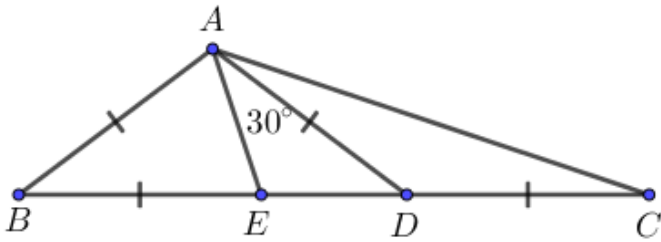


1. In the following figure, points D and E are on side BC such that $EB = BA = AD = DC$ and $\angle DAE = 30^\circ$.

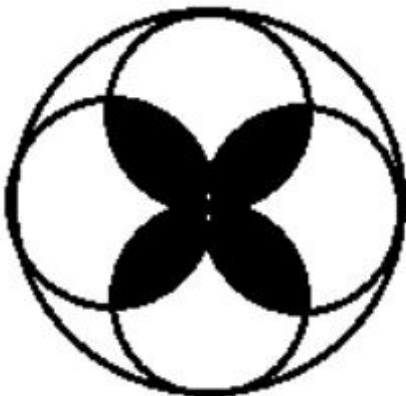


In degrees, what is the measure of angle $\angle BAC$?

(Note : the figure is not drawn to scale)

- A) 100
 - B) 135
 - C) 120
 - D) 90
 - E) 115
- (Benar +2, Salah 0, Kosong 0)

2. Consider the following figure.

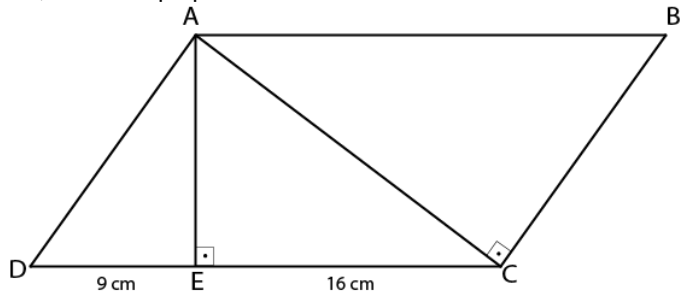


Given that the diameter of the largest circle is 4 cm. The other four circles inside it have the same size.

Calculate the area of the shaded region.

- A) $2\pi - 4 \text{ cm}^2$
 - B) 1.14 cm^2
 - C) $\pi - 2 \text{ cm}^2$
 - D) $\frac{\pi}{4} - \frac{1}{2} \text{ cm}^2$
 - E) 2.28 cm^2
- (Benar +2, Salah 0, Kosong 0)

3. The following figure shows a parallelogram ABCD with $|DE| = 9 \text{ cm}$. $|CE| = 16 \text{ cm}$. AE is perpendicular to DC, and AC is perpendicular to BC.



Find the distance between the points B and D.

- A) $10\sqrt{13}$
 - B) $10\sqrt{15}$
 - C) $10\sqrt{14}$
 - D) $20\sqrt{3}$
 - E) $10\sqrt{11}$
- (Benar +2, Salah 0, Kosong 0)

4. The absolute value of x , denoted by $|x|$, is defined as:

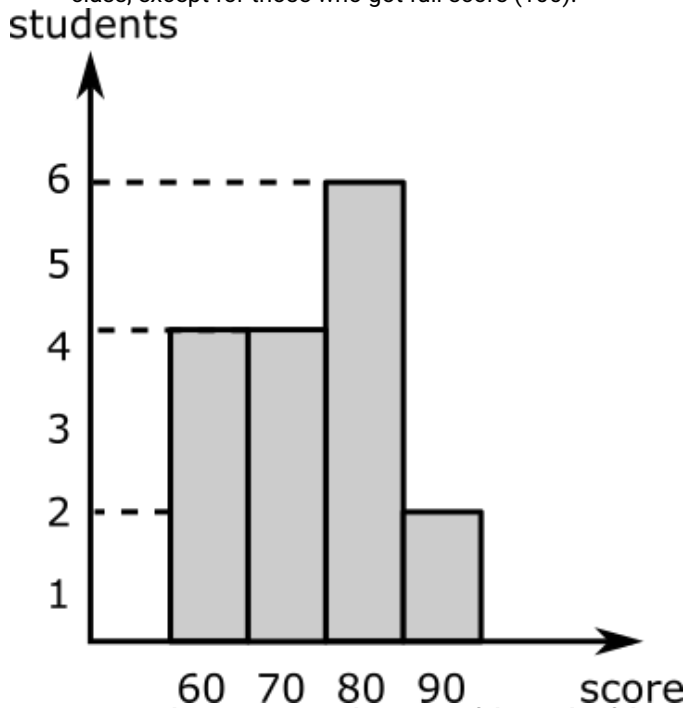
$$|x| = \begin{cases} -x & x < 0 \\ x & x \geq 0 \end{cases}$$

What is the sum of all real number x so that

$$|12x + 8| = x^2 + 28?$$

- A) 3
 - B) 0
 - C) 6
 - D) 4
 - E) 12
- (Benar +2, Salah 0, Kosong 0)

5. The chart below shows the scores of all students in a class, except for those who got full score (100).



How many students got 100 in their exam if the mode of the complete data equals to the class average?

- A) 4
 - B) 5
 - C) 3
 - D) 1
 - E) 2
- (Benar +2, Salah 0, Kosong 0)

6. Given a_1, a_2, \dots is a sequence with the following properties:

- (i) $a_1 = 1$
- (ii) $a_{2n} = n \cdot a_n$ for any positive integer n

Calculate the value of $a_{2^{2020}}$?

- A) $2^{2037171}$
 - B) $2^{2039190}$
 - C) $2^{4078380}$
 - D) 2^{2020}
 - E) $2^{1019595}$
- (Benar +2, Salah 0, Kosong 0)

7. The sum of all odd numbers between 22 and 220 but not divisible by 11 is _____.

- A) 10980
 - B) 80190
 - C) 19080
 - D) 18009
 - E) 10890
- (Benar +2, Salah 0, Kosong 0)

8. How many different arrangements can be made from the word CORONAVIRUS such that all vowels are grouped together? Allowed examples include COOAIURNVRS.

- A) $\frac{7! 5!}{4}$
 - B) $\frac{11!}{4}$
 - C) $\frac{7! 4!}{5}$
 - D) $\frac{7! 5!}{5}$
 - E) $11!$
- (Benar +2, Salah 0, Kosong 0)

9. During a picnic, each participant will choose to go snorkeling or join a boat trip. There are 13 participants that choose to join boat trip but not snorkeling, 8 participants that choose to go snorkeling and also boat trip, and 4 participant who choose not to go either snorkeling or boat trip. **If there are 32 participant overall, how many participants decided to go snorkeling?**

- A) 9
 - B) 11
 - C) 15
 - D) 7
 - E) 13
- (Benar +2, Salah 0, Kosong 0)

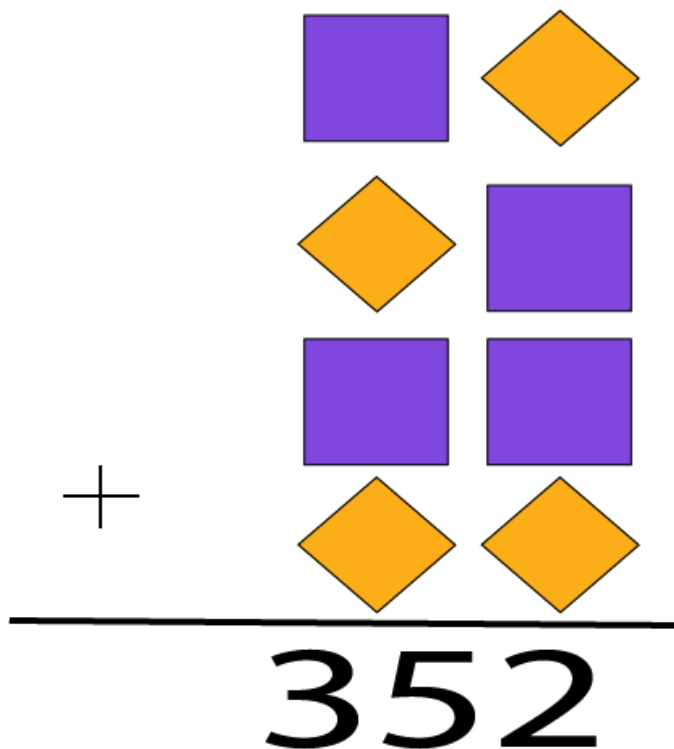
10. Hendra went to a dark room to take a pair of socks. There are three pairs of green socks, a pair of red socks, a pair of black socks, and two pairs of blue socks. **At least how many socks he must take to make sure that he have a matching pair?**

- A) 3
 - B) 5
 - C) 2
 - D) 4
 - E) 6
- (Benar +2, Salah 0, Kosong 0)

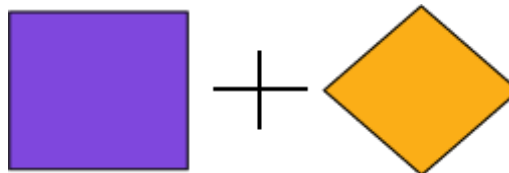
11. If we chose a three-digit number randomly, what is the probability of getting an odd number or a number containing 5?

- A) $\frac{31}{50}$
 - B) $\frac{16}{25}$
 - C) $\frac{3}{5}$
 - D) $\frac{28}{225}$
 - E) $\frac{5}{4}$
- (Benar +2, Salah 0, Kosong 0)

12.



Find



- A) 15
 - B) 17
 - C) 16
 - D) 18
 - E) 14
- (Benar +2, Salah 0, Kosong 0)

13. There are n couples (husband and wife) sitting around a round table.

Calculate how many ways they can sit such that every wife sits next to her husband.

- A) $2n!$
 B) $(2n - 1)!$
 C) $(n - 1)! \cdot 2^n$
 D) $(n - 1)! \cdot 2$
 E) $(n - 1)! \cdot (n - 1)!$

(Benar +2, Salah 0, Kosong 0)

14. How many numbers of the form $\overline{143a7b8}$ are divisible by 6 and 4, with $a > b$?

- A) 6
 B) 8
 C) 10
 D) 7
 E) 9

(Benar +2, Salah 0, Kosong 0)

15. If $-1 \leq x \leq 4$, then what is the positive difference between maximum and minimum values of

$$x^2 - 4x - 12?$$

- A) 9
 B) 13
 C) 12
 D) 7
 E) 16

(Benar +2, Salah 0, Kosong 0)

16. Find the sum of all integers n , such that $\frac{4n + 1}{2n + 3}$ is a

natural number.

- A) -4
 B) 3
 C) -6
 D) 4
 E) -5

(Benar +2, Salah 0, Kosong 0)

17. a, b, c, d are positive integers such that
 $ab + cd = 95$
 $ac + bd = 92$
 $ad + bc = 100$

Determine the mean of a, b, c, d .

- A) 14
- B) 28
- C) 21
- D) 35
- E) 7

(Benar +2, Salah 0, Kosong 0)

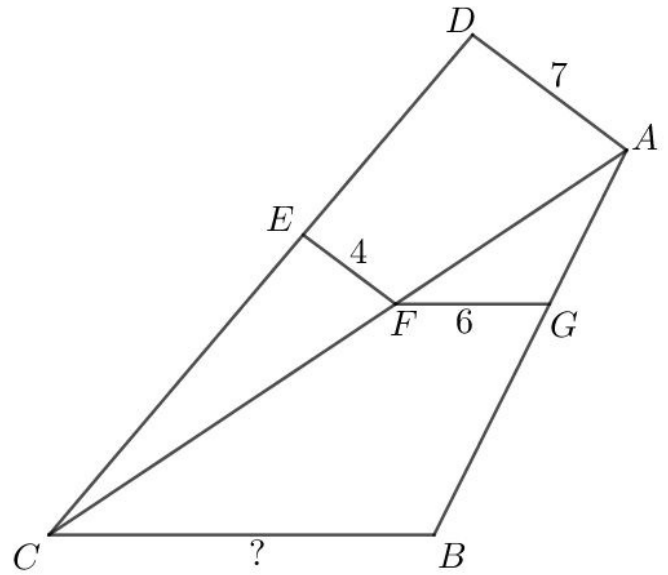
18. A class of 32 students have mean score of Mathematics of 65 and range 70. If the lowest score and the highest score are not included in calculation, the mean score remains the same.

Determine the highest score.

- A) 85
- B) 95
- C) 100
- D) 80
- E) 90

(Benar +2, Salah 0, Kosong 0)

19. In the following picture, AD is parallel to EF, and FG is parallel to CB. The length of segment AD = 7, EF = 4 and FG = 6.



What is the length of segment BC?

- A) 16
- B) 12
- C) 15
- D) 14
- E) 5

(Benar +2, Salah 0, Kosong 0)

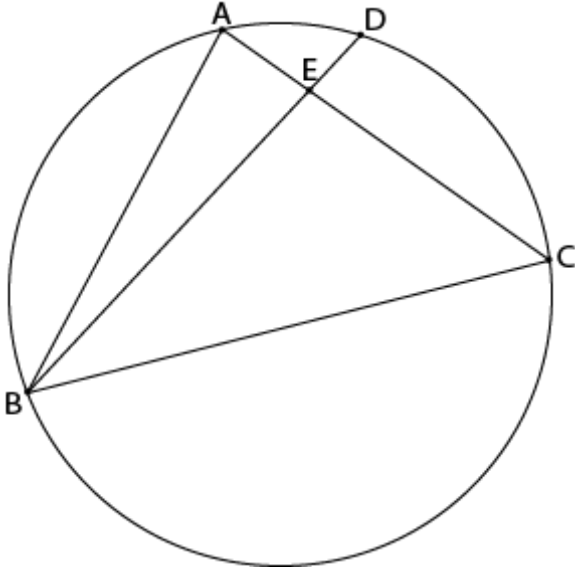
20. A woman with her 6-year old child are queueing with 5 other adults to get a rapid test for COVID-19. The line cannot start with an underage person.

If the woman must stay next to her child, how many ways of arrangement can be formed?

- A) $6! \cdot 2! - 1$
- B) $6! - 5!$
- C) $11 \cdot 5!$
- D) $6! \cdot 2!$
- E) $12 \cdot 6!$

(Benar +2, Salah 0, Kosong 0)

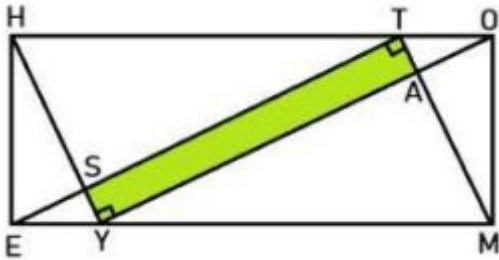
21. The vertices of the triangle ABC and the point D lie on the circumference of a circle. The areas of triangles ABC and BCE are 146 and 96, respectively. The lengths of line segments AE and DE are 2.5 cm and 1.5 cm, respectively.



Find the length of the line segment BE.

- A) 8 cm
 B) 7 cm
 C) 9 cm
 D) 6 cm
 E) 7.5 cm
 (Benar +2, Salah 0, Kosong 0)

22. Consider the following figure.



STAY and HOME are rectangles. Triangles HET and MOY are congruent, with the length of HY = 3 cm and OY = 4 cm, and HY is perpendicular to OY

Calculate the area of rectangle STAY (i.e. area of the shaded region).

- A) $\frac{12^3}{4^5}$
 B) $\frac{123}{4^5}$
 C) $\frac{12^3}{5^4}$
 D) $\frac{123}{45}$
 E) $\frac{12^3}{45}$

(Benar +2, Salah 0, Kosong 0)

23. Two distinct quadratic polynomials $f(x)$ and $g(x)$ with leading coefficients equal to 1 satisfy $f(1) + f(3) + f(5) = g(1) + g(3) + g(5)$.

Find all solutions of $f(x) = g(x)$.

- A) $-2 \leq x \leq 0$
 B) $0 \leq x \leq 1$
 C) $1 \leq x \leq 2$
 D) $x = -3$
 E) $x = 3$
 (Benar +2, Salah 0, Kosong 0)

24. A machine generates a random four-letter sequence of letters from the letters in the word CORONA.

What is the probability that the word begins and ends with O?

- A) $\frac{1}{8}$
 B) $\frac{1}{4}$
 C) $\frac{1}{16}$
 D) $\frac{1}{15}$
 E) $\frac{1}{2}$

(Benar +2, Salah 0, Kosong 0)

25. How many positive three-digit integers have a remainder of 1 when divided by 4, a remainder of 9 when divided by 12 and a remainder of 10 when divided by 13?
- A) 6
B) 4
C) 5
D) 7
E) 3
- (Benar +2, Salah 0, Kosong 0)

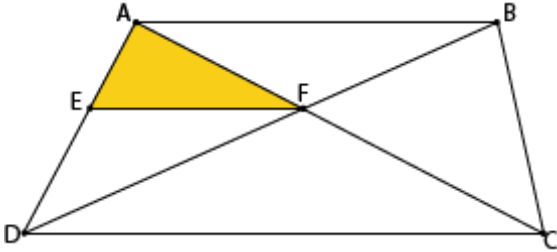
26. Given $\frac{p + \frac{p}{r} + \frac{p}{q} + 1}{q + \frac{q}{r} + \frac{q}{p} + 1} = 7$, where p, q, r are positive integers. Find the number of all possible solutions such that $p + 3q + 2r \leq 32$.
- A) 18
B) 16
C) 24
D) 28
E) 22
- (Benar +2, Salah 0, Kosong 0)

27. Anna has 13 apples that she wants to share with her two little brothers, Brian and Carlie. In how many ways can she share the apples if all three of them must have at least 3 apples each?
- A) 12
B) 9
C) 8
D) 15
E) 6
- (Benar +2, Salah 0, Kosong 0)

28. Given $(11 + \frac{1}{2}) + (12 + \frac{3}{4}) + (13 + \frac{7}{8}) + (14 + \frac{15}{16}) + \dots$
- $\underbrace{\hspace{1.5cm}}_{a_1} \quad \underbrace{\hspace{1.5cm}}_{a_2} \quad \underbrace{\hspace{1.5cm}}_{a_3} \quad \underbrace{\hspace{1.5cm}}_{a_4} \quad + \dots$
- Find the nearest integer to the sum of $a_1 + a_2 + a_3 + \dots + a_{20}$.
- A) 432
B) 429
C) 431
D) 430
E) 435
- (Benar +2, Salah 0, Kosong 0)

29. Three positive numbers form a geometric sequence. When 18 is added to the second number, those three numbers form an arithmetic sequence. **If the first number of the geometric sequence is 4, what is the sum of the first three terms of this geometric sequence?**
- A) 96
 B) 84
 C) 76
 D) 67
 E) 52
 (Benar +2, Salah 0, Kosong 0)

30. Given that $AB \parallel CD \parallel EF$. The area of the triangle ACD is 105 cm^2 . The lengths of AB and CD are 6 and 14, respectively. Point F is the intersection point of the diagonals of the trapezium ABCD.



- Find the area of the triangle AEF.**
- A) 8.35 cm^2
 B) 10.25 cm^2
 C) 31.5 cm^2
 D) 39.5 cm^2
 E) 9.45 cm^2
 (Benar +2, Salah 0, Kosong 0)

31. A group of 12 people are divided into 2 teams of 6 players to play basketball. **If we know that Michael and Jordan must be teammates, in how many ways can we form the teams?**
 (Benar +4, Salah 0, Kosong 0)

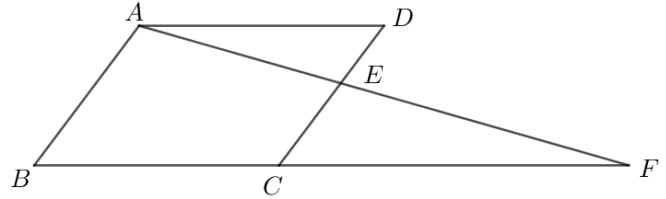
32. In a school there are 210 students. For extracurricular activities 100 students join dance, 90 students join music, and 80 students join sport. Also it is known that 50 students join dance and music, 40 students join music and sport, 30 students join dance and sport. **If 10 students join all three of the extracurricular activities, determine the number of students who do not join any of them.**
 (Benar +4, Salah 0, Kosong 0)

33. What is the remainder when $13^{25} - 1$ is divided by 10?
(Benar +4, Salah 0, Kosong 0)

34. If f is a function such that $f(xy) = f(x - y)$ for all real numbers x and y .
If $f(2020) = 1$ determine the value of $f(-2) - f(4)$.
(Benar +4, Salah 0, Kosong 0)

35. Find the greatest prime number p such that when 715, 1846, and 2020 are divided by p the remainder is always 19.
(Benar +4, Salah 0, Kosong 0)

36. In the following picture, the area of triangle ABF is equal to the area of parallelogram ABCD.



- If the area of parallelogram ABCD is 360 cm^2 , is the area of quadrilateral ABCE is $\text{---} \text{ cm}^2$.
(Benar +4, Salah 0, Kosong 0)

37. In a charity, several books will be given to 30 kids. Each kid can only take at most 12 books.

What is the minimum number of books that should be prepared so that there are always two kids who get more than two books?

(Benar +4, Salah 0, Kosong 0)

38. How many four-digit even numbers can be formed using the digits 0, 3, 4, 5, 6, 9 without repetition?

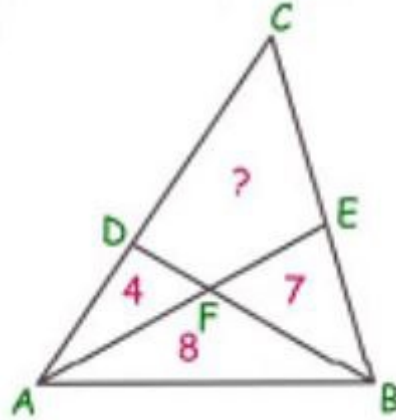
(Benar +4, Salah 0, Kosong 0)

39. Given p and q are non-negative integers, and $p \cdot 3^q = 3^{20} + 3^{21} + 3^{22}$, where p is not divisible by 3

Find the value of $p - q$.

(Benar +4, Salah 0, Kosong 0)

40. Two straight lines divide a triangle into 4 parts with given areas as shown in the picture.



Calculate the missing area.

(Benar +4, Salah 0, Kosong 0)