

Quiz Two

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 Score: ____/11

Problem 1: Convert 5142_{10} into base 4.

$$5142 = 4^6 + 1046 = 4^6 + 4^5 + 22 = 4^6 + 4^5 + 4^2 + 4^1 + 2 = 1100112_4$$

Score: /2

Problem 2: The following Mayan numeral has three places. Express it as a Hindu-Arabic numeral.

$$\begin{array}{c} \cdot \cdot \\ \cdot \cdot \\ \hline \cdot \cdot \end{array} = 2 \times (18 \times 20) + 12 \times 20 + 7 = 967$$

Score: /2

Problem 3: The following Kaktovik numeral has 4 places. Find its Hindu-Arabic numeral.

$$\setminus \setminus \setminus \setminus = 1 \times 20^3 + 3 \times 20^2 + 6 \times 20 + 12 = 9332$$

Score: /2

Problem 4: Convert 168745_{10} to a Babylonian numeral.

$$168\,745 = 46 \times 60^2 + 3145 = 46 \times 60^2 + 52 \times 60 + 25 = \text{𐎠𐎠𐎠} \quad \text{𐎠𐎠𐎠} \quad \text{𐎠𐎠}$$

Score: /2

Problem 5: In the Dungeon Theatre of the Dragoness, the seats are arranged 7 in a row to the left of the stage and 9 in a row to the right of the stage. Suppose the extended family of Fire Horse gathers to see a show in the Dungeon Theatre; if they all sit on the left of the stage, there are 3 members of the family without a seat. If they all sit on the right of the stage, there are 5 empty seats. Find the second smallest possible number of seats the Dungeon Theatre may have.

Say there are L rows on the left and R rows on the right. Then there are $7L$ seats on the left and $9R$ seats on the right. Therefore the family takes $7L + 3$ seats on the left or $9R - 5$ seats on the right, so $7L + 3 = 9R - 5$, so $7L + 8 = 9R$.

L	4	13	22	31
R	4	11	18	25
Total	$7L + 9R$	64	190	442

Score: /3