

Name _____

Books and Notes may be used. No Calculators. Test is on FRONT and BACK.1) List all the elements of the set $D = \{x \mid x \in \mathbf{Z} \text{ and } x^2 \leq 4\}$

2) Draw a Venn diagram that shows the relationships among the following four sets:

$$A = \{1, 2, 3, 4\},$$

$$B = \{0, 2, 4, 6, 8, 10\},$$

$$C = \{1, 2, 3\},$$

$$D = \{5, 6, 7, 8, 9\}$$

3) The records of 200 students at Central College show the following courses taken:

55 students took Latin

25 students took Greek and Latin

70 students took Sanskrit

20 students took Greek and Sanskrit

90 students took Greek

5 students took all three languages

40 students did not take any of the three languages

How many students took only Sanskrit?

4) Write a formula for the n^{th} term of the sequence 2, 5, 8, 11, 14, (where $n_1=2$, etc).

5) Convert the binary number 1011011_2 to base 10.

6) Convert the binary number 1011011_2 to base 16.

7) Let $A = \begin{bmatrix} 2 & 0 \\ -3 & 5 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 0 & 2 \\ -1 & 3 & 0 \end{bmatrix}$. Compute AB .

8) Let $A = \begin{bmatrix} 7 & 4 & -2 \\ -6 & 3 & 1 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 0 & 2 \\ -1 & 3 & 0 \end{bmatrix}$. Compute $A+B$.

9) Let $A = \begin{bmatrix} 4 & 5 \\ -3 & 0 \end{bmatrix}$. Compute the inverse of A .

10) Let a and b be integers. If p is a prime such that $p|ab$, then $p|a$ or $p|b$. Show, by giving an example of values for p , a , and b , that this relationship does not necessarily hold if p is not prime.