[](http://www.kuratorium.uwoj.bydgoszcz.pl/)

**ETAP WOJEWÓDZKI**

**KOD UCZNIA: \_\_\_\_\_\_\_\_\_\_\_\_\_**

Termin: 3.03.2018 roku, godzina 10:00

Czas pisania pracy: 90 minut

Życzymy powodzenia!

Zadania za 8 punktów

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| Numer zadania | 1 | 2 | 3 | 4 | Razem |
| Liczba punktów |  |  |  |  |  |

Zadania za 1 punkt

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| Numer zadania | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | Razem |
| Liczba punktów |  |  |  |  |  |  |  |  |  |

Suma punktów: …………………………………….

Podpisy Komisji Konkursowej:

**ETAP WOJEWÓDZKI**

Ważne informacje:

1. Przed przystąpieniem do rozwiązywania zadań przeczytaj uważnie polecenia.
2. Masz 90 minut na rozwiązanie czterech zadań za 8 punktów oraz ośmiu zadań za 1 punkt.
3. W zadaniach za 8 punktów oceniane jest pełne rozwiązanie wraz z odpowiedzią.
4. W zadaniach za 1 punkt oceniana jest tylko czytelnie zapisana odpowiedź.
5. Pisz długopisem lub piórem. Jeżeli się pomylisz, przekreśl błąd i napisz ponownie.
6. Pisz czytelnie i zamieszczaj odpowiedzi w miejscu do tego przeznaczonym.   
   Pamiętaj, że zapisy w brudnopisie nie podlegają ocenie.
7. Nie możesz używać kalkulatora.
8. Przy każdym zadaniu podano maksymalną liczbę punktów możliwą do uzyskania za jego rozwiązanie.  
   Łączna maksymalna liczba punktów za wszystkie zadania to 40.

**Zadanie 1.** (8 punktów)

Niech , , . Oblicz .

**Rozwiązanie zadania 1:**

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**Zadanie 2.** (8 punktów)

W prostokącie boki i mają długość 9 cm, a boki i  mają długość 8 cm.   
Na boku znajduje się punkt w odległości 4 cm od punktu.   
Na boku znajduje się punkt w odległości 6 cm od punktu.   
Proste i przecinają się w punkcie .

Oblicz pole trójkąta .

**Rozwiązanie zadania 2:**

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**Zadanie 3.** (8 punktów)

Każdy uczeń w klasie liczącej 30 uczniów otrzymał do rozwiązania równanie

z niewiadomą . W miejscu literki każdy uczeń miał wstawić swój numer w dzienniku. Na przykład, uczeń o numerze 17 otrzymał równanie , a uczeń o numerze 1 otrzymał równanie .

Oblicz prawdopodobieństwo tego, że losowo wybrany uczeń otrzymał równanie, którego rozwiązaniem jest liczba całkowita.

Zakładamy, że uczniowie mają w dzienniku kolejne numery od 1 do 30.

**Rozwiązanie zadania 3:**

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**Zadanie 4.** (8 punktów)

Stożek powstał z obrotu pewnego trójkąta prostokątnego wokół prostej zawierającej dłuższą przyprostokątną tego trójkąta. Stożek powstał z obrotu tego samego trójkąta wokół prostej zawierającej krótszą przyprostokątną.   
Stożek ma objętość , a stożek  ma objętość .   
Oblicz długość przeciwprostokątnej tego trójkąta.

**Rozwiązanie zadania 4:**

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**Zadanie 1. (1 punkt)**

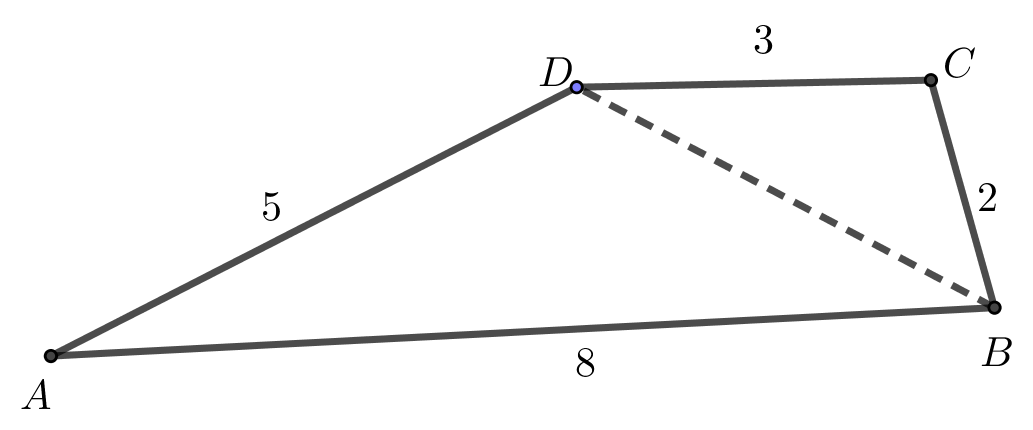
Zapisz liczbę w postaci iloczynu dwóch liczb dwucyfrowych.

Brudnopis

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| **Odpowiedź do zadania 1:** |  |

**Zadanie 2. (1 punkt)**

Czworokąt , przedstawiony na rysunku,   
ma boki o następujących długościach:   
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Długość przekątnej wyrażona w centymetrach   
jest liczbą całkowitą.

Wyznacz długość przekątnej .

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| **Odpowiedź do zadania 2:** |  |

**Zadanie 3**. (1 punkt)

W pewnym graniastosłupie łączna liczba wszystkich wierzchołków, krawędzi i ścian jest równa 6002. Ile boków ma podstawa tego graniastosłupa?

Brudnopis

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| **Odpowiedź do zadania 3:** |  |

**Zadanie 4**. (1 punkt)

Pewna dodatnia liczba całkowita ma dokładnie 8 dzielników naturalnych, przy czym jednym z tych dzielników jest liczba 20. Co to za liczba?

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| **Odpowiedź do zadania 4:** |  |

**Zadanie 5.** (1 punkt)

Funkcja każdej liczbie całkowitej nieparzystej przyporządkowuje liczbę o 1 mniejszą, a każdej liczbie całkowitej parzystej przyporządkowuje sześcian tej liczby powiększony o 9.

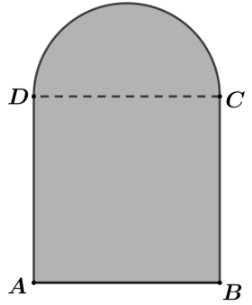
Oblicz .

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| **Odpowiedź do zadania 5:** |  |

**Zadanie 6**. (1 punkt)

Figura przedstawiona na rysunku składa się z  kwadratu i półkola o średnicy .

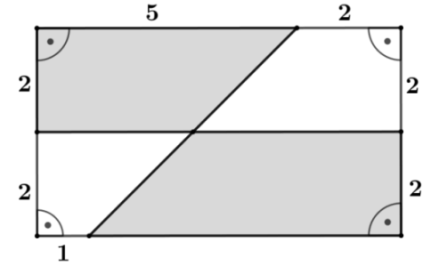
Pole tej figury jest równe . Oblicz pole kwadratu

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| **Odpowiedź do zadania 6:** |  |

**Zadanie 7.** (1 punkt)

****Oblicz sumę pól trapezów zacieniowanych na rysunku.  
 (Liczby na rysunku pokazują długości odpowiednich odcinków.)

Brudnopis

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| **Odpowiedź do zadania 7:** |  |

**Zadanie 8. (1 punkt)**

Pole przekroju osiowego walca jest równe .   
Ile wynosi pole powierzchni bocznej tego walca?

Brudnopis

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| **Odpowiedź do zadania 8:** |  |

**Brudnopis**

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