

Math 106, Turn in Homework #1
Spring 2009, due Thursday, January 29

Name ANSWER KEY

Use units where appropriate in your answers (\$, %, etc.) Put your answers in the spaces provided and show, at a minimum, the equations you used to solve the problems. Round your answers to two decimal places.

1. Basic percent problems.

- 2 a) 9 is what percent of 137? 6.57% $\frac{9}{137} = 0.06569 \uparrow = 6.57\%$
- 2 b) 35% of what number is 5? 14.29 $.35x = 5 ; x = \frac{5}{.35} = 14.285 \uparrow \sim 14.29$
- 2 c) What is 14% of \$400? \$56 $.14 \cdot 400 = 56$

- 2 2. Sara's pay just before her company was taken over by another company was \$11.50 per hour. In the takeover everyone kept their jobs but their pay was immediately cut (decreased) by 10%. Sara's hourly pay immediately after the takeover was \$10.35
 $11.50 - .10(11.50) = 11.50 - 1.15 = \10.35

One year after the takeover Sara received a 15% pay raise. Once she received her raise, her new hourly rate was \$11.90

$10.35 + 10.35 \times .15 = 10.35 + 1.55 = \11.90

What was Sara's percentage change in hourly pay overall (from before the takeover until after her raise)? 3.48%

$\frac{11.90 - 11.50}{11.50} = \frac{.40}{11.50} = 0.03478 \uparrow = 3.48\%$

- 2 3. Frank bought some stock which lost 40% of its value in the first year after he purchased it. If Frank had initially invested \$5000, how much was his investment in the stock worth a year after his initial investment? \$3000

$5000 - .40(5000) = 5000 - 2000 = \3000

After another year passed, his stock increased by 90% of its depressed value (the value at the end of the first year.). If his broker claims that Frank's net investment return after the two years is a 50% gain, is the broker correct? NO Justify this answer by doing both of the following, showing all work neatly.

- 2 a) Give the **actual** percentage change in the value of the investment over the two year period.

Value @ end of year 2: $3000 + .9(3000) = 3000 + 2700 = 5700$

Actual % change = $\frac{5700 - 5000}{5000} = \frac{700}{5000} = 14\%$ increase actually occurred, not 50%

- 2 b) Calculate what the investment would have been worth if it had gained 50% of its initial value and compare that to the actual value of the investment at the end of two years.

Gain of 50%: $5000 + .5(5000) = 5000 + 2500 = \7500 = value of stock had increased by 50% of starting value.

\$5700 - actual value of the stock.
(You have \$1800 less than the broker says you have.)

4. **Exponents.** Rewrite each of the following expression using a single positive exponent. **Do not** multiply out your answers.

✓ a) $(2.9^4)^5 = 2.9^{20}$ (multiply exponents)

✓ b) $3.4^5 \times 3.4^{-8} = 3.4^{-3} = \frac{1}{3.4^3}$

5. **Scientific Notation.**

✓ a) Express each of the following terms in scientific notation:

i) $695,000,000,000 = 6.95 \times 10^{11}$

✓ ii) $0.0000037 = 3.7 \times 10^{-6}$

✓ b) Find the product of $695,000,000,000 \times 0.0000037$ using your results from part 5a above, and express your answer in scientific notation. Show work!

$$6.95 \times 10^{11} \times 3.7 \times 10^{-6} = 6.95 \times 3.7 \times 10^5$$

$$= 25.715 \times 10^5$$

$$= 2.5715 \times 10 \times 10^5$$

$$= \boxed{2.5715 \times 10^6} \leftarrow \text{Back into scientific notation.}$$