Mathematical Concepts — Joysheet 2
MAT 117, Spring 2013 — D. Ivanšić

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Show all your work!

1. (10pts) a) What percent of 7 is 4?

$A = PB$

$4 = P \cdot 7$

$P = \frac{4}{7} = 0.571429$

57.1429%

b) 13% of what number is 20?

$A = PB$

$20 = 0.13 \cdot B$

$\frac{20}{0.13} = B$

$B = 153.846154$

2. (6pts) You bought a pair of sunglasses for \$139. If sales tax is 6.25% (like in some counties in Illinois), what is the total cost?

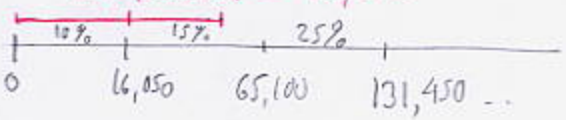
$tax = 0.0625 \cdot 139 = 8.69$

$139 + 8.69 = 147.69$

3. (12pts) Jack and Jill, a married couple with one child, filed a tax return in 2008. Their total income was \$76,300, they deposited \$6000 into a retirement account, paid \$4,500 in mortgage interest and \$2,400 in property taxes, and donated \$300 to charity. Use the table on page 448 of our book to first determine Jack and Jill's taxable income (don't forget the exemption) and then find the tax on this income.

Married filing jointly brackets:

Tax. income = 48,900



Exemption per person 3500

Standard deduction: 10,900

Deductions: 4500
2400
300
7100

less than stand. deduction,
so use stand. deduction 10,900

Taxable income $= 76,300 - (6,000 + 10,900 + 3 \cdot 3500)$

$= 76,300 - 27,400$

$= 48,900$

$tax = 0.1 \cdot 16,050 + 0.15 \cdot (48,900 - 16,050)$

$= 1,605 + 0.15 \cdot 32,850$

$= 1605 + 4927.5 = 6532.50$

4. (12pts) In 2006, rent for a 1-bedroom apartment in a building was \$600. After three years, due to high demand, it climbed 35%. Then, over the next three years, demand decreased significantly, so rent fell 25%. What is the rent after the six-year period? Did it increase or decrease compared to rent in 2006?

$600 \cdot 0.35 = 210$

Rent in 2009: $600 + 210 = 810$

$810 \cdot 0.25 = 202.50$

Rent in 2012: $810 - 202.50 = 607.50$, a slight increase over 2006

not really requested → (Percent increase is: $1.35 \cdot 0.75 = 1.0125$ ← subtract 1 to get 0.0125, a 1.25% increase)

(1.35: $1 + 0.35$; 0.75: $1 - 0.25$)

5. (10pts) How much money should you deposit in a simple-interest account bearing 2.53% if you would like to have \$3000 in eighteen months? How much of the final \$3000 is from interest?

$A = P(1 + rt)$

$3000 = P(1 + 0.0253 \cdot \frac{18}{12})$

$3000 = P \cdot 1.03795 \quad | \div 1.03795$

$P = \frac{3000}{1.03795} = 2890.32$ (rounded up)

From interest:

$3000 - 2890.32 = 109.68$

6. (10pts) You can deposit \$1,000 into an account bearing 4.75% simple interest. How long will it take until you have \$1,300 in the account?

$A = P(1 + rt)$

$1300 = 1000(1 + 0.0475 \cdot t) \quad | \div 1000$

$1.3 = 1 + 0.0475t \quad | - 1$

$0.3 = 0.0475t \quad | \div 0.0475$

$t = \frac{0.3}{0.0475} = 6.315789$

It will take about 6.32 years