Are both of these numbers perfect numbers? Explain your reasoning.

28

35

Answer: 28 is perfect. 35 is not.

Semiperfect Numbers

Perfect numbers are also semiperfect. Why?

Answer: Perfect numbers are also semiperfect because a perfect number is equal to the sum of all of its proper factors (which is a subset of its proper factors).

Classify the following numbers as abundant or deficient. Are any of these numbers also semiperfect?

25--Deficient

30—Abundant and Semiperfect

49--Deficient

100—Abundant and Semiperfect

510—Abundant and Semiperfect

Would it be possible for a deficient number to be semiperfect?

- Explain your reasoning.

Answer: A deficient number could not be semiperfect, because all proper factors of a deficient number have a sum that is less than the deficient number itself.

Which of these numbers are weird?

Answer:

836--weird

912—not weird

4030--weird

Try These:

- 26 is *not untouchable*. Verify this by finding a number whose proper factors sum to 26. Answer: 26 is not untouchable because the proper factors of 46 sum to 26.
- 40 is *not untouchable*. Verify this by finding a number whose proper factors sum to 40. Answer: 40 is not untouchable because the proper factors of 74 sum to 40.
- Which of the following numbers is *untouchable*: 87 or 88? Explain your reasoning. Answer: 88 is untouchable.

Which of the following are friends? Explain your reasoning.

80 and 200 (Answer: Friends)

50 and 112 (Answer: Not Friends)

40 and 224 (Answer: Friends)

Which of the following are happy numbers?

19 (Answer: Happy)

31 (Answer: Happy)

50 (Answer: Not Happy)

70 (Answer: Happy)

82 (Answer: Happy)

- Can you find another happy number (or numbers)?

Answer: Many answers are possible.

Try these:

- 1260 is a vampire number. Verify this.

(Answer: 21 x 60 = 1260.)

- 1435 is a vampire number. Verify this.

(Answer: 35 x 41 = 1435.)

- Which of the following numbers is a vampire number: 1827 or 1829? Verify your answer. (Answer: 1827 is a vampire number, because 21 x 87 = 1827.)

Lazy Caterer Numbers

- How about 3 cuts? What would be the maximum number of pieces?

(Answer: With 3 cuts, the maximum number of pieces of 7.)

Try These:

- What is the maximum number of pieces (of a pancake) that could be made with 4 straight cuts? (Answer: 11)
- What is the maximum number of pieces (of a pancake) that could be made with 5 straight cuts? (Answer: 16)
- Do you notice any type of pattern?

(Answer: The lazy caterer numbers are each one more than the triangular numbers. The triangular numbers are 1, 3, 6, 10, 15, 21, 28, 36, etc.)

Which of the following are narcissistic numbers?

153 (Answer: Narcissistic)

371 (Answer: Narcissistic)

407 (Answer: Narcissistic)

451 (Answer: Not Narcissistic)

8208 (Answer: Narcissistic)

Which of the following are McNugget numbers?

22 (Answer: Not McNugget)

23 (Answer: Not McNugget)

24 (Answer: McNugget)

35 (Answer: McNugget)

40 (Answer: McNugget)

45 (Answer: McNugget)

51 (Answer: McNugget)

101 (Answer: McNugget)

McNugget Numbers

- There is a number that is the largest *non-McNugget* number.
- Can you discover what this number is? (Answer: 43)

Thank you so much for attending!