Your TA: _____ Seat #: ☐ – ☐

Math 105 TOPICS IN MATHEMATICS

QUIZ – VI (In-Class)

March 2 (Mon), 2015

Instructor: Yasuyuki Kachi

Line #: 52920.

ID # : _____ Name : _____

[I] (3pts)

$$\frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \frac{1}{16} + \frac{1}{32} + \frac{1}{64} + \frac{1}{128} = \underline{\qquad}.$$

⋆ Dont' give your answer in decimals (no credit). Give your answer in the form "an integer divided by another integer".

[II] (3pts) Which one is bigger?

(a) $\left(1 + \frac{1}{20}\right)^{20}$ or

(b) $$1 + \frac{1}{1!} + \frac{1}{2!} + \frac{1}{3!} + \frac{1}{4!} + \frac{1}{5!} + \frac{1}{6!} + \frac{1}{7!} + \frac{1}{8!} + \frac{1}{9!} + \frac{1}{10!} + \frac{1}{11!} + \frac{1}{12!} + \frac{1}{13!} + \frac{1}{14!} + \frac{1}{15!} + \frac{1}{16!} + \frac{1}{17!} + \frac{1}{18!} + \frac{1}{19!} + \frac{1}{20!}.$$

[**Answer**]: _____. (Just say '(a)', or '(b)'.)

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[III] (3pts) One definition of e is as follows:

$$e \quad = \quad \lim_{n \to \infty} \left(1 + \boxed{} \right)^{n} \quad .$$

[IV] (6pts) (a) $\dfrac{1}{945}$ is

☐ a rational number. ☐ an irrational number. (Check one.)

(b) $14.77777777777777777...$ (the digit 7 continues permanently) is

☐ a rational number. ☐ an irrational number. (Check one.)

[V] (5pts) Do $\sqrt{2}$ and

$$1+\frac{24}{60}+\frac{51}{60^2}+\frac{10}{60^3}+\frac{7}{60^4}+\frac{46}{60^5}+\frac{6}{60^6}+\frac{4}{60^7}+\frac{44}{60^8}+\frac{50}{60^9}+\frac{28}{60^{10}}+\frac{51}{60^{11}}+\frac{20}{60^{12}}$$

coincide as real numbers?

☐ Yes, they coincide. ☐ No, they do not coincide. (Check one.)

Explain.

_____

_____ .