Math 099 - Final Exam

May 7, 2019

Name key

Score _____

Show all work. Supply explanations when necessary. Partial credit will be awarded for correct work. You may use your calculator unless otherwise indicated.

1. (2 points) Which specific operation would you do first in the following expression? (Tell exactly what operation you should do.)

$$4 \cdot (3^2 - 17) + 9$$

$3^2 = 9$ comes first

2. (2 points) Which specific operation would you do first in the following expression? (Tell exactly what operation you should do.)

$$100 \times (1.0225)^{4 \times 20}$$

$4 \times 20 = 80$ comes first

3. (4 points) Evaluate each expression **without using a calculator**. Show your work.

(a) $7 - 4 \cdot (-2)$

$= 7 - (-8) = 7 + 8 = \boxed{15}$

(b) $(2 - 2) - 2^2 - 2 - [2 \times (2 - 2)]$

$0 - 4 - 2 - (2 \times 0) = -4 - 2 = \boxed{-6}$

4. (1 point) Give an example of a whole number that is not a natural number.

0

5. (1 point) Give an example of a rational number that is not an integer.

$\frac{5}{2}$

6. (2 points) Let $A = \{x \mid x \in \mathbb{N} \text{ and } x < 8\}$. Rewrite A in roster notation.

$A = \{1, 2, 3, 4, 5, 6, 7\}$

7. (2 points) Let $D = \{x \mid x = 3k + 2 \text{ and } k \in \mathbb{N}\}$.

(a) Give an example of a natural number that is an element of D.

$3k+2$ = 2 more than a multiple of 3.

$3(1) + 2 = 3 + 2 = 5$

(b) Give an example of a natural number that is not an element of D.

6 is not 2 more than a multiple of 3

8. (6 points) Identify each compound equation or inequality as a disjunction or a conjunction, then solve.

(a) $-2x + 7 < 1$ and $6x - 10 < 20$

Conjunction

$-7 \quad -7$

$-2x < -6$

$X > 3$

$+10 \quad 10$

$6x < 30$

AND $X < 5$

$3 < X < 5$

(b) $3x + 5 = 2x + 2$ or $8x = 7$

Disjunction

$X + 5 = 2$

$X = -3$ or $X = \frac{7}{8}$

9. (4 points) Use your calculator to evaluate each expression.

(a) $\dfrac{7.25 \times (8.5 - 3.75)}{16.85 - 9.1}$ $\approx$ 4.4435

(b) $\left(1 + \dfrac{0.08725}{12}\right)^{12 \times 25}$ $\approx$ 8.7877

10. (4 points) Use your calculator to evaluate each expression at the given values.

(a) $P \cdot \left(1 + \frac{r}{n}\right)^{nt}$ when $P = 1500$, $r = 4.15\%$, $n = 2$, and $t = 25$

$\approx$ 4188.52

(b) $R \cdot \left[1 - (1 + \frac{r}{n})^{-nt}\right]$ when $R = 1000$, $r = 8.25\%$, $n = 12$, and $t = 15$

$\approx$ 708.66

11. (2 points) Round each number to the indicated place.

(a) $8,657,331.95$ to the nearest thousand

8,657,000.00

(b) 59.82645 to the nearest ten thousandth

59.82650

12. (1 point) Write 9.375% in decimal form.

0.09375

13. (1 point) Write 0.0675 in percent form.

6.75%

14. (2 points) What is 20% of 150?

$0.20 \times 150 = 30$

15. (2 points) What percent of 75 is 5?

$\square \times 75 = 5$ $\quad \frac{5}{75} = 0.0\overline{6} = 6.\overline{6}\%$

16. (2 points) 15% of what is 90?

$0.15 \times \square = 90$ $\quad \frac{90}{0.15} = 600$

17. (2 points) The advertised price of a 2nd generation Amazon Echo Plus is \$149.99. The sales tax rate is 8.75%. What is the total cost of the device?

$149.99 + 0.0875 \times 149.99 =$

\$163.11

18. (5 points) Suppose p is the statement "Today is Tuesday" and q is the statement "I am late for work."

(a) Write the statement in words: $\sim p \vee (\sim q)$

TODAY IS NOT TUESDAY OR I AM NOT LATE FOR WORK.

(b) Write the statement in words: $p \wedge q$

TODAY IS TUESDAY AND I AM LATE FOR WORK

(c) Write the statement in symbolic form: "If I am late for work, then today is Tuesday."

$q \rightarrow p$

19. (5 points) A letter is selected at random from the word *zenzizenzizenzic*.

(a) What is the sample space?

$\{z, e, n, i, c\}$

(b) What is the probability of selecting the letter z?

$\frac{6}{16}$

(c) What is the probability of selecting a letter other than z?

$1 - \frac{6}{16} = \frac{10}{16}$

(d) What is the probability of selecting the letter i or e?

$\frac{6}{16}$