CENTRALNA KOMISJA EGZAMINACYJNA

Arkusz zawiera informacje prawnie chronione do momentu rozpoczęcia egzaminu.

MMA 2020

WYPEŁNIA ZDAJĄCY

KOD

PESEL

miejsce na naklejkę

NOWA FORMUŁA

EGZAMIN MATURALNY Z MATEMATYKI

POZIOM PODSTAWOWY

DODATKOWE ZADANIA W JĘZYKU ANGIELSKIM

DATA: **21 maja 2020 r.**

GODZINA ROZPOCZĘCIA: **09:00**

CZAS PRACY: **80 minut**

LICZBA PUNKTÓW DO UZYSKANIA: **30**

Instrukcja dla zdającego

1. Sprawdź, czy arkusz egzaminacyjny zawiera 14 stron (zadania 1–21). Ewentualny brak zgłoś przewodniczącemu zespołu nadzorującego egzamin.
2. Rozwiązania i odpowiedzi zapisz w miejscu na to przeznaczonym przy każdym zadaniu.
3. Pisz czytelnie. Używaj długopisu/pióra tylko z czarnym tuszem/atramentem.
4. Nie używaj korektora, a błędne zapisy wyraźnie przekreśl.
5. Pamiętaj, że zapisy w brudnopisie nie będą oceniane.
6. Możesz korzystać z *Wybranych wzorów matematycznych*, cyrkla, linijki oraz kalkulatora prostego.
7. Na tej stronie oraz na karcie odpowiedzi wpisz swój numer PESEL i przyklej naklejkę z kodem.
8. Nie wpisuj żadnych znaków w części przeznaczonej dla egzaminatora.

MMA 2020

Task 1. (0–1)

The reciprocal of $3\frac{2}{9}-5\frac{1}{3}\cdot\sqrt{\frac{49}{144}}$ is:

A. -9 **B.** $-\frac{1}{9}$ **C.** $\frac{1}{9}$ **D.** 9

Task 2. (0–1)

The product of all solutions of the equation $(x-1)(x+2)(x-3)=0$ is:

A. -6 **B.** -2 **C.** 2 **D.** 6

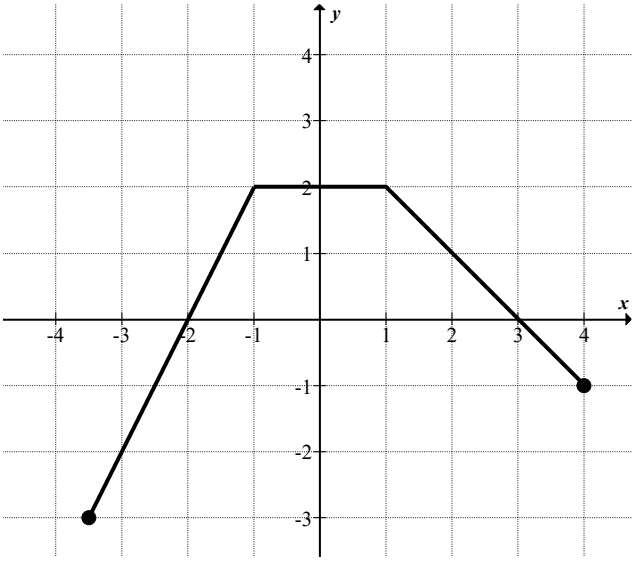
Task 3. (0–1)

If $x+y=25$ and $x-y=-4$, then x^2-y^2 equals:

A. -100 **B.** -29 **C.** 29 **D.** 100

Task 4. (0–1)

The graph below shows function f.



Therefore,

A. $f(1)-2=f(0)$ **B.** $f(1)-2=f(2)$

C. $f(0)-2=f(-2)$ **D.** $f(1)-2=f(-1)$

Task 5. (0–1)

The number $\frac{4^8+4^7}{320\cdot 4^4}$ is equal to:

A. 4^{-1} **B.** 4^0 **C.** 4^1 **D.** 4^2

NOTES

Task 6. (0–1)

If $\log_3 5 = 0.68$ then $\log_3 45$ equals:

A. 1.32 **B.** 1.36 **C.** 2.68 **D.** 6.8

Task 7. (0–1)

The length of the side of a square is reduced by 10 percent. Then, the area of the square will be reduced by:

A. 9% **B.** 10% **C.** 19% **D.** 81%

Task 8. (0–1)

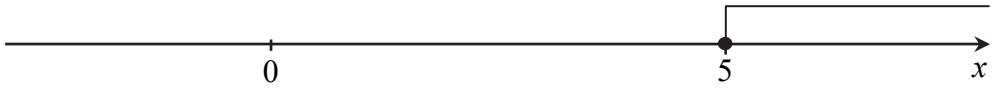
The expression $2(x-3)-5x(3-x)$ can be written as:

A. $-10x(x-3)$ **B.** $10x(x-3)$ **C.** $(5x-2)(x-3)$ **D.** $(5x+2)(x-3)$

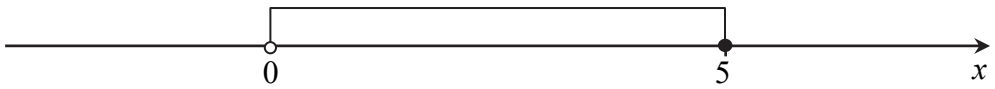
Task 9. (0–1)

The solution set for the inequality $2-\frac{2}{3}(x-1) \geq -\frac{2}{3}$ is the interval:

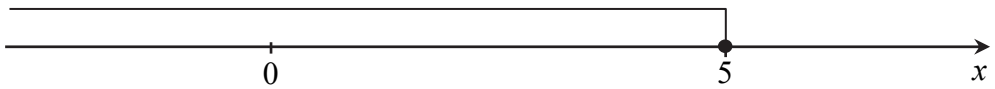
A.



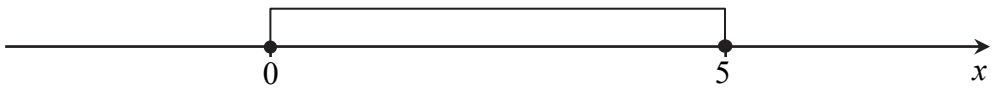
B.



C.



D.



Task 10. (0–1)

The function f is given by the formula $f(x)=\left(\frac{9}{4}\right)^x$ for each real number x. For $x=-\frac{3}{2}$, the function f assumes the value of:

A. $\frac{27}{8}$ **B.** $\frac{4}{9}$ **C.** $\frac{8}{27}$ **D.** $\frac{9}{4}$

NOTES

Task 11. (0–1)

The area of a rectangle is 27. One side of this rectangle is 3 times the length of the other side. The perimeter of the rectangle is:

A. 12 **B.** 18 **C.** 24 **D.** 27

Task 12. (0–1)

The sequence (a_n) is given by the formula $a_n = -n^2 + 14n - 42$ for $n \geq 1$. The number of its positive terms is:

A. 0 **B.** 3 **C.** 5 **D.** 12

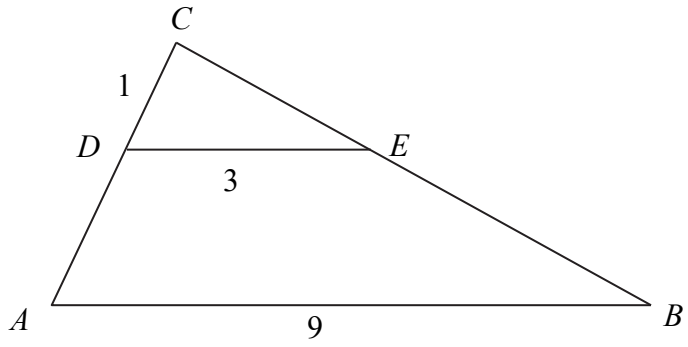
Task 13. (0–1)

In a geometric sequence (a_n) defined for $n \geq 1$, $a_2 = 1$ and $a_3 = 1 + \sqrt{5}$. Therefore, a_1 is equal to:

A. $\sqrt{5} - 1$ **B.** $\frac{\sqrt{5} - 1}{4}$ **C.** $\sqrt{5} + 1$ **D.** $\frac{\sqrt{5} + 1}{4}$

Task 14. (0–1)

In the triangle *ABC*, the line segments *AB* and *DE* are parallel (refer to the figure below), and $|CD| = 1$, $|DE| = 3$ and $|AB| = 9$.



Hence,

A. $|AD| = 2$ **B.** $|AD| = \frac{7}{3}$ **C.** $|AD| = 3$ **D.** $|AD| = \frac{10}{3}$

Task 15. (0–1)

In a square based prism, the base edge length is 2, and the height of the prism is $2\sqrt{6}$. The angle between the diagonal of this prism and its base is:

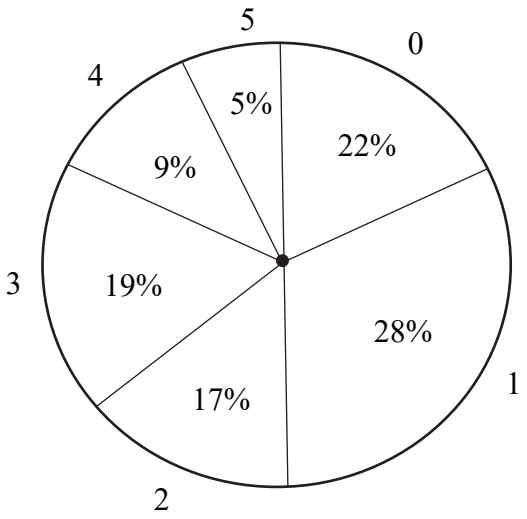
A. 30° **B.** 45° **C.** 60° **D.** 75°

NOTES

Task 16. (0–1)

The pie chart below shows a summary of responses given by a group of people to the question:

How many books did you read last month?



The median of the responses is:

A. 1 **B.** 1.5 **C.** 2 **D.** 2.5

NOTES

Task 17. (0–3)

The quadratic function f is given by the formula $f(x) = -2(x+1)(x-3)$.

Complete the following sentences.

a) The axis of symmetry of the graph of the function f is a line given by the equation

…….. .

b) The least value of the function f in the interval $\langle -1, 2 \rangle$ equals

…… . .

c) The area of a triangle whose vertices are the points of intersection of the graph of the function f with the axes of the coordinate system equals

……. .

NOTES

Task 18. (0–2)

The geometrical interpretation of the set of simultaneous equations $\begin{cases} x+y=2 \\ x+(1+m)y=1 \end{cases}$ with the unknowns x and y are:

a) two parallel lines, when m equals ...…… .

b) two perpendicular lines, when m equals ...…….. .

NOTES

Task 19. (0–3)

Two numbers are randomly drawn without replacement from the set $\{2, 3, 5, 7, 11, 13\}$.
Complete the following sentences.

a) The probability of event A in which the sum of two numbers drawn is divisible by 9 equals …… .

b) The probability of event B in which two odd numbers are drawn equals …… .

c) The probability of event C in which the product of two numbers drawn is less than 30 equals …… .

NOTES

Task 20. (0–3)

Point $A=(-1,2)$ is the end point of a line segment AB, whereas point $S=\left(1,\frac{1}{2}\right)$ is the midpoint of the line segment AB. Complete the following sentences.

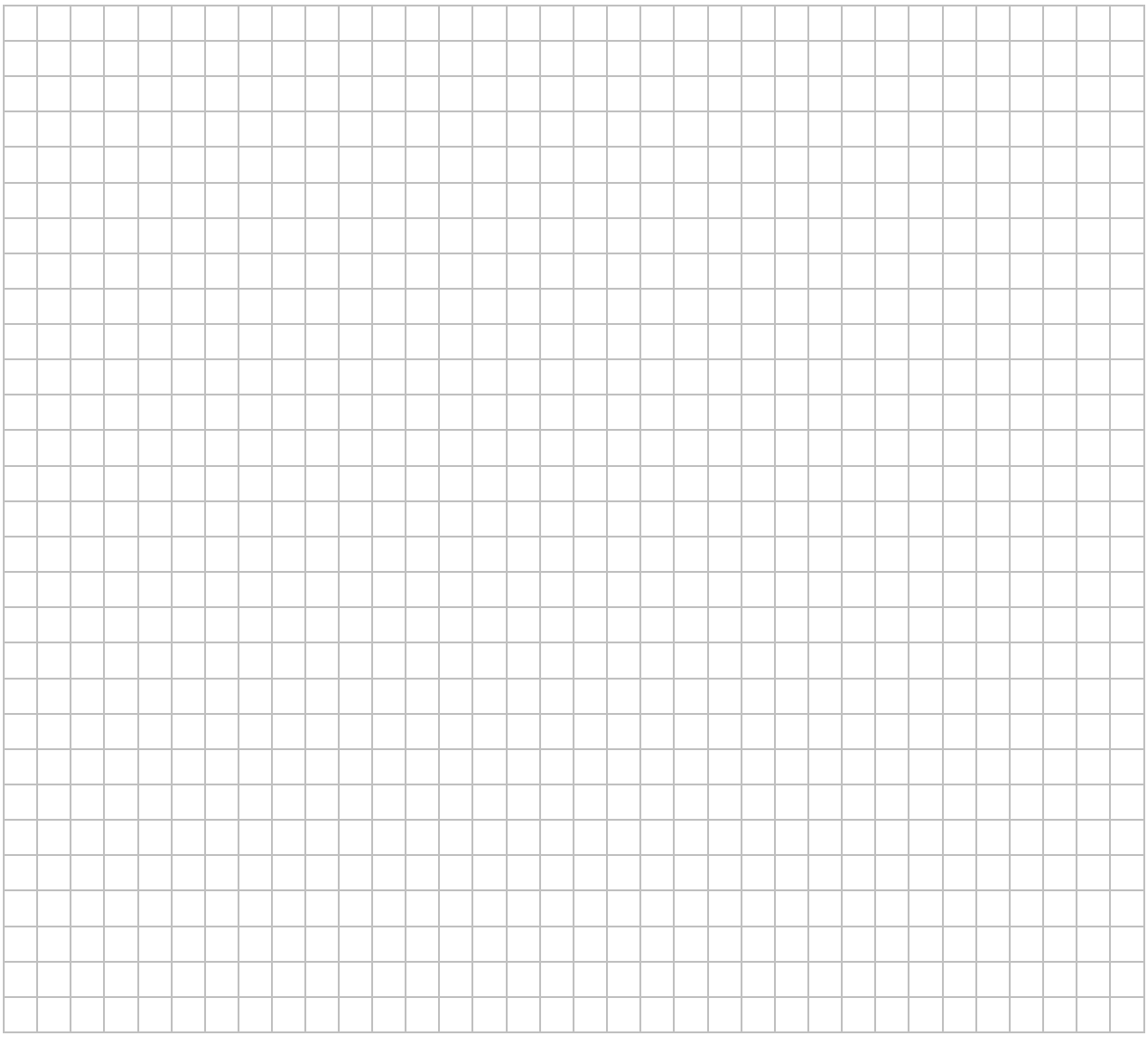
a) The coordinates of point B are: …….. .

b) The line segment AB is reflected in x-axis. The coordinates of the endpoints of the image of AB after reflection are:

$A'=(.....,.....)$, $B'=(.....,.....)$.

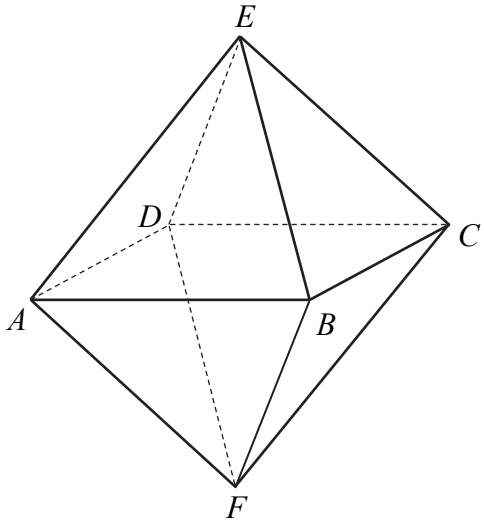
c) The length of the line segment AB is ….....……. .

NOTES



Task 21. (0–3)

Two square based pyramids *ABCDE* and *ABCDF* have the same base *ABCD* (refer to the figure below). All the edges of the pyramids have the same length of 10 cm.



Complete the following sentences.

a) The distance *EF* between the vertices of the pyramids equals ……. .

b) The volume of the obtained solid is …….. .

c) The surface area of the obtained solid is ……..……. .

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