

Ex Number System Activity

Which is bigger? 58_{nine} or 42_{twelve}

We have two different numbers in two different bases?
Let's translate each into our more standard/familiar Hindu-Arabic

$$58_{\text{nine}} = 5(\text{longs in base 9}) + 8(\text{units})$$

- recall the longs are 9 units long?



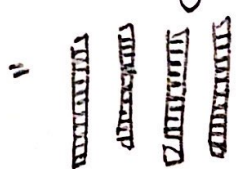
$$= 9 + 9 + 9 + 9 + 9 + 8 = 45 + 8$$

we can regroup $5+8$ to 13
ie 1 long in base 10

$$\text{so } 58_{\text{nine}} = 53$$

Let's do the same for 42_{twelve}
but note we are in base twelve now?

$$42_{\text{twelve}} = 4(\text{longs in base 12}) + 2(\text{units})$$



$$+ 2 = 12 + 12 + 12 + 12 + 2 = 48 + 2$$

we can regroup $8+2$ to 10
ie 1 long in base 10

$$\text{so } 42_{\text{twelve}} = 50$$

$$\underline{53} > \underline{50}$$

so

58_{nine} is bigger than 42_{twelve}

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