

Name: _____

MATH 142, Test 1

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SAMPLE

Please **read** carefully, **show** all your work, and **explain** all your answers.
Credit may be reduced if work is incomplete.

PART 1. Each problem is worth 4 points.

Problem 1. Write out, in English, the proper pronunciation of the following sentences.

A. $3x^3 + \sqrt{y} \geq z$

B. $\frac{-2 + 3x}{4} = 5$

Problem 2. $1 - 0 = 1, 2 - 0 = 2, 3 - 0 = 3, 4 - 0 = 4, 5 - 0 = 5, \dots$

State, symbolically, the corresponding abstract fact about subtraction of zero.

Problem 3. Determine whether the following sentences use “ x ” as a dummy variable or as an unknown

Sentence

Type of variable

A. $3 + 2x = 5x.$

B. $(3 + 2)x = 5x.$

Problem 4. Let $a = 1$, $b = -2$, and $c = 3$. Evaluate

A. $\frac{a^2 + b}{c} =$

B. $a + (b + c)^2 =$

Problem 5. Solve the inequality $|x - 7| < 5$. Express your answer as $a < x < b$.

PART 2. Each problem is worth 8 points.

Problem 6. Write out, in English, how you would say these aloud.

A. $\{x \mid 2 \leq x < 3\}$

B. $4 \in \{x \mid x \geq 1\}$

Problem 7. Give the defining property (i.e., set builder notation) for $(-3, 7]$

Problem 8. Given $S = [-3, 6)$ and $T = (4, 12]$, find

A. $S \cap T =$

B. $S \cup T =$

Problem 9 & 10. a) Given $S = \{1, 2, 3, 4, 5, 6\}$, $T = \{4, 5, 6, 7, 8\}$, and the universal set $\{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$, find

A. $S \cap T =$

B. $(S \cap T)^c =$

C. S^c and T^c ; $S^c =$, $T^c =$

D. $S^c \cup T^c =$

b) Compare the results of parts B and D.

Problem 11. Give each of the following functions as a command.

A. $f(x) = 4x^3 - 5$

B. $f(x) = \sqrt{x - 2}$

Problem 12. Give the “ $f(x)$ ” definitions of the functions

A. Add 3 and then take the absolute value.

B. Square, add 5, and then divide by 2.

Problem 13. Given $f(x) = x^3$ and $g(x) = x - 2$, find

A. $g(f(x)) =$

B. $f(g(x)) =$

Problem 14. Find two simpler functions f and g such that $f(g(x)) = \sqrt{x + 2}$.

Problem 15. The cost of photocopies is 5 cents each for the first 8, and 3 cents each for every copy after the first 8.

A. Express the function that gives the cost of x copies.

B. What is the domain of the function in part A?