MATH 1710 Review 2 Otts, 09F

Notes for items 1 – 10:

Select from the list of numbers all that belong to the specified sets.

1. Natural numbers and Rational numbers

Natural Numbers: Also known as (aka) the counting numbers: 1, 2, 3, . . .

Rational Numbers: Any number that can be written as a ratio of some Integer divided by some non-zero Integer.

Elements of both sets: Any number in the list that appears in both the set of Natural Numbers and the Set of Rational Numbers

Reflection: Can a Natural number also be a Rational number?

Are all Natural numbers also Rational numbers? Why?

What does the previous answer mean about the relationship of Natural numbers to the set of Rational numbers?

Are all Rational Numbers also Natural numbers? Why?

What does the previous answer mean about the relationship of Rational numbers to the set of Natural numbers?

2. Integer numbers and Irrational numbers

Integer numbers: The positive and negative Whole Numbers and Zero:

. . . -3, -2, -1, 0, 1, 2, 3, . . .

Irrational numbers: Any number that cannot be written as a Rational Number, such as $\prod$, roots of prime numbers, and so on.

Elements of both sets: Any number in the list that appears in both the set of Integer Numbers and the Set of Rational Numbers

Reflection: Can an Integer number also be an Irrational number?

Are any Integer numbers also Irrational numbers?

Are any Irrational Numbers also Integer numbers?

What do the previous answers mean about the relationship of the two sets?

Write the number in scientific notation.

In scientific notation ONLY 1 nonzero digit is to the left of the decimal point and all trailing zeros are dropped. This new version of the number is multiplied by a power of 10 that moves the NEW decimal point back to its original position (ONLY the NEW decimal point gets moved):

3. 1,900,000 in scientific notation = $1.9 * 10^{?}$

Which way does the new decimal point need to move to get back to its original position? If left, then the exponent is negative; if right, positive.

4. 0.0000006 in scientific notation =

What is the only non-zero digit? Which way and how far does the new decimal point need to move to get back to its original position? If left, then the exponent is negative; if right, positive.

Write the number in standard form.

The reverse process of items 3 & 4. Goal: return the decimal point to its original place. How far does one power of 10 move a decimal point?

5. 5.770×10^{6}

6. 2.295×10^{-6}

Reflection: What does a positive exponent of ten mean in scientific notation form?

What does a negative exponent of ten mean in scientific notation form?

How far does each power of 10 move the decimal point?

(for items 7 - 9): Find the percent change if a quantity changes from P1 to P2. Round your answer to the nearest tenth if appropriate.

P1 is the beginning value and P2 is the ending value. The percent change will be either positive when P1 is the smaller number and negative when P1 is the larger number.

ALWAYS subtract P1 from P2 (P2 – P1) and divide the difference by P1. This gives you the decimal value. Then multiply by 100 to convert to a percent.

Percent change formula (remember: subtract first, divide second, and finally multiply by 100):

((P2–P1)/P1) *100

7. P1 = $17, P2 = $43

Reflection: Was the % change + or –? Why? Can you determine the sign of the % change before calculating? How?

8. P1 = 3.8, P2 = 2.9

Use the information given in the table to solve the problem.

9. The table gives the Consumer Price Index for selected years.

Year	1960	1965	1970	1975	1980
CPI	30	35.8	48.8	63.6	82.4

What is the percent change (to the nearest tenth of a percent) in prices from 1965 to 1980? *(Why do you need to be careful?)*

Goal: Find percent change from 1965 to 1980.
Price in 1965:
Price in 1980:
Plug into formula: (P2-P1)/P1 then multiply by 100:

Solve the problem.

10. An oil spill of 4399 cubic centimeters is spilled onto a pond and spreads out in a circular shape having a diameter of 536 centimeters. Approximate the thickness of the oil film to four decimal places.

Read with Understanding:
cubic: a measure of volume as a product of three dimensions: length, width, and height (also called depth or thickness). Volume measures how much something holds or the amount of space an item occupies.
circular: need to know the formula for the area of a circle: $A = \Pi r^2$
diameter: the area formula for a circle calls for the radius, but you were given the diameter. How do you find a radius when you know the diameter?
thickness: one of the three dimensions of volume. You need to divide the volume by the product of the other two (the product of length and width is the area) to find the thickness.
four decimal places: You can set your calculator to display all numbers to up to 9 decimal places. ([MODE] button).

Goal: Approximate the thickness of the oil spill to 4 decimal places.

Step 1: Find the radius when the diameter is 536 cm.

Divide the diameter by 2 to find the radius.

Step 2: Calculate the area of the circular spill.

Use calculator and the formula $A = \Pi r^2$

Π is [2^{nd}] [^]

Step 3: Divide the volume by the area and round to 4 decimal places.

Thickness =