Mathematics Examples

GRADE 7

1. Find the sum of squares of positive even integers which are less than 18.

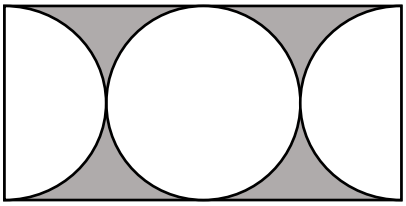
2. Find the value of $A + B$ if $\frac{A}{B} = \left(-2\frac{3}{4} + \frac{5}{8}\right) \div \left(1\frac{3}{5} - 3\frac{7}{8}\right)$, where $gcd(A, B) = 1$.

3. Alan has cats and dogs. He would like to go overseas for 5 days. He leaves his pets in a pet hotel. The cost of pet care is shown in the table. If he pays 1400 baht, then find the number of his cat(s).

Animal	Cost per Day (baht)
Bird	50
Cat	80
Dog	100
Rabbit	60

ASMOPSS THAILAND 2023

4. From the figure, there are two semicircles and a circle containing in the rectangle. If the width of the rectangle is 4 cm. long, then find the difference between the area of the rectangle and the shade area. (Given $\pi = 3.14$)



5. The adjacent pairs of sides of a square are increased by 10% and 20% respectively. Find the percentage of the area of the resulting rectangle exceeds the area of the square.

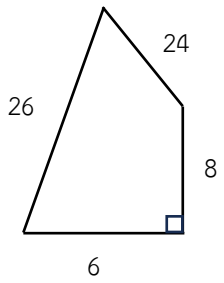
##

ASMOPSS THAILAND 2023

GRADE 8

1. Find the value of $\sqrt[n]{\frac{36}{4^{n+1}+2^{2n+5}}}$.

2. From the figure, find the area of the equilateral.



3. What is the sum of all digits of $(9{,}999)^2$?

4. Suppose that $p(x) = x^2 + x - 2$ and $q(x) = 3x^2 - 8x + 5$. Find the sum of all real roots of $p(x) + q(x) = 0$.

5. For the data $12, 18, 19, x + 2, 21, x - 3, 5, 23$ if the mean is 16.875, find the median of the data.

##

ASMOPSS THAILAND 2023

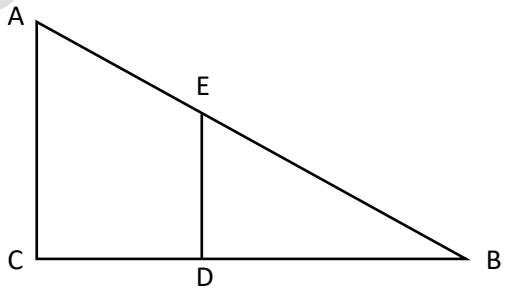
GRADE 9

1. Let a and b be minimum and maximum solutions of.
   $x + 17 \leq 6x - 11 \leq x + 43$, respectively. Find the value of ab.

2. Find the volume of a truncated pyramid whose height is 6 units if the side length of the base of the whole pyramid is 4 units and the side length of the base of the smaller pyramid is 2 units.

3. Jan and June play a game by each throws a dice and then find a sum of points of two dices. If the sum is an even number, then Jan wins. Otherwise, June wins. What is the difference of the probability of Jan winning and the probability of June winning?

4. From the figure, find the length of side AB if $AC = 5, CD = 7.2,$ and $DE = 2$.



5. Find the product of all real roots of.
   $x^4 - 7x^3 + 16x^2 - 28x + 48 = 0$.

##

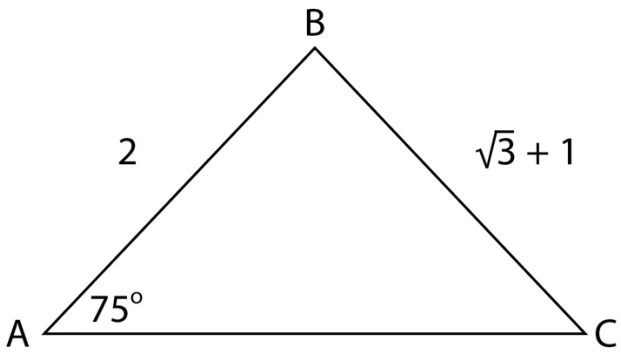
ASMOPSS THAILAND 2023

GRADE 10 – 12

1. Given $\frac{3}{x+5}-\frac{2}{x}=4$ can be written as $ax^2+bx+c=0$, where $a,b,c\in R$. Find the value of a^2+bc.

2. Given that $y=2x^3+3x^2-19x-5$ and $y=4x+7$ are two equations of curves. Suppose that these two curves intersect at points $x=a,b,c$. Find the value of $|a|+|b|+|c|$.

3. From the figure below, the triangle ABC has an area X square units. Find the value of $10X$. (Given that $\sqrt{2}=1.414,\sqrt{3}=1.732$)



4. Let θ be the solutions of the equation $(\sin\theta+\cos\theta)(1-\sin\theta\cos\theta)=4\cos^3\theta$ for $0\le\theta\le2\pi$. How many the value of θ are there?

ASMC THAILAND 2023

5. The probability that Yaya will buy an item online in any week is 0.5. Yaya does not buy more than one item online in any week. Find the probability that, in a 3-week period, Yaya buys at most 1 items online.

6. Bag A contains 4 balls numbered 2,3,4,8. Bag B contains 5 balls numbered 1,5,7,8,8. Bag C contains 7 balls numbered 2,6,8,8,8,9,9. One ball is selected at random from each bag. Let X be an event 'exactly two of the selected balls have the same number'. If $P[X]=\frac{m}{n}$, where gcd(m,n)=1, then find the value of $n-m$.

7. Tim invests 1,000 baht in the ASMOPSS stock at the rate of 10% compounded annually. What is the interest earned in 3 years?

8. Given that

$$A=\begin{bmatrix}1 & 2 & -3\\ 3 & 0 & -1\\ 0 & -1 & 2\end{bmatrix} \text{ and } B=\begin{bmatrix}0 & 1 & -1\\ 2 & 1 & 3\\ 1 & -1 & -2\end{bmatrix}. \text{ Find } |\det(A(B+A^{-1}))|.$$

ASMOPSS THAILAND 2023

9. Let x be a positive real number and y be a real number satisfying these two equations $4^{5x} \cdot 16^{x^2} = 64$ and $y = \dfrac{\log 3 + \log 7 - \log 12 - \log 14}{\log 2}$.
Find the value of x^y.

10. Let z_1, z_2, z_3 be distinct complex numbers. If z_1, z_2, z_3 are cube roots of -8, then find the value of $|z_1 z_2| + |z_2 z_3| + |z_1 z_3|$.

##

ASMOPSS THAILAND 2023

Answer

G.7

1. 816.00 2. 176.00 3. 001.00 4. 025.12 5. 032.00

G.8

1. 000.25 2. 144.00 3. 036.00 4. 001.75 5. 018.50

G.9

1. 060.48 2. 056.00 3. 000.00 4. 013.00 5. 012.00

G.10 – 12

1. 206.00 2. 007.50 3. 023.66 4. 002.00 5. 000.50

6. 005.00 7. 331.00 8. 069.00 9. 008.00 10. 012.00

ASMOPSS THAILAND 2023