sides are tangent to circles A and B, respectively. What is the area of the part that is inside the rectangle but not inside the circle?

A. $12-3\pi$ B. $16-3\pi$ C. $10-2\pi$ D. $14-2\pi$ E. $10-3\pi$

15 （6分）In the figure, a semicircle with diameter EF intersects each side of rectangle $ABCD$ at exactly one point. The lengths of segments EF and FC are 20 centimeters and 2 centimeters, respectively. The area of the shaded region is $a-b\cdot\pi$ square centimeters. Find the value of $a+b$. (Assuming the value of π is 3.14.)



A. 326 B. 338 C. 348 D. 444 E. 500

Day 4

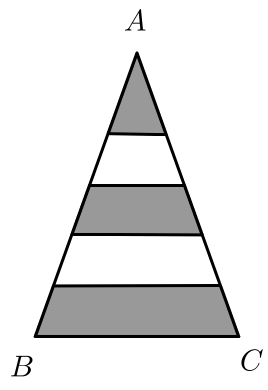
16 (6分) Let a be a real number. If $|a| = -a$, what is the simplified value of $|a-1|-|a-2|$?

A. -3 B. -1 C. 1 D. $2a-3$ E. $3-2a$

17 (6分) Bertha has 6 daughters and no sons. Some of her daughters have 6 daughters, and the rest have none. Bertha has a total of 30 daughters and granddaughters, and no great-granddaughters. How many of Bertha's daughters and grand-daughters have no children? (2004 AMC 10A Problems, Problem #6)

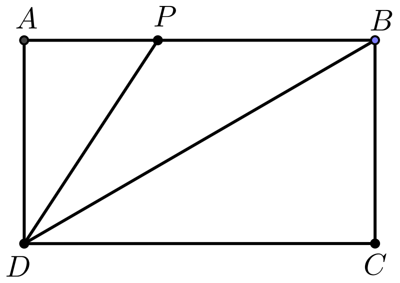
A. 22 B. 23 C. 24 D. 25 E. 26

18 (6分) In the figure, the area of triangle ABC is 1. Connecting the points that divide segments AB and AC into five equal parts, what is the area of the shaded region in the figure?



A. $\frac{13}{25}$ B. $\frac{3}{5}$ C. $\frac{16}{25}$ D. $\frac{18}{25}$ E. $\frac{4}{5}$

19 (6分) In rectangle $ABCD$, $AD = 1$. Point P lies on side $\overline{AB}$, and segments $\overline{DB}$ and $\overline{DP}$ trisect $\angle ADC$. What is the perimeter of $\triangle BDP$?



A. $3+\frac{\sqrt{3}}{3}$ B. $2+\frac{4\sqrt{3}}{3}$ C. $2+2\sqrt{2}$ D. $\frac{3+3\sqrt{5}}{2}$ E. $2+\frac{5\sqrt{3}}{3}$

20 (6分) In a candy distribution scenario, three individuals, A, B, and C, each have a positive integer number of candies. If A gives B 20 candies, B's candy count will be twice the sum of A and C's candy counts. If A gives C 30 candies, C's candy count will be three times the sum of A and B's candy counts. How many candies do A, B, and C have in total?

A. 48 B. 60 C. 80 D. 90 E. 100

Think Academy

2025 Feb AMC 10 AR Daily Practice

Day 1

1 （6分）Define $a※b=\dfrac{a-b}{a+b}$ for all real numbers a and b. Find the value of $5※(4※3)$.

A. $\dfrac{16}{17}$ B. $\dfrac{17}{18}$ C. $\dfrac{18}{19}$ D. $\dfrac{19}{20}$ E. $\dfrac{21}{22}$

Answer B

Solution $4※3=\dfrac{4-3}{4+3}=\dfrac{1}{7}$,

$$5※\frac{1}{7}=\frac{5-\frac{1}{7}}{5+\frac{1}{7}}=\frac{17}{18}.$$

$\therefore 5※(4※3)=\dfrac{17}{18}$.

2 （6分）Real numbers x,y, and z satisfy the inequalities $0<x<1$,$-1<y<0$, and $1<z<2$.

Which of the following numbers is necessarily positive?

A. $y+x^2$ B. $y+xz$ C. $y+y^2$ D. $y+2y^2$ E. $xy+z^2$

Answer E

Solution Notice that $xy+z^2$ must be positive because $\left|z^2\right|>1>|xy|$. Therefore the answer is E.

The other choices:

(A) As x grows closer to 0, x^2 decreases and thus becomes less than y.

(B) x can be as small as possible $(x>0)$, so xz grows close to 0 as x approaches 0.

(C) For all $-1<y<0$, $y>y^2$, and thus it is always negative.

(D) The same logic as above, but when $-\dfrac{1}{2}<y<0$ this time.

3 （6分）

Jason walks from his home to school. If he walks 75 meters per minute, he will be 8 minutes late; if he walks 80 meters per minute, he will be 6 minutes late. In order to arrive on time, how fast should Jason walk in meters per minute?

A. 90 B. 100 C. 110 D. 120 E. 130

Answer B

Solution The required time is $(75\times8-80\times6)\div(80-75)=24$ minutes. $75\times(24+8)\div24=100$ meters per minute. Alternatively, we can also set up a rational equation to solve the problem.

4 (6分) A rectangle $ABCD$ has $AB=8$ and $BC=4$. Points P and Q lie on sides $\overline{AB}$ and $\overline{BC}$, respectively, such that $AP=CQ$ and the area of $\triangle BPQ$ is 6. What is PQ^2?

A. 32 B. 34 C. 36 D. 38 E. 40

Answer E

Solution Since the area of $\triangle BPQ$ is 6, we get that $\dfrac{BP\cdot BQ}{2}=6$. Thus, $BP\cdot BQ=12$. Let $AP=QC=x$. Then $BP=4-x$ and $BQ=8-x$, so $(4-x)(8-x)=12$. Expanding and factoring gives $(x-2)(x-10)=0$, so either $x=2$ or $x=10$.

If $x=10$, then $BP=-6$ and $BQ=-2$, which is impossible, so thus $x=2$. This gives $BP=2$ and $BQ=6$. Since $ABCD$ is a rectangle, $\angle B=90^\circ$, so applying the Pythagorean Theorem on $\triangle BPQ$ gives $2^2+6^2=PQ^2$. Thus, $PQ^2=4+36=40$.

5 (6分) In the coordinate system, the x and y coordinates of the intersection point between lines $y=x-k$ and $y=kx+2$ are both integers. How many possible values of k are there?

A. 4 B. 5 C. 6 D. 7 E. 8

Answer A

Solution Construct the system $\begin{cases} y = x - k① \\ y = kx + 2② \end{cases}$.

Plug the first equation into the second equation, we have $x(1-k) = k+2$.

It is clear that $1-k \neq 0$, so we have $x = \dfrac{k+2}{1-k} = -1 + \dfrac{3}{1-k}$.

When $1-k = \pm 3$ or ± 1, x is an integer, and now y is also an integer.

Therefore, $k = \{4, 2, 0, -2\}$, four of them.

Day 2

6 (6分) A bicycle has two wheels, while a tricycle has three wheels. There are a 17 such vehicles with 41 wheels. Find the number of bicycles.

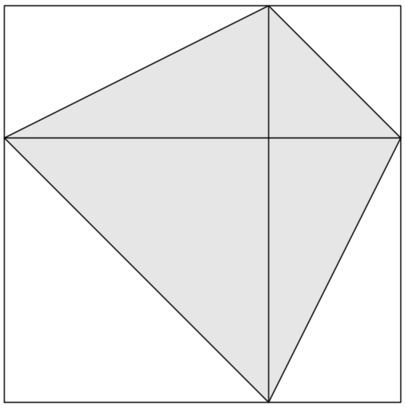
A. 10　　B. 11　　C. 12　　D. 13　　E. 14

Answer A

Solution Suppose that all vehicles are tricycles, then there are $(3 \times 17 - 41) \div (3-2) = 10$ bicycles.

Alternatively, we can also set up system of linear equations to solve the problem.

7 (6分) Two squares of side lengths 2 and 3 lie within a third square of side length 5, as shown below. What is the area of the shaded region?



A. 11　　B. 11.5　　C. 12　　D. 12.5　　E. 13

Answer D

Solution Each of the 4 shaded triangles can be paired with a congruent but unshaded triangle, and vice versa. Hence, the shaded region and the combined unshaded regions have the same area, so the shaded region has half the area of the entire square. The requested answer is therefore $\frac{5^2}{2}=12.5$.

8 (6分) Which of the following numbers is a perfect square?

A. $\frac{23!24!}{3}$ B. $\frac{24!25!}{3}$ C. $\frac{25!26!}{3}$ D. $\frac{26!27!}{3}$ E. $\frac{27!28!}{3}$

Answer D

Solution Note that for all positive n, we have $\frac{n!\,(n+1)!}{3}=\frac{(n!)^2\cdot(n+1)}{3}=(n!)^2\cdot\frac{n+1}{3}$. We must find a value of n such that $(n!)^2\cdot\frac{n+1}{3}$ is a perfect square. Since $(n!)^2$ is a perfect square, we must also have $\frac{n+1}{3}$ be a perfect square. In order for $\frac{n+1}{3}$ to be a perfect square, $n+1$ must be twice a perfect square. From the answer choices, $n+1=27$ works, thus, $n=26$ and our desired answer is $(\mathrm{D})\frac{26!27!}{3}$.

9 (6分) Cards labeled from 1 to 9 are distributed to students A, B, and C, three cards each person without repetition. The following are the conversations between the students.

A: The three numbers on my cards form an arithmetic sequence.

B: Me too.

C: Only my cards do not form an arithmetic sequence.

Suppose that everyone is telling the truth, find the minimum of the sum of the numbers in three cards of C.

A. 6 B. 7 C. 8 D. 9 E. 10

Answer D

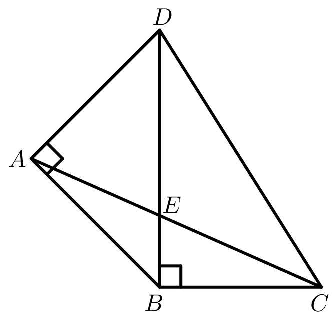
Solution As the numbers of A and B form arithmetic sequences, their sums must be multiples of 3. The sum of 9 cards is 45, which is also a multiple of 3. Therefore, the sum of C is also a multiple of 3. The sum of C can not be $6 = (1 + 2 + 3)$, so the sum is at least 9. Check and find 9 is the correct answer.

A: $(9, 8, 7)$

B: $(5, 4, 3)$

C: $(1, 2, 6)$

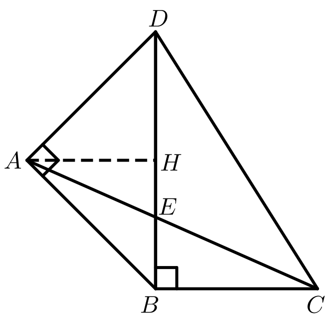
10 (6分) Let $ABCD$ be a convex quadrilateral such that $\angle DAB = \angle DBC = 90^{\circ}$ and $DA = AB = 6$. Let E be the intersection of the diagonals AC and BD. If $BE = 2\sqrt{2}$, find the area of $ABCD$.



A. 30 B. 36 C. 48 D. 54 E. 60

Answer D

Solution Construct $AH \perp BD$.



$\because \angle DAB = 90^{\circ}$, $DA = AB = 6$,

$\therefore BD = \sqrt{DA^2 + AB^2} = 6\sqrt{2}$.

$\because AH \perp BD$,

$\therefore AH = BH = DH = \frac{1}{2}BD = 3\sqrt{2}$, $\angle AHE = 90^{\circ}$,

$\because BE = 2\sqrt{2}$,

$\therefore EH = BH - BE = 3\sqrt{2} - 2\sqrt{2} = \sqrt{2}$,

$\because \angle AHE = \angle CBE = \angle DBC = 90^\circ$, $\angle AEH = \angle CEB$,

$\therefore \triangle AHE \sim \triangle CEB$,

$\therefore \frac{AH}{BC} = \frac{EH}{BE}$, or $\frac{3\sqrt{2}}{BC} = \frac{\sqrt{2}}{2\sqrt{2}}$, $BC = 6\sqrt{2}$,

$\therefore A_{\triangle BCD} = \frac{1}{2}BD \times BC = \frac{1}{2} \times 6\sqrt{2} \times 6\sqrt{2} = 36$,

$A_{\triangle ABD} = \frac{1}{2}AD \times AB = \frac{1}{2} \times 6 \times 6 = 18$,

$\therefore A_{ABCD} = A_{\triangle BCD} + A_{\triangle ABD} = 36 + 18 = 54$.

Therefore, $A_{ABCD} = 54$.

Day 3

11 （6分）A palindrome is a number that has the same value when read from left to right or from right to left. (For example, 12321 is a palindrome.) Determine the number of palindromes between 1000 and 2023.

A. 10 B. 11 C. 12 D. 13 E. 14

Answer B

Solution Enumerate based on patterns: 1001, 1111, 1221, 1331, 1441, 1551, 1661, 1771, 1881, 1991, 2002.

12 （6分）Consider the Fibonacci Sequence $1, 1, 2, 3, 5, 8, \cdots$. Starting the third number, each succeeding number is the sum of the previous two numbers. Among the first 2023 numbers in the sequence, how many of them are multiples of 5?

A. 403 B. 404 C. 405 D. 505 E. 506

Answer B

Solution

We can determine the pattern of remainders when each term in the sequence is divided by 5: $1, 1, 2, 3, 0, 3, 3, 1, 4, 0, 4, 4, 3, 2, 0, 2, 2, 4, 1, 0, 1, 1, 2, 3, \cdots$. We find that a remainder of 0 appears once for every 5 numbers if the divisor is 5. As $2023 \div 5 = 404\, R\, 3$, there are 404 such numbers.

13 （6分）Consider positive integers a, b, c, d such that $ab = cd$, which of the following is a possible value of $a + b + c + d$?

A. 97 B. 101 C. 301 D. 401

E. None of the above

Answer C

Solution Since 97, 101, and 401 are both prime and $301 = 7 \times 43$.

Let $a = mn,\ b = pq,\ c = mp,\ d = nq,\ m,\ n,\ p,\ q \in \mathbb{N}^*$,

Then $a + b + c + d = mn + pq + mp + nq = (m + q)(n + p)$,

So we are good as long as $a + b + c + d$ is not prime.

For example, $301 = 7 \times 43 = (1 + 6) \cdot (1 + 42)$.

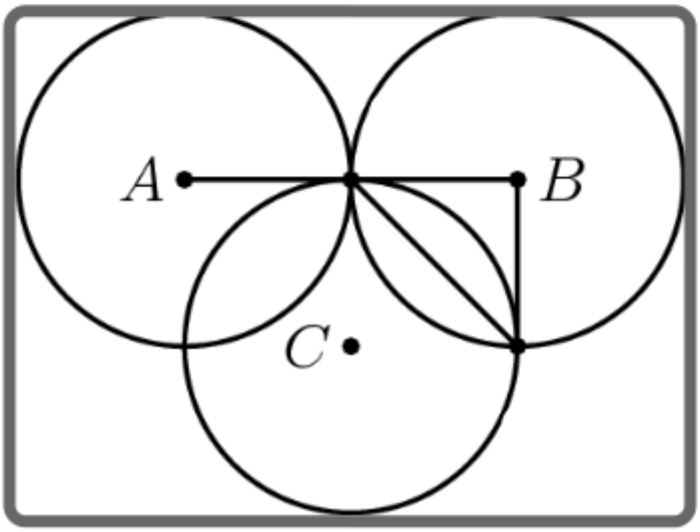
This is true when $a = 1,\ b = 252,\ c = 42,\ d = 6$.

14 （6分）Circles A, B, and C each have radius 1. Circles A and B share one point of tangency. Circle C has a point of tangency with the midpoint of $\overline{AB}$. One side of rectangle D is tangent to both circles A and B, and its opposite side is tangent to circle C. The other two sides are tangent to circles A and B, respectively. What is the area of the part that is inside the rectangle but not inside the circle?

A. $12 - 3\pi$ B. $16 - 3\pi$ C. $10 - 2\pi$ D. $14 - 2\pi$ E. $10 - 3\pi$

Answer C

Solution



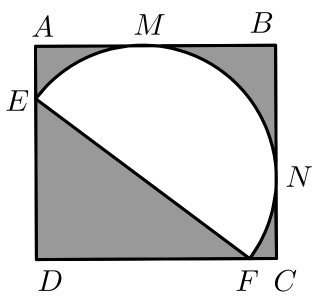
By the principle of inclusion-exclusion, it can be deduced that the desired area is equal to the area of the rectangle D minus the sum of the areas of the three circles A, B, and C, plus the overlapping area between circle C and circles A and B.

Then, we can compute the shaded area as the area of half of C plus the area of the rectangle minus the area of the two sectors created by A and B. This is

$\frac{\pi(1)^2}{2} + (2)(1) - 2 \cdot \frac{\pi(1)^2}{4} = 2.$

The area of the rectangle is $4 \times 3 = 12$, so the area is $12 - 2\pi - 2 = 10 - 2\pi$.

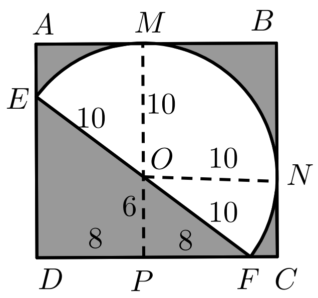
15 （6分）In the figure, a semicircle with diameter EF intersects each side of rectangle $ABCD$ at exactly one point. The lengths of segments EF and FC are 20 centimeters and 2 centimeters, respectively. The area of the shaded region is $a - b \cdot \pi$ square centimeters. Find the value of $a + b$. (Assuming the value of π is 3.14.)



A. 326 B. 338 C. 348 D. 444 E. 500

Answer B

Solution Let EF be a line segment with midpoint O. Draw a perpendicular line OP from O to CD at point P. Connect OM and ON.



Then, OM is perpendicular to AB, and ON is perpendicular to BC. Given that EF has a length of $20\ \mathrm{cm}$, we can deduce that $OE = OF = OM = ON = 10\ \mathrm{cm}$. Therefore, PF can be calculated as $10 - 2 = 8\ \mathrm{cm}$.

The length of OP is $6\ \mathrm{cm}$, and since OP bisects CD, we have $DP = PF = 8\ \mathrm{cm}$.

Consequently, $AD = MP = 16\ \mathrm{cm}$.

The length of BC is given as $8 + 8 + 2 = 18\ \mathrm{cm}$.

Now, we want to find the area of the shaded region, denoted as S_{shaded}. This can be obtained by subtracting the area of the semicircle from the area of quadrilateral $ABCD$. The area of quadrilateral $ABCD$ can be calculated as $AD \times BC = 16 \times 18$. The area of the semicircle can be calculated as $\frac{1}{2}\pi \times r^2$, where the radius r is $\frac{1}{2} \times EF = 10\ \mathrm{cm}$. Thus, the area of the shaded region is:

$S_{\text{shaded}} = 16 \times 18 - \frac{1}{2} \times \pi \times 10^2 = 288 - 50\pi.$

Therefore, the answer is $288 + 50 = \boxed{\textbf{(B)}338}$.

Day 4

16 (6分) Let a be a real number. If $|a| = -a$, what is the simplified value of $|a-1| - |a-2|$?

A. -3 B. -1 C. 1 D. $2a-3$ E. $3-2a$

Answer B

Solution

Think Academy

Given $|a| = -a$, we can deduce that $a \leqslant 0$ (since the absolute value of a number is non-negative, and here it equals the negative value of a).

Now, let's simplify the expression $|a-1| - |a-2|$:

$|a-1| - |a-2| = -(a-1) + (a-2) = -1$.

Hence, the simplified value of the expression is -1.

The correct answer is $\boxed{\text{B}}$.

17 (6分) Bertha has 6 daughters and no sons. Some of her daughters have 6 daughters, and the rest have none. Bertha has a total of 30 daughters and granddaughters, and no great-granddaughters. How many of Bertha's daughters and grand-daughters have no children?

(2004 AMC 10A Problems, Problem #6)

A. 22 B. 23 C. 24 D. 25 E. 26

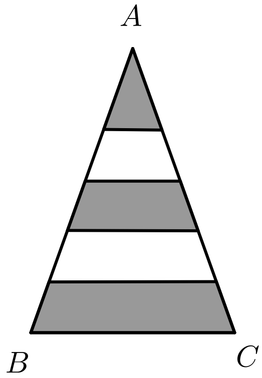
Answer E

Solution Solution 1: Since Bertha has 6 daughters, she has $30-6=24$ granddaughters, of which none have daughters. Of Bertha's daughters, $\frac{24}{6}=4$ have daughters, so $6-4=2$ do not have daughters. Therefore, of Bertha's daughters and granddaughters, $24+2=26$ do not have daughters. $\boxed{(\text{E})26}$.

Solution 2: Bertha has $30-6=24$ granddaughters, none of whom have any daughters. The granddaughters are the children of $\frac{24}{6}=4$ of Bertha's daughters, so the number of women having no daughters is $30-4=\boxed{26}$.

Draw a tree diagram and see that the answer can be found in the sum of $6+6$ granddaughters, $5+5$ daughters, and 4 more daughters. Adding them together gives the answer of $\boxed{(\text{E})26}$.

18 (6分) In the figure, the area of triangle ABC is 1. Connecting the points that divide segments AB and AC into five equal parts, what is the area of the shaded region in the figure?



A. $\frac{13}{25}$ B. $\frac{3}{5}$ C. $\frac{16}{25}$ D. $\frac{18}{25}$ E. $\frac{4}{5}$

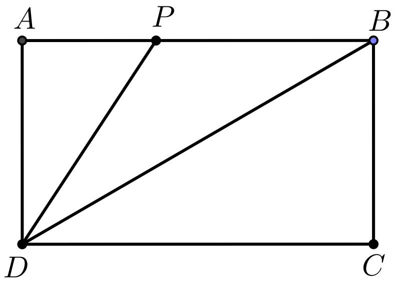
Answer B

Solution The areas of the shaded regions in the figure have a ratio of $1:3:5:7:9$ from top to bottom. To find the area of the shaded region, we sum up the areas of the three shaded regions from top to bottom, which correspond to the areas with ratios $1:5:9$. Then, we divide this sum by the total sum of all the areas (which corresponds to the total sum of the ratios $1:3:5:7:9$ in the figure).

The shaded region's area is $\frac{1+5+9}{1+3+5+7+9}=\frac{15}{25}=\frac{3}{5}$.

Hence, the area of the shaded region is $\boxed{\frac{3}{5}}$.

19 (6分) In rectangle $ABCD$, $AD=1$. Point P lies on side $\overline{AB}$, and segments $\overline{DB}$ and $\overline{DP}$ trisect $\angle ADC$. What is the perimeter of $\triangle BDP$?



A. $3+\frac{\sqrt{3}}{3}$ B. $2+\frac{4\sqrt{3}}{3}$ C. $2+2\sqrt{2}$ D. $\frac{3+3\sqrt{5}}{2}$ E. $2+\frac{5\sqrt{3}}{3}$

Answer B

Solution

Since $\angle ADC$ is trisected, $\angle ADP = \angle PDB = \angle BDC = 30^\circ$. Thus, $PD = \frac{2\sqrt{3}}{3}$, $DB = 2$, and $BP = \sqrt{3} - \frac{\sqrt{3}}{3} = \frac{2\sqrt{3}}{3}$. Adding them, we get $\boxed{(\text{B})\ 2 + \frac{4\sqrt{3}}{3}}$.

20 (6分) In a candy distribution scenario, three individuals, A, B, and C, each have a positive integer number of candies. If A gives B 20 candies, B's candy count will be twice the sum of A and C's candy counts. If A gives C 30 candies, C's candy count will be three times the sum of A and B's candy counts. How many candies do A, B, and C have in total?

A. 48 B. 60 C. 80 D. 90 E. 100

Answer A

Solution Let x, y, and z represent the numbers of candies for A, B, and C, respectively. From the given conditions, we have the following system of equations:

$$\begin{cases} y + 20 = 2(x - 20 + z) & (1) \\ z + 30 = 3(x - 30 + y) & (2) \end{cases}$$

Solving and simplifying, we get:

$$\begin{cases} 2x + 2z - y = 60 & (3) \\ 3x + 3y - z = 120 & (4) \end{cases}$$

From equation (3), we have $y = 2x + 2z - 60$. Substituting this into equation (4), we get:

$3x + 3(2x + 2z - 60) - z = 120$

Hence, $9x + 5z = 300$. Since x and z are positive integers, we have:

$9 \leq 9x \leq 300$

Therefore, $1 \leq x \leq 33\frac{1}{3}$. After checking, we find that $x = 30$ satisfies the equation, and this implies that $5z = 30$. Thus, $z = 6$ and $y = 2 \times 30 + 2 \times 6 - 60 = 12$.

So, the number of candies for A, B, and C respectively are:

$A : 30$ candies $B : 12$ candies $C : 6$ candies

The total number of candies for A, B, and C is $30 + 12 + 6 = 48$.

Therefore, the answer is $\boxed{(\mathbf{A})\ 48}$.