

1.一圓形跑道周長 300 米。A、B 兩人分別從直徑兩端同時出發。若反向而行 1 分鐘相遇。若同向而行 5 分鐘甲可以追上乙。A 速度為 () 米/分、B 速度為 () 米/分。(A circular track has a circumference of 300 meters. A and B start simultaneously from opposite ends of a diameter. If they walk in opposite directions, they meet after 1 minute. If they walk in the same direction, A catches up with B in 5 minutes. What are the speeds of A and B in meters per minute?)

答案 1 : 90

答案 2 : 60

2.一個正方形紙片的邊長為 4 厘米。如果將其剪成 4 個完全相同的小正方形。那麼每個小正方形的周長是多少厘米？(A square piece of paper has a side length of 4 centimeters. If it is cut into 4 identical smaller squares, what is the perimeter of each smaller square in centimeters?)

A. 4

B. 8

C. 12

D. 16

答案 : B

3.一個正方形的邊長增加 2 厘米後。新的正方形面積比原正方形面積大 36 平方厘米。原正方形的邊長是？(The side length of a square is increased by 2 centimeters, and the area of the new square is 36 square centimeters larger than the area of the original square. What is the side length of the original square?)

A. 7

B. 8

C. 9

D. 10

答案 : B

4.Trump 從家到學校時。前一半路程步行後一半路程乘車。從學校回家時。前 1/3 時間乘車。後 2/3 時間步行。結果去學校的時間比回家所用的時間多 2 小時。已知 Trump 步行的速度為每小時 5 千米。乘車速度為每小時 15 千米。那麼 Trump 從家到學校的路程是 () 千米？(Trump walks the first half of the distance from home to school and takes a car for the second half. On his way back from school to home, he takes a car for the first third of the time and walks for the remaining two-thirds. As a result, the time taken to go to school is 2 hours more than the time taken to come back home. Given that Trump's walking speed is 5 km/h and his driving speed is 15 km/h, what is the distance from home to school (in kilometers)?)

答案 : 150

5.同樣走 100 米。Biden 要走 180 步。Kelvin 要走 120 步。Biden 和 Kelvin 同時同方向從同一地點出發。如果每走一步所用的時間相同。那麼 Kelvin 走出 450 米後往回走。還要走 () 步才能遇到 Biden？(Biden needs 180 steps to walk 100 meters, while Kelvin needs 120 steps to walk the same distance. Biden and Kelvin start walking from the same point in the same direction at the same time, with each step taking the same amount of time. How many steps will Kelvin need to walk back to meet Biden after walking 450 meters forward?)

答案 : 108

6.一件工作。A、B 合做需 4 小時完成。B、C 合做需 5 小時完成。現在先請 A、C 合做 2 小時後。餘下的 B 還需做 6 小時完成。B 單獨做完這件工作要 () 小時？(A job can be completed by A and B working together in 4 hours,

and by B and C working together in 5 hours. Now, A and C work together for 2 hours, and then B completes the remaining work in 6 hours. How many hours does it take for B to complete the job alone?)

答案：20

7.一個數列的前五項依次是：2, 5, 10, 17, 26。從第六項開始，每一項是前一項與它的序列位置（從1開始）的平方之和。第六項是多少？(The first five terms of a sequence are: 2, 5, 10, 17, 26. Starting from the sixth term, each term is the sum of the previous term and the square of its position in the sequence (starting from 1). What is the sixth term?)

A. 37

B. 49

C. 57

D. 62

答案：D

8.有三個連續的自然數。如果中間的數是 n ，那麼這三個數的和是多少？(There are three consecutive natural numbers. If the middle number is n , what is the sum of these three numbers?)

A. $3n$

B. $3n+1$

C. $3n+2$

D. $3n-1$

答案：A

9.兩根同樣長的蠟燭，點完一根粗蠟燭要2小時，而點完一根細蠟燭要1小時。一天晚上停電，Cindy同時點燃了這兩根蠟燭看書，若干分鐘後來點了，Cindy將兩支蠟燭同時熄滅，發現粗蠟燭的長是細蠟燭的2倍。問：停電（_____）分鐘？(Two candles of the same length are used. One thick candle takes 2 hours to burn out, while one thin candle takes 1 hour to burn out. One night, the power went out and Cindy lit both candles at the same time to read. After a certain number of minutes, the power came back on, and Cindy extinguished both candles simultaneously, finding that the length of the thick candle was twice that of the thin candle. How many minutes was the power out?)

答案：20

10.一批樹苗，如果分給男女生栽，平均每人栽6棵；如果單份給女生栽，平均每人栽10棵。單份給男生栽，平均每人栽（_____）棵？(A batch of saplings is to be planted. If both boys and girls plant them, each student plants an average of 6 saplings. If only the girls plant them, each girl plants an average of 10 saplings. How many saplings would each boy plant on average if only the boys plant them?)

答案：15

11.自動扶梯以自下而上勻速行駛著，兩位孩子上樓，男孩子每分鐘走40級，女孩子每分鐘走20級，結果男孩子2分鐘到達樓上，女孩子3分鐘到達樓上。問該自動扶梯有多少級？(The escalator is moving upward at a constant speed. Two children are going up: the boy walks 40 steps per minute, and the girl walks 20 steps per minute. It takes the boy 2 minutes to reach the top and the girl 3 minutes to reach the top. How many steps does the escalator have?)

A. 108

B. 120

C · 126

D · 128

答案：B

12. 某水庫建有 10 個洩洪閘，現有水庫的水位已經超過安全線，上游河水還在按一定的速度流入水庫，為了防洪，需調節泄水速度。假設每個閘門洩洪的速度相同，經測算，若打開 1 個洩洪閘，經 30 個小時水位降至安全線；若同時打開 2 個洩洪閘，10 個小時水位降至安全線。現在水務署要求用 2.5 小時使水位降至安全線下，問至少要同時打開多少個閘門。（A reservoir has 10 floodgates. The water level in the reservoir has already exceeded the safety line, and upstream river water is still flowing into the reservoir at a constant rate. To prevent flooding, the water discharge rate needs to be adjusted. Assuming each floodgate discharges water at the same rate, measurements show that if 1 floodgate is opened, it takes 30 hours for the water level to drop to the safety line. If 2 floodgates are opened simultaneously, it takes 10 hours for the water level to drop to the safety line. Now, the water authority requires that the water level be reduced to below the safety line in 2.5 hours. How many floodgates need to be opened simultaneously to achieve this?）

A · 7

B · 8

C · 9

D · 10

答案：A

13. 4 頭牛 28 天可以吃完 10 公頃牧場上全部牧草，7 頭牛 63 天可以吃完 30 公頃牧場上全部牧草，那麼 60 頭（ ）天可以吃完 40 公頃牧場上全部牧草？（每公頃牧場上原有草量相等，且每公頃牧場上每天生長草量相等）。（4 cows can eat all the grass on a 10-hectare pasture in 28 days. 7 cows can eat all the grass on a 30-hectare pasture in 63 days. How many days will it take for 60 cows to eat all the grass on a 40-hectare pasture? (The amount of grass originally on each hectare is the same, and the daily growth rate of grass on each hectare is also the same.)）

答案：6

1. 一件工作，A、B 合做需 4 小時完成，B、C 合做需 5 小時完成。現在先請 A、C 合做 2 小時後，餘下的 B 還需做 6 小時完成。B 單獨做完這件工作要（ ）小時？（A job can be completed by A and B working together in 4 hours, and by B and C working together in 5 hours. Now, A and C work together for 2 hours, and then B completes the remaining work in 6 hours. How many hours does it take for B to complete the job alone?）

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A. 37

B. 49

C. 57

D. 62

答案：D

3. 有三個連續的自然數，如果中間的數是 n ，那麼這三個數的和是多少？(There are three consecutive natural numbers. If the middle number is n , what is the sum of these three numbers?)

- A. $3n$
- B. $3n+1$
- C. $3n+2$
- D. $3n-1$

答案：A

4. 一批樹苗，如果分給男女生栽，平均每人栽 6 棵；如果單份給女生栽，平均每人栽 10 棵。單份給男生栽，平均每人栽 () 棵？(A batch of saplings is to be planted. If both boys and girls plant them, each student plants an average of 6 saplings. If only the girls plant them, each girl plants an average of 10 saplings. How many saplings would each boy plant on average if only the boys plant them?)

答案：15

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- A · 108
- B · 120
- C · 126
- D · 128

答案：B

6. 4 頭牛 28 天可以吃完 10 公頃牧場上全部牧草，7 頭牛 63 天可以吃完 30 公頃牧場上全部牧草，那麼 60 頭牛 () 天可以吃完 40 公頃牧場上全部牧草？(每公頃牧場上原有草量相等，且每公頃牧場上每天生長草量相等) · 4 cows can eat all the grass on a 10-hectare pasture in 28 days. 7 cows can eat all the grass on a 30-hectare pasture in 63 days. How many days will it take for 60 cows to eat all the grass on a 40-hectare pasture? (The amount of grass originally on each hectare is the same, and the daily growth rate of grass on each hectare is also the same.)

答案：6

7. 一個正方形紙片的邊長為 4 厘米，如果將其剪成 4 個完全相同的小正方形，那麼每個小正方形的周長是多少厘米？A square piece of paper has a side length of 4 centimeters. If it is cut into 4 identical smaller squares, what is the perimeter of each smaller square in centimeters?

- A. 4
- B. 8
- C. 12
- D. 16

答案：B

8. 一個正方形的邊長增加 2 厘米後，新的正方形面積比原正方形面積大 36 平方厘米。原正方形的邊長是？The side

length of a square is increased by 2 centimeters, and the area of the new square is 36 square centimeters larger than the area of the original square. What is the side length of the original square?

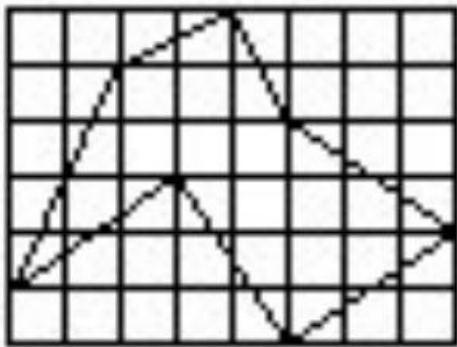
- A. 7
- B. 8
- C. 9
- D. 10

答案：B

9.某劇場 8 : 30 開始檢票，但早就有人排隊等候，從第一名旅客來到時起，每分鐘來的旅客人數一樣多，如果開 3 個檢票口，則 8 : 39 就不再有人排隊；如果開 5 個檢票口，則 8 : 35 就沒有人排隊，那麼第一個旅客到達的時間是 (_____) 時間。The theater starts ticket inspection at 8:30, but there have already been people queuing up. From the time the first visitor arrives, the number of visitors arriving each minute is the same. If 3 ticket inspection counters are opened, there will be no more people in line by 8:39. If 5 ticket inspection counters are opened, there will be no more people in line by 8:35. What time did the first visitor arrive?

答案：7 : 45

10.如圖，已知每個小正方形格的面積是 1 平方厘米，則不規則圖形的面積是(_____)平方厘米。As shown in the figure, given that the area of each small square grid is 1 square centimeter, the area of the irregular shape is (_____) square centimeter ?



答案：19

11.A、B、C、D、E 五人在一次滿分為 100 分的考試中，A 得 94 分，B 是第一名，C 得分是 A 與 D 的平均分，D 得分是五人的平均分，E 比 C 多 2 分，是第二名，則 B 得了 (_____) 分？In an exam with a maximum score of 100, five people, A, B, C, D, and E, took the test. A scored 94 points, B got the highest score, C's score is the average of A and D's scores, D's score is the average score of the five people, and E scored 2 points more than C and got the second highest score. What score did B get?

答案：98

12.AB 兩人以勻速繞圓形跑道相向跑步，出發點在圓直徑的兩端，如果他們同時出發，並在 A 跑完 60 米時第一次相遇，B 跑一圈還差 80 米時兩人第二次相遇，求跑道的長是(_____)米？A and B are running at a constant speed in opposite directions around a circular track, starting from points at opposite ends of a diameter. If they meet for the first time when A has run 60 meters, and for the second time when B is 80 meters short of a full lap, what is the length of the track?

start at the same time and meet for the first time when A has run 60 meters, and they meet for the second time when B has 80 meters left to complete one full lap, what is the length of the track in () meters?

答案：200

1. 一個正方形的邊長增加 2 厘米後，新的正方形面積比原正方形面積大 36 平方厘米，原正方形的邊長是？The side length of a square is increased by 2 centimeters, and the area of the new square is 36 square centimeters larger than the area of the original square. What is the side length of the original square?

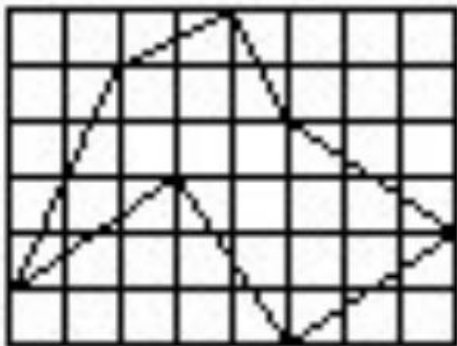
- A. 7
- B. 8
- C. 9
- D. 10

答案：B

2. 某劇場 8 : 30 開始檢票，但早就有人排隊等候，從第一名旅客來到時起，每分鐘來的旅客人數一樣多，如果開 3 個檢票口，則 8 : 39 就不再有人排隊；如果開 5 個檢票口，則 8 : 35 就沒有人排隊，那麼第一個旅客到達的時間是 () 時間。The theater starts ticket inspection at 8:30, but there have already been people queuing up. From the time the first visitor arrives, the number of visitors arriving each minute is the same. If 3 ticket inspection counters are opened, there will be no more people in line by 8:39. If 5 ticket inspection counters are opened, there will be no more people in line by 8:35. What time did the first visitor arrive?

答案：7 : 45

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答案：19

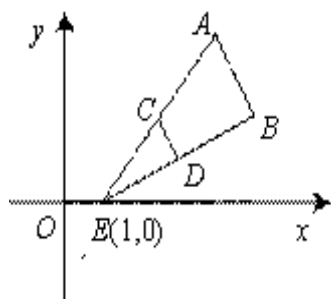
4. A、B、C、D、E 五人在一次滿分為 100 分的考試中，A 得 94 分，B 是第一名，C 得分是 A 與 D 的平均分，D 得分是五人的平均分，E 比 C 多 2 分，是第二名，則 B 得了()分？ In an exam with a maximum score of 100, five people, A, B, C, D, and E, took the test. A scored 94 points, B got the highest score, C's score is the average of A and D's scores, D's score is the average score of the five people, and E scored 2 points more than C and got the second highest score. What score did B get?

答案：98

5. A、B 兩人以勻速繞圓形跑道相向跑步，出發點在圓直徑的兩端，如果他們同時出發，並在 A 跑完 60 米時第一次相遇，B 跑一圈還差 80 米時兩人第二次相遇，求跑道的長是()米？ A and B are running at a constant speed in opposite directions around a circular track, starting from points at opposite ends of a diameter. If they start at the same time and meet for the first time when A has run 60 meters, and they meet for the second time when B has 80 meters left to complete one full lap, what is the length of the track in () meters?

答案：200

6. 如圖， $\triangle ABE$ 和 $\triangle CDE$ 是以點 E 為位似中心的位似圖形，已知點 A (3, 4)，點 C (2, 2)，點 D (3, 1)，則點 D 的對應點 B 的座標是？ Given that $\triangle ABE$ and $\triangle CDE$ are similar figures with E as the center of similarity, and given the coordinates of points A (3, 4), C (2, 2), and D (3, 1), find the coordinates of point B, which corresponds to point D.



- A · (4, 2)
- B · (4, 1)
- C · (5, 2)
- D · (5, 1)

答案：C

7. 若一次函數 $y=(k+3)x-1$ 的函數值 y 隨 x 的增大而減小，則 k 值可能是？ If the value of the linear function $y=(k+3)x-1$ decreases as x increases, what are the possible values of k ?

- A. 2
- B. $3/2$
- C. $-1/2$

D. -4

答案：D

8. 在平面直角坐標系中,將函數 $y=3x+2$ 的圖象向下平移 3 個單位長度,所得函數圖象的解析式是? In a Cartesian coordinate system, if the graph of the function $y=3x+2$ is translated downward by 3 units, what is the equation of the resulting function's graph?

A. $y=3x+5$

B. $y=3x-5$

C. $y=3x+1$

D. $y=3x-1$

答案：D

9. 若一個正整數 n , 它能被 3 和 5 整除, 但不能被 7 整除, 那麼下列哪個數同樣滿足這個條件? Given a positive integer n that is divisible by both 3 and 5 but not by 7, which of the following numbers also meets this condition?

A. 105

B. 90

C. 120

D. 140

答案：B

10. 一條直線將平面分為兩部分, 兩條不重合的直線最多可以把平面分為 () 部分, 三條不都在同一直線上的直線最多可以把平面分為 () 部分, 以此類推, 十條直線最多可以把平面分為 () 部分。A single line divides the plane into two parts. Two non-overlapping lines can divide the plane into at most () parts. Three lines, not all on the same line, can divide the plane into at most () parts. Following this pattern, ten lines can divide the plane into at most () parts.

答案 1：4

答案 2：7

答案 3：56

11. 現在有牛、羊、馬吃一塊草地的草，牛、馬吃需要 45 天吃完，於是馬、羊吃需要 60 天吃完，於是牛、羊吃需要 90 天吃完，牛、羊一起吃草的速度為馬吃草的速度，求馬、牛、羊一起吃，需（ ）天？
 There are a cow, a sheep, and a horse grazing on a pasture. The cow and the horse together can finish grazing the pasture in 45 days. The horse and the sheep together can finish grazing the pasture in 60 days. The cow and the sheep together can finish grazing the pasture in 90 days. The grazing rate of the cow and the sheep together equals the grazing rate of the horse. How many days will it take for the cow, the sheep, and the horse grazing together to finish grazing the pasture?

答案：36

12. 給一本書編上頁碼共要用 789 個數字，這本書有多少（ ）頁？
 To number the pages of a book, a total of 789 digits are used. How many pages does the book have?

答案：299

1. 某劇場 8:30 開始檢票，但早就有人排隊等候，從第一名旅客來到時起，每分鐘來的旅客人數一樣多，如果開 3 個檢票口，則 8:39 就不再有人排隊；如果開 5 個檢票口，則 8:35 就沒有人排隊，那麼第一個旅客到達的時間是（ ）時間。
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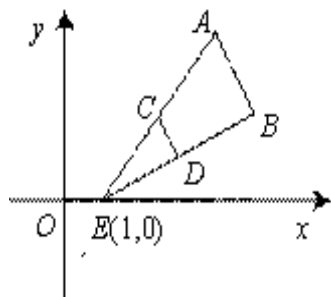
答案：7:45

2. 如圖，已知每個小正方形格的面積是 1 平方厘米，則不規則圖形的面積是（ ）平方厘米。
 As shown in the figure, given that the area of each small square grid is 1 square centimeter, the area of the irregular shape is () square centimeter?



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3. 如圖， $\triangle ABE$ 和 $\triangle CDE$ 是以點 E 為位似中心的位似圖形，已知點 A (3, 4)，點 C (2, 2)，點 D (3, 1)，則點 D 的對應點 B 的座標是？
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- A. $(4 \cdot 2)$
- B. $(4 \cdot 1)$
- C. $(5 \cdot 2)$
- D. $(5 \cdot 1)$

答案：C

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- A. 2
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- C. $-1/2$
- D. -4

答案：D

5. 在平面直角坐標系中, 將函數 $y=3x+2$ 的圖象向下平移 3 個單位長度, 所得函數圖象的解析式是? In a Cartesian coordinate system, if the graph of the function $y=3x+2$ is translated downward by 3 units, what is the equation of the resulting function's graph?

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答案：D

6. 給一本書編上頁碼共要用 789 個數字, 這本書有多少 () 頁? To number the pages of a book, a total of 789 digits are used. How many pages does the book have?

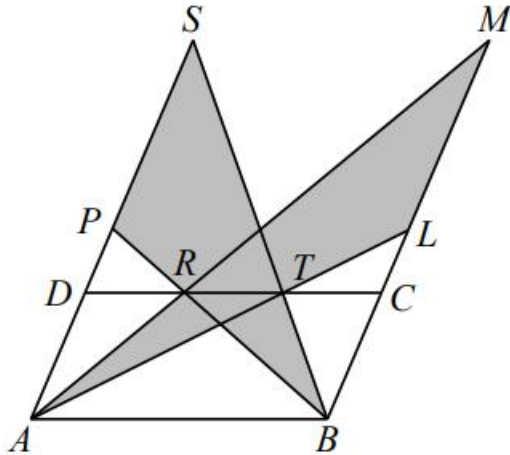
答案：299

7. 在某數列中, 首三項是 1, 2, 3。然後接著每一項都是之前三項之和的相反數。例如, 第四項是 -6 (1 2 3 + + 的相反數), 而第五項是 6。問第 99 項 () ? The first three terms in a sequence are: 1, 2, 3. Each term after that is the opposite of the sum of the three previous terms. For example, the 4th term is -6 (the opposite of 1 2 3 + +), and the 5th term is 1. What is the 99th term?

答案：3

8. 如圖所示, 點 R 與 T 在平行四邊形 ABCD 的邊 CD 上使得 $DR=RT=TC$ 。直線 AR 與 AT 分別交直線 BC 的延長線於點 M 與點 L。直線 BT 與 BR 分別交直線 AD 的延長線於點 S 與點 P。已知平行四邊形 ABCD 的面積是 48 cm^2 。請問陰影部分的面積是多少 cm^2 ? (As shown in the diagram, points R and T lie on side CD of

parallelogram ABCD such that $DR=RT=TC$. Lines AR and AT intersect the extension of line BC at points M and L respectively, and lines BT and BR intersect the extension of line AD at points S and P respectively. Given that the area of parallelogram ABCD is 48 cm², what is the area of the shaded region in square centimeters?)



- A. $\sqrt{2} + 1$
- B. $\sqrt{3} + 1$
- C. $\sqrt{3} + 2$
- D. $\sqrt{2} + 2$

答案：A

9.將任意一個大於 0 的整數 n 輸入到程式中，程式將按照以下步驟執行：

步驟 1：令 p 的值等於 0；

步驟 2：當 n 等於 0 時，跳轉至步驟 3。否則令 b 的值等於 n 除以 10 的餘數，將 p 的值加上 b ，令 n 等於 $(n-b) \div 10$ ，重複執行步驟 2；

步驟 3：令 q 的值等於 p 除以 9 的餘數，依次輸出 p 和 q ，結束整個程式；現在向程式輸入整數 3527594，請問程式輸出 p 的值是 ()， q 的值是 ()。

When any positive integer n is input into the program, the program will execute the following steps:

Step 1 : Set the value of p to 0.

Step 2 : When n is equal to 0, jump to step 3. Otherwise, set the value of b to the remainder of n divided by 10. Add b to p , set n equal to $(n-b) \div 10$, and repeat step 2.

Step 3 : Set the value of q to the remainder of p divided by 9. Output p and q in order, ending the entire program.

Now, input the integer 3527594 into the program. What are the values of p and q that the program outputs?

答案 1: 35

答案 2 : 8

10.已知全集 $U=R$ ，集合 $A=\{x|1 \leq x < 7\}$ ， $B=\{x|x^2-7x+10 < 0\}$ ，則 $A \cap (\complement R B) = ()$

Given the universal set $U=R$, the set $A=\{x|1 \leq x < 7\}$ ， $B=\{x|x^2-7x+10 < 0\}$ ， find $A \cap (\complement R B)$.

A · $(1,2) \cup (5,7)$

B · $[1,2] \cup [5,7]$

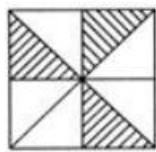
C · $(1,2) \cup (5,7]$

D · $[1,2] \cup (5,7)$

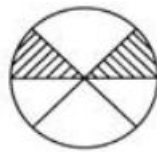
答案: B

11 有四個遊戲盤面積相等。將它們水準放穩後，在上面扔一顆玻璃小球。若小球落在陰影部分，則可中獎。Susan 要想增加中獎機會，應選擇的遊戲盤是 ()。

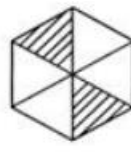
There are four game disks of equal area. When they are laid flat and a small glass ball is thrown onto them, if the ball lands on the shaded part, you win a prize. To increase his chances of winning, Susan should choose the game disk that is ().



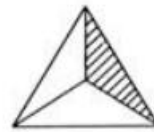
(A)



(B)



(C)



(D)

答案: A

1. 在你面前有一條長長的階梯。假如你每步跨 2 階，那麼最後剩下 1 階；假如你每步跨 3 階，那麼最後剩 2 階；假如你每步跨 5 階，那麼最後剩 4 階；假如你每步跨 6 階，那麼最後剩 5 階；只有當你每步跨 7 階時，最後才正好走完，一階也不剩。從此可以推到，最少有 () 階樓梯。

In front of you is a long staircase. If you take 2 steps at a time, there is 1 step remaining at the end; if you take 3 steps at a time, there are 2 steps remaining; if you take 5 steps at a time, there are 4 steps remaining; if you take 6 steps at a time, there are 5 steps remaining; and only if you take 7 steps at a time, you will finish exactly without any steps remaining. From this, it can be deduced that the staircase has at least () steps.

答案: 119

2. 王老太上集上去賣雞蛋，第一個人買走藍子裏雞蛋的一半又一個，第二個人買走剩下雞蛋的一半又一個，這時藍子裏還剩一個雞蛋，請問王老太一共賣出 () 個雞蛋？
Grandma Wang went to the market to sell eggs. The first person bought half of the eggs in the basket plus one more egg. The second person bought half of the remaining eggs plus one more egg. After that, there was one egg left in the basket. How many eggs did Grandma Wang sell in total?

答案: 9

3. $(1+i)^4 + (1-i)^4 = ()$

答案: -8

4. 設 $1 \leq x, y, z \leq 6$ ，則自然數 x, y, z 的乘積能被 10 整除的情形有 () 種

Given that $1 \leq x, y, z \leq 6$, and x, y, z are natural numbers, how many cases are there where the product x, y, z is divisible by 10?

答案: 72

5.將任意一個大於 0 的整數 n 輸入到程式中，程式將按照以下步驟執行：

步驟 1: 令 p 的值等於 0;

步驟 2: 當 n 等於 0 時，跳轉至步驟 3，否則令 b 的值等於 n 除以 10 的餘數，將 p 的值加上 b ，令 n 等於 $(n-b) \div 10$ ，重複執行步驟 2;

步驟 3: 令 q 的值等於 p 除以 9 的餘數，依次輸出 p 和 q ，結束整個程式：現在向程式輸入整數 3527594，請問程式輸出 p 的值是 ()， q 的值是 ()。

When any positive integer n is input into the program, the program will execute the following steps:

Step 1: Set the value of p to 0.

Step 2: When n is equal to 0, jump to step 3. Otherwise, set the value of b to the remainder of n divided by 10. Add b to p , set n equal to $(n-b) \div 10$, and repeat step 2.

Step 3: Set the value of q to the remainder of p divided by 9. Output p and q in order, ending the entire program.

Now, input the integer 3527594 into the program. What are the values of p and q that the program outputs?

答案 1: 35

答案 2: 8

6.已知全集 $U=R$ ，集合 $A=\{x|1 \leq x < 7\}$ ， $B=\{x|x^2-7x+10 < 0\}$ ，則 $A \cap (\complement R B) = ()$

Given the universal set $U=R$, the set $A=\{x|1 \leq x < 7\}$ ， $B=\{x|x^2-7x+10 < 0\}$ ，find $A \cap (\complement R B)$.

A. $(1,2) \cup (5,7)$

B. $[1,2] \cup [5,7)$

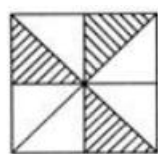
C. $(1,2) \cup (5,7]$

D. $(1,2] \cup (5,7)$

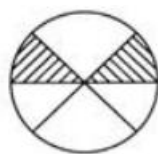
答案: B

7.有四個遊戲盤面積相等，將它們水準放穩後，在上面扔一顆玻璃小球，若小球落在陰影部分，則可中獎，Susan 要想增加中獎機會，應選擇的遊戲盤是 ()。

There are four game disks of equal area. When they are laid flat and a small glass ball is thrown onto them, if the ball lands on the shaded part, you win a prize. To increase his chances of winning, Susan should choose the game disk that is ().



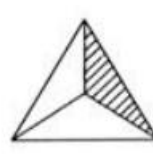
(A)



(B)



(C)



(D)

答案: A

8.給一本書編上頁碼共要用 789 個數字，這本書有多少 () 頁? To number the pages of a book, a total of 789 digits are used. How many pages does the book have?

答案: 299

9.在某數列中，首三項是 1, 2, 3。然後接著每一項都是之前三項之和的相反數。例如，第四項是 -6 ($1+2+3$ 的相反數)，而第五項是 6。問第 99 項是 ()? The first three terms in a sequence are: 1, 2, 3. Each term after that is

the opposite of the sum of the three previous terms. For example, the 4th term is -6 (the opposite of $1+2+3$), and the 5th term is 1 . What is the 99th term?

答案: 3

10. 已知等差數列 $\{a_n\}$ 的前 n 項和為 S_n , $a_1+a_5=0.5S_5$, 且 $a_9=20$, 則 $S_{11}=(\quad)$

Given an arithmetic sequence $\{a_n\}$ with the sum of the first n terms denoted by S_n , it is known that $a_1+a_5=0.5S_5$ and $a_9=20$. Find $S_{11}=(\quad)$.

- A. 260
- B. 220
- C. 130
- D. 110

答案: D

11. 有一片牧場的草, 假如放牧 27 頭牛, 那麼 6 個星期可以把草吃光; 假如放牧 23 頭牛, 那麼 9 個星期可以把草吃光; 假如放牧 21 頭牛, (\quad) 星期可以把草吃完?

There is a pasture with grass. If 27 cows are grazing, the grass will be eaten up in 6 weeks. If 23 cows are grazing, the grass will be eaten up in 9 weeks. How many weeks will it take for 21 cows to eat up the grass?

答案: 12

1. 在你面前有一條長長的階梯。假如你每步跨 2 階, 那麼最後剩下 1 階; 假如你每步跨 3 階, 那麼最後剩 2 階; 假如你每步跨 5 階, 那麼最後剩 4 階; 假如你每步跨 6 階, 那麼最後剩 5 階; 只有當你每步跨 7 階時, 最後才正好走完, 一階也不剩。從此可以推到, 最少有 (\quad) 階樓梯。

In front of you is a long staircase. If you take 2 steps at a time, there is 1 step remaining at the end; if you take 3 steps at a time, there are 2 steps remaining; if you take 5 steps at a time, there are 4 steps remaining; if you take 6 steps at a time, there are 5 steps remaining; and only if you take 7 steps at a time, you will finish exactly without any steps remaining. From this, it can be deduced that the staircase has at least (\quad) steps.

答案: 119

2. $(1+i)^4 + (1-i)^4 = (\quad)$

答案: -8

3. 設 $1 \leq x, y, z \leq 6$, 則自然數 x, y, z 的乘積能被 10 整除的情形有 (\quad) 種

Given that $1 \leq x, y, z \leq 6$, and x, y, z are natural numbers, how many cases are there where the product x, y, z is divisible by 10?

答案: 72

4. 一天有個年輕人來到王老闆的店裏買一件禮物, 這件禮物成本是 18 元, 售價是 21 元。結果是這個年輕人掏出 100 元要買這件禮物。王老闆當時沒有零錢, 用那 100 元向街坊換了 100 元的零錢, 找給年輕人 79 元。但是街坊後來發現那 100 元是假鈔, 王老闆無奈還了街坊 100 元。現在問題是: 王老闆在這次交易中到底損失了 (\quad) 錢?

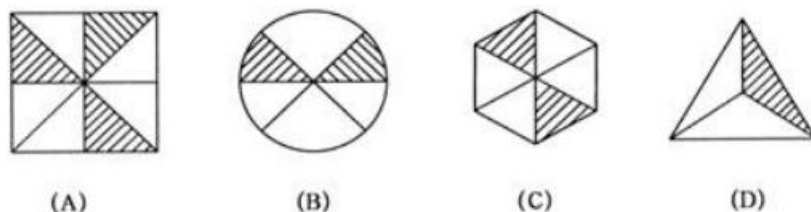
One day, a young man came to Mr. Wang's shop to buy a gift that cost \$18, with a selling price of \$21. The young man paid with a \$100 bill. Mr. Wang didn't have change, so he exchanged the \$100 bill for smaller denominations with a neighbor and then gave the young man \$79 in change. Later, the neighbor discovered

that the \$100 bill was counterfeit, and Mr. Wang had to pay the neighbor \$100. The question now is: how much money did Mr. Wang lose in this transaction?

答案: 97

4. 有四個遊戲盤面積相等，將它們水準放穩後，在上面扔一顆玻璃小球，若小球落在陰影部分，則可中獎，Susan 要想增加中獎機會，應選擇的遊戲盤是 ()。

There are four game disks of equal area. When they are laid flat and a small glass ball is thrown onto them, if the ball lands on the shaded part, you win a prize. To increase his chances of winning, Susan should choose the game disk that is ().



答案: A

5. 給一本書編上頁碼共要用 789 個數字，這本書有多少 () 頁? To number the pages of a book, a total of 789 digits are used. How many pages does the book have?

答案: 299

6. $\left(x - \frac{1}{x^6}\right)^{2009}$ 的二項展開式中常數項為 ()。

The constant term in the binomial expansion of $\left(x - \frac{1}{x^6}\right)^{2009}$ is?

A. C_{2009}^{286}

B. C_{2009}^{287}

C. $-C_{2009}^{286}$

D. $-C_{2009}^{287}$

答案: D

7. 一個四位數與它的各個位上的數之和是 1972，這個四位數是 () ？

A four-digit number, when added to the sum of its digits, equals 1972. Find this four-digit number.

答案: 1949

8. 方程 $x^3 - 12x + a = 0$ 有三個不同的實數根，則實數 a 的取值範圍為 ()

The equation $x^3 - 12x + a = 0$ has three distinct real roots. The range of values for the real number a is

() .

A. $(-16, 16)$

B. $[-16, 16]$

C. $(-\infty, -8)$

D. $(8, +\infty)$

答案: A

9. $\cos(\sqrt{1-\sqrt{x^2+5x+7}} + \sqrt{x^2+5x+6}) = (\quad)$

答案: 1

10. 圓錐的軸截面 SAB 是邊長為 2 的等邊三角形, O 為底面中心, M 為 SO 的中點, 動點 P 在圓錐底面內 (包括圓周)。

若 $AM \perp MP$, 則 P 點形成的軌跡的長度為 ()

The axial cross-section SAB of a cone is an equilateral triangle with side length 2. O is the center of the base, and M is the midpoint of SO. A moving point P is within the base of the cone (including the circumference). If $AM \perp MP$, the length of the trajectory formed by point P is ().

A. $\sqrt{7}$

B. $\frac{\sqrt{7}}{2}$

C. 3

D. $\frac{3}{2}$

答案: B