Міністерство освіти і науки України

Управління освіти і науки Черкаської облдержадміістрації

**ДНЗ «Городищенський професійний ліцей»**

Розробила: Пилипенко

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 викладач математи та

інформатики

***Анотація***

Пропонований збірник призначений для контролю знань учнів 10 класу з алгебри і початків аналізу на основі днанадцятибальної системи оцінювання. Завдання складено відповідно до вимог чинної програми. Послідовність тем відповідає структурі програми для 10 класу. У збірнику міститься три тематичних контрольних робіт та дві самостійні за курс алгебри і початків аналізу 10 класу, відповіді з вказівками .

Контрольні роботи подані у двох варіантах. Кожен варіант містить завдання чотирьох рівнів, які відповідають прийнятим рівням оцінювання навчальних досягнень учнів.

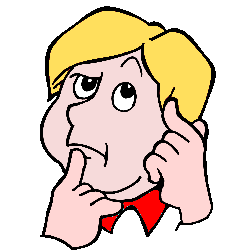
Перший рівень (початковий) подано у формі тестів, які включають основні поняття даної теми, її ключові теоретичні положення. Кожне завдання цього рівня оцінюється одним балом.

Другий рівень (середній) містить завдання у формі тестів і вимагає від учнів уміння відтворити отриману інформацію на рівні обов’язкових результатів навчання. Завдання оцінюється одним балом.

Третій рівень (достатній) перевіряє вміння учнів самостійно розв’язувати задачі та вправи у стандартних умовах. Кожне завдання оцінюється в півтора бали.

Четвертий рівень (високий) підвищеної складності. Завдання оцінюється трьома балами.

Запропонована структура завдань контрольних робіт дасть можливість учням перевірити свої знання, підготуватися до зовнішнього незалежного оцінювання з математики, а вчителям перевірити знання учнів з кожної теми та провести підсумкове оцінювання.

***Самостійна робота по темі: «Функції, їхні властивості і графіки»***

В. №1

1. Виконати дії: (1 - ) :

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| Розв'язання: | | | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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2. Знайти область визначення функції:

а) у = 5 + 1; б) у = .

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| Розв'язання: | | | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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 3. Знайдіть значення аргументу *х*, при якому значення функції у = дорівнює 11.

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| Розв'язання: | | | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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4. З'ясувати чи є дана функція парною, не парною, загального вигляду:

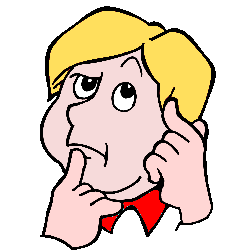
а) f (х) = 2х4 + 3х2 + 7; в) у = .

б) f (х) = 3х5 - 8х3;

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| Розв'язання: | | | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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 5. Побудувати графік функції: у = 3х2 – 6х +1.

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| Розв'язання: | | | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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***Самостійна робота по темі: «Функції, їхні властивості і графіки»***

В. №2

1. Виконати дії: 1 -

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| Розв'язання: | | | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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2. Знайти область визначення функції:

а) у = -3х + 10; б) у = .

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| Розв'язання: | | | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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3. Знайдіть значення аргументу *х*, при якому значення функції у = дорівнює 1.

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| Розв'язання: | | | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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4. З'ясувати чи є дана функція парною, не парною, загального вигляду:

а) f (х) = 5х3 - 2х2; в) у = .

б) f (х) = (х + 3)5;

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| Розв'язання: | | | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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5. Побудувати графік функції: у = х2 – 5х -6.

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| Розв'язання: | | | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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***Контрольна робота №1 з теми: « Функції,їхні***

***властивості і графіки » .***

***Варіант 1***

*Початковий та середній рівні навчальних досягнень* (№ 1-6 по 1 б.)

У завданнях 1-6 виберіть правильну відповідь

**1.** Графіку якої з наведених функцій належить точка ?

А)  Б) 

В)  Г) 

**2.** Укажіть область визначення функції .

А)  Б) 

В)  Г) 

**3.** Укажіть значення функції в точці , якщо .

А) 9 Б) 0,1

В) 3 Г) 

**4.** Серед наведених функцій укажіть парну.

А)  Б) 

В)  Г) 

**5.** Укажіть проміжки зростання функції .

А)  Б) 

В)  Г) 

1. **6.** Знайдіть значення виразу ()4 ∙ ()5

А) -36; Б) -1; В) 1; Г) -5.

*Бланк відповідей* ***Правильну відповідь відмічайте таким чином***

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | А | Б | В | Г |
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*Достатній рівень навчальних досягнень* (№ 7, 8 по 1,5 б.)

**7.** Розв'язати рівняння =3

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| Розв'язання: | | | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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**8.** Розв'язати нерівність < х + 1

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| Розв'язання: | | | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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* Високий рівень навчальних досягнень* (3 б.)

**9.** Побудувати графік функції .

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| Розв'язання: | | | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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***Контрольна робота №1 з теми: « Функції,їхні***

***властивості і графіки » .***

**Варіант 2**

*Початковий та середній рівні навчальних досягнень* (№ 1-6 по 1 б.)

У завданнях 1-6 виберіть правильну відповідь

**1.** Графіку якої з наведених функцій належить точка ?

А)  Б) 

В)  Г) 

**2.** Укажіть область визначення функції .

А)  Б) 

В)  Г) 

**3.** Укажіть значення функції в точці , якщо .

А) 0 Б) -2,5

В)  Г) не існує

**4.** Серед наведених функцій укажіть непарну.

А)  Б) 

В)  Г) 

**5.** Укажіть проміжки спадання функції .

А)  Б) 

В)  Г) 

**6.** Знайдіть значення виразу

А) 60; Б) 30; В) 15; Г) 150.

*Бланк відповідей* ***Правильну відповідь відмічайте таким чином***

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*Достатній рівень навчальних досягнень* (№ 7, 8 по 1,5 б.)

**7.** Розв'язати рівняння =3

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| Розв'язання: | | | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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**8.** Розв'язати нерівність 4 – *х*

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| Розв'язання: | | | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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* Високий рівень навчальних досягнень* (3 б.)

**9.** Побудувати графік функції у = .

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| Розв'язання: | | | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | Відповідь:\_\_\_ | | | | |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

***Самостійна робота по темі «Тригонометричні функції»***

**Варіант 1**

1. Приведіть до тригонометричних функцій числа а: *(3 бали)*

а); б) сtg (π – α); в) sіn (π + α).

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| Розв'язання: | | | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | Відповідь:\_\_\_ | | | | |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

2. Подайте в радіанній мірі кут: 5° *(1 бал)*

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| Розв'язання: | | | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | Відповідь:\_\_\_ | | | | |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

3. Подайте в градусній мірі кут:  *(1 бал)*

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| Розв'язання: | | | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | Відповідь:\_\_\_ | | | | |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

4. Обчисліть: 3sin  + 2cos  – tg  *(2 бали)*

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| Розв'язання: | | | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | Відповідь:\_\_\_ | | | | |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

5. Знайдіть значення виразу: sіn 56° соs 34° + соs 56° sіn 34° *(1 бал)*

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| Розв'язання: | | | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | Відповідь:\_\_\_ | | | | |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

6. У якій чверті знаходиться точка *Ρ*α *,* якщо: sin α < 0 і cos α > 0? *(1 бал)*

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| Розв'язання: | | | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | Відповідь:\_\_\_ | | | | |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

7. Спростіть:  *(3 бали)*

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| Розв'язання: | | | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | Відповідь:\_\_\_ | | | | |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

***Самостійна робота по темі «Тригонометричні функції»***

**Варіант 2**

1. Приведіть до тригонометричних функцій числа а: *(3 бали)*

а); б) tg (π + α); в).

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| Розв'язання: | | | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | Відповідь:\_\_\_ | | | | |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

2. Подайте в радіанній мірі кут: 1140º *(1 бал)*

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| Розв'язання: | | | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | Відповідь:\_\_\_ | | | | |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

3. Подайте в градусній мірі кут: 1,25π *(1 бал)*

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| Розв'язання: | | | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | Відповідь:\_\_\_ | | | | |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

4. Обчисліть: 5sin  +3tg  – 5cos  – 10ctg  *(2 бали)*

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Розв'язання: | | | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | Відповідь:\_\_\_ | | | | |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

5. Знайдіть значення виразу: г)  *(1 бал)*

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Розв'язання: | | | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | Відповідь:\_\_\_ | | | | |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

6. У якій чверті знаходиться точка *Ρ*α *,* якщо: sin α < 0 і cos α < О?  *(1 бал)*

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| Розв'язання: | | | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | Відповідь:\_\_\_ | | | | |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

7. Спростіть:  *(3 бали)*

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| Розв'язання: | | | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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**Контрольна робота №2 по темі «Тригонометричні функції»**

**В. №1**

*Початковий та середній рівні навчальних досягнень (№ 1-6 по 1 б.)*

*У завданнях 1-6 виберіть правильну відповідь*

1. Запишіть у радіанній мірі кут 120°

а) ; б) ; в) ; г) .

2. Подайте в градусній мірі кут 2,5π .

а) 54°; б) 450°; в) 540°; г) 45°.

3. Знайдіть: sіn .

а) ; б) б) - ; в)  ; г) 0.

4. Знайдіть соs α, якщо sіn α = – 0,6 і π < α < .

а) 0,6; б) 0,8; в) 10; г) - 0,8.

5. Знайдіть значення виразу соs  соs – sin sin .

а) 0; б) 1; в) -1; г) 9.

6. Розв'яжіть рівняння cos *x* = .

а)*+* 2π*п*, *п*  Z; б) *±* *+* π*п*, *п*  Z;

в) *+* π*п*, *п*  Z; г) *±* *+* 2π*п*, *п* Z.

*Бланк відповідей* ***Правильну відповідь відмічайте таким чином***

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| --- | --- | --- | --- | --- |
|  | А | Б | В | Г |
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*Достатній рівень навчальних досягнень (3 бали)*

7. Розв'яжіть рівняння 2sin  = - .

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| Розв'язання: | | | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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8. Розв'яжіть нерівність: 2 cos  <  .

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| Розв'язання: | | | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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*Високий рівень навчальних досягнень (3 бали)*

9. Побудуйте графік функції *у* = 2sin *х -* 1.

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| Розв'язання: | | | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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**Контрольна робота №2 по темі «Тригонометричні функції»**

**В. №2**

*Початковий та середній рівні навчальних досягнень*(№ 1-6 по 1 б.)

* У завданнях 1-6 виберіть правильну відповідь*

1. Запишіть у радіанній мірі кут 300°.

а) ; б) ; в) ; г) .

2. Подайте в градусній мірі кут .

а) 30°; б) 351°; в) 60°; г) 135°.

3. Знайдіть : соs .

а) 1; б) - ; в) ; г) - .

4. Знайдіть tgα*,* якщо соs α = - 0,6 і  < α < π.

а) 0,8; б) 0,6; в) - ; г)  .

5. Знайдіть значення виразу sin соs  + созsin .

а) 0; б) -1; в) 1; г) 7.

6. Розв'яжіть рівняння *sinx = .*

а) (-1)*n*  + π*n*, *п* є *Z;* б) (-1)*n*  + 2π*n*, *п* є *Z;*

*в)*  + π*n*, *п* є *Z; г)* (-1)*n*  + π*n*, *п* є *Z.*

*Бланк відповідей* ***Правильну відповідь відмічайте таким чином***

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | А | Б | В | Г |
| 1 |  |  |  |  |
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| 3 |  |  |  |  |
| 4 |  |  |  |  |
| 5 |  |  |  |  |
| 6 |  |  |  |  |

**

*Достатній рівень навчальних досягнень (3 бали)*

7. Розв'яжіть рівняння 6соs2*х* + cos *x* – 1 = 0.

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| Розв'язання: | | | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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8. Розв'яжіть нерівність: 2 sin – 1.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| Розв'язання: | | | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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*Високий рівень навчальних досягнень (3 бали)*

9. Побудуйте графік функції *у* = -2cos *х* + 1.

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**Контрольна робота №3 по темі «Похідна та її застосування»**

**В. №1**

*Початковий та середній рівні навчальних досягнень*(№ 1-6 по 1 б.)

* У завданнях 1-6 виберіть правильну відповідь*

1. Знайдіть похідну функції *y* = −sin*x* + cos*x*.

**А** −cos*x* − sin*x* **В** −cos*x* + sin*x*

**Б** sin*x* + cos*x* **Г** cos*x* − sin*x*

2. Знайдіть похідну функції *y* = lncos*x*.

**А** −ctg *x* **Б** −tg *x* **В** ctg *x* **Г** tg *x*

3. Тіло рухається за законом *s*(*t*) = 3+3*t*2 (*s* — у метрах, *t* — у секундах).

Обчисліть швидкість руху тіла в момент *t* = 1 с.

**А** 9 м/с **Б** 12 м/с **В** 6 м/с **Г** 18 м/с

4. Знайдіть кутовий коефіцієнт дотичної до параболи *y* = −2*x*2 +3*x*

у точці з абсцисою *x*0 = 1.

**А** −1 **Б** −7 **В** 1 **Г** 7

5. Графік функції *y* = *f* (*x*) заданий на проміжку [−5;2] (рис. 1).

Користуючись графіком, укажіть проміжки, на яких *f* ′(*x*) < 0.

**А** (−5; −1) **Б** (−1;2) **В** (−2;3) **Г** (0;3)

6. Користуючись графіком функції *y* = *f* (*x*) (рис. 2), укажіть найменше

значення функції на проміжку [−2;5].

**А** −2 **Б** 5 **В** −3 **Г** −1



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| 5 |  |  |  |  |
| 6 |  |  |  |  |

*Бланк відповідей* ***Правильну відповідь відмічайте таким чином***

**

*Достатній рівень навчальних досягнень (3 бали)*

7. Знайдіть точки екстремуму функції *y* = 3*x*2 – *x*3.

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| Розв'язання: | | | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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8. Доведіть, що функція *f* (*x*) = 2*x*5 + 4*x*3 +3*x* −7 на множині ***R*** є зростаючою.

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*Високий рівень навчальних досягнень (3 бали)*

9. На графіку функції знайдіть точки, у яких дотична паралельна прямій *y* = *x* −3.

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| Розв'язання: | | | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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**Контрольна робота №3 по темі «Похідна та її застосування»**

**В. №2**

*Початковий та середній рівні навчальних досягнень*(№ 1-6 по 1 б.)

 *У завданнях 1-6 виберіть правильну відповідь*

1. Знайдіть похідну функції *y* = −cos*x* + sin*x*.

**А** −cos*x* − sin*x* **В** −cos*x* + sin*x*

**Б** sin*x* + cos*x* **Г** cos*x* − sin*x*

2. Знайдіть похідну функції *y* = lnsin*x*.

**А** −ctg *x* **Б** −tg *x* **В** ctg *x* **Г** tg *x*

3. Тіло рухається за законом *s*(*t*) = 2+2*t*2 (*s* — у метрах, *t* — у секундах).

Обчисліть швидкість руху тіла в момент *t* = 2 с.

**А** 6 м/с **Б** 10 м/с **В** 12 м/с **Г** 8 м/с

4. Знайдіть кутовий коефіцієнт дотичної до параболи *y* = −2*x*2 +2*x*

у точці з абсцисою *x*0 = −1.

**А** 6 **Б** −6 **В** −4 **Г** 2

5. Графік функції *y* = *f* (*x*) заданий на проміжку [−1;4] (рис. 3).

Користуючись графіком, укажіть проміжки, на яких *f* ′(*x*) > 0.

**А** (−1;2) **Б** (2;4) **В** (0;4) **Г** (−2;1)

6. Користуючись графіком функції *y* = *f* (*x*) (рис. 4), укажіть найменше

значення функції на проміжку [−4;2].

**А** 1 **Б** 2 **В** −4 **Г** 5



*Бланк відповідей* ***Правильну відповідь відмічайте таким чином***

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | А | Б | В | Г |
| 1 |  |  |  |  |
| 2 |  |  |  |  |
| 3 |  |  |  |  |
| 4 |  |  |  |  |
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**

*Достатній рівень навчальних досягнень (3 бали)*

7. Знайдіть точки екстремуму функції *y* = *x*4 −2*x*2 .

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| Розв'язання: | | | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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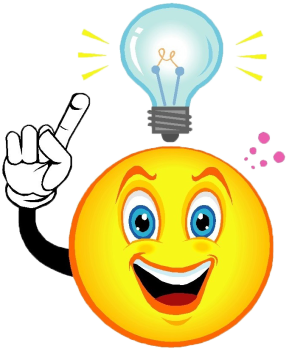
8. Доведіть, що функція *f* (*x*) = 5−2*x* – *x*3 −4*x*7 на множині ***R*** є спадною.

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*Високий рівень навчальних досягнень (3 бали)*

9. На графіку функції знайдіть точки, у яких дотична паралельна прямій *y* = 2*x* +3.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| Розв'язання: | | | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | Відповідь:\_\_\_ | | | | |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

***Відповіді та вказівки***

*Самостійна робота по темі: «Функції, їхні властивості і графіки»*

**Варіант 1**

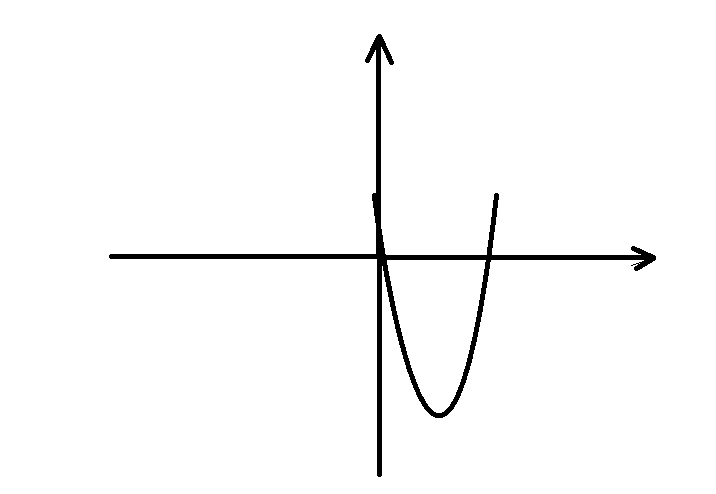
1. *Відповідь:* 2.

2. *Відповідь:*а) D(у) = ; б) D(у) =)

3. *Відповідь:* 2,5

4. *Відповідь:*а) *f (-x) = f(x) f(x)* - парна функція; б) *f (-x) = - f(x) f(x)* – непарна функція; в) *у (-х)- у(х)*, *у (-х) у(х)* *у* – функція загального виду.

5. *у* = , ;



**-2**

***х***

**1**

**0**

***у***

**Варіант 2**

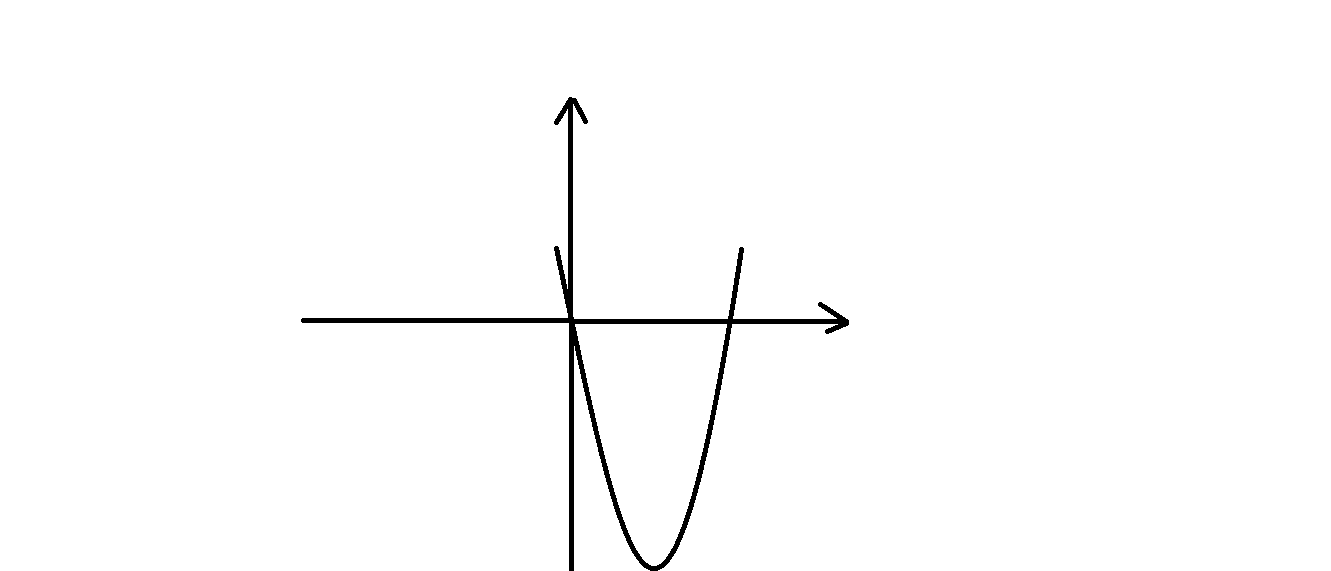
1. *Відповідь:* -1.

2. *Відповідь:* а) D(у) = ; б) D(у) =).

3. *Відповідь:* 2.

4. *Відповідь:*а) *f (-x) -f (x) f(x)* - функція загального виду; б) *f (-x) - f(x)*, *f (-x) -f (x) f(x)* – функція загального виду; в) *у (-х) у(х)* *у* –парна функція.

5.*у* = , ;



**-12,25**

***х***

***у***

**0**

**2,5**

*Контрольна робота №1*

**Варіант 1**

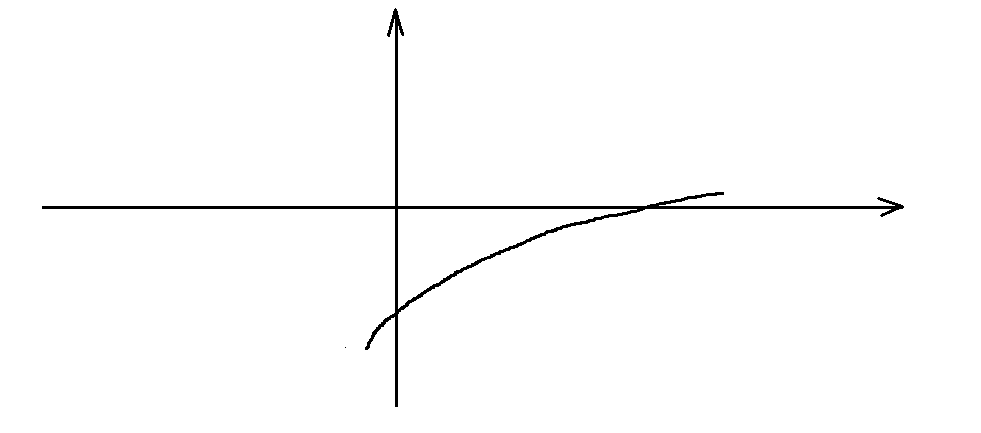
|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | А | Б | В | Г |
| 1 |  |  |  |  |
| 2 |  |  |  |  |
| 3 |  |  |  |  |
| 4 |  |  |  |  |
| 5 |  |  |  |  |
| 6 |  |  |  |  |

7. =3, =32, 5 + = 9; = 42.

*х* 1 = 16; *х* = 17. *Відповідь:*17

8. < х + 1

*Відповідь:х*  (5;+).

9.

***у =***

**-4**

***-3***

**-1**

**15**

**0**

***х***

***у***

**Варіант 2**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | А | Б | В | Г |
| 1 |  |  |  |  |
| 2 |  |  |  |  |
| 3 |  |  |  |  |
| 4 |  |  |  |  |
| 5 |  |  |  |  |
| 6 |  |  |  |  |

7. =3, =32, 7 = 9; = 22.

*х* 1 = 4; *х* = 3.Оскільки *х* = 3 не є коренем.  *Відповідь:*Рівняння коренів не має.

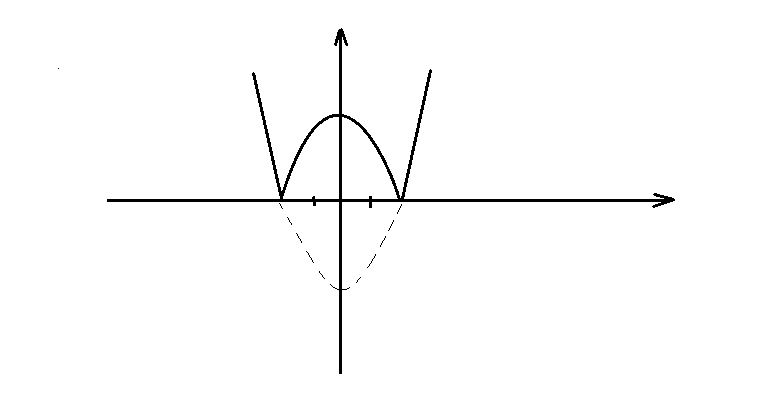
8. 4 – *х*4х

10х

4х

10х

*Відповідь:*(1; 10]

9. 

**4**

***х***

**-2**

**2**

**0**

***у***

***у =***

*Самостійна робота до теми: «Тригонометричні функції»*

**Варіант 1**

1. *Відповідь:* а) соs α; б) *- ctgα*; в) - sіn α.

2. *Відповідь:* .

3. *Відповідь:* 105°.

4. *Відповідь:* .

5. *Відповідь:* 1.

6. *Відповідь:* IV

7. *Відповідь:* 1.

**Варіант 2**

1. *Відповідь:* а) - sіn α; б) tg α; в) *сtg* α*.*

2. *Відповідь:* π.

3. *Відповідь:* 225°.

4. *Відповідь:* -7;

5. *Відповідь:*1.

6. *Відповідь:* III.

7. *Відповідь:*  –1.

*Контрольна робота №2*

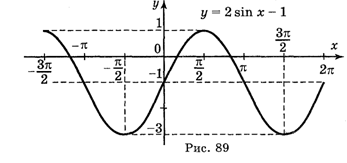
**Варіант 1**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | А | Б | В | Г |
| 1 |  |  |  |  |
| 2 |  |  |  |  |
| 3 |  |  |  |  |
| 4 |  |  |  |  |
| 5 |  |  |  |  |
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7. *Відповідь:* +(-1) *n*+1+, *п**Z.*

8. *Відповідь:* , *пZ.*

9.



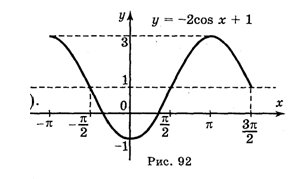
*Контрольна робота №2*

**Варіант 2**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | А | Б | В | Г |
| 1 |  |  |  |  |
| 2 |  |  |  |  |
| 3 |  |  |  |  |
| 4 |  |  |  |  |
| 5 |  |  |  |  |
| 6 |  |  |  |  |

7. *Відповідь:* ±  + 2π*n*; ± arccos  + *2πп,* *n**Z*.

8. *Відповідь:* , *пZ.*

9. 

*Контрольна робота №3*

**Варіант 1**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | А | Б | В | Г |
| 1 |  |  |  |  |
| 2 |  |  |  |  |
| 3 |  |  |  |  |
| 4 |  |  |  |  |
| 5 |  |  |  |  |
| 6 |  |  |  |  |

7. *хmin* = 0; *хmax* = 0.

8. *f(x)=.* D (у) = R; *f '(x)=* + 12х2 + 3, *f '(x)0,* то *f(x)* зростає на R.

9.Оскільки прямі паралельні, якщо їх кутові коефіцієнти рівні, то у'(х0) = 1.

у' (х) = = ;

у'(х0) = 1; (х0 + 2)2 = 1; х0 + 2 = 1; х0 = 1 або

х0 + 2 = 1; х0 = 3. Отже, точками, у яких дотична паралельна прямій

у = х3, будуть (1; 0) і (3; 2).

*Контрольна робота №3*

**Варіант 2**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | А | Б | В | Г |
| 1 |  |  |  |  |
| 2 |  |  |  |  |
| 3 |  |  |  |  |
| 4 |  |  |  |  |
| 5 |  |  |  |  |
| 6 |  |  |  |  |

7. *хmin* = -1; *хmin* = 1; *хmax* = 0.

8. *f(x)=.* D (у) = R; *f '(x)=* 3х2 28 3, *f '(x)0,* то *f(x)* спадає на R.

9. Оскільки прямі паралельні, якщо їх кутові коефіцієнти рівні, то у'(х0) = 2.

у' (х) = = ;

у'(х0) = 2; (х0 + 1)2 = 1; х0 + 1 = 1; х0 = або

х0 + 1 = 1; х0 = 2. Отже, точками, у яких дотична паралельна прямій

у = 2х3, будуть (0;1) і (; 3).