

## 7<sup>th</sup> Grade Assignment – Week #23

### Individual Work

- Your major task this week is to prepare for the Percents test.  
You can prepare for the test by doing this:
  - Do the problems on **Percents Sheet #7**.
  - Do the **Practice Test** (found at the end of this document).

### Group Assignments:

#### *For Tuesday: Nim!*

- *One-Pile NIM*. Since it has been a long since we played NIM, you should start by refreshing your memory of how the game is played and what the unbeatable strategy is. If there is anyone new to your group, then you should teach them all about it. Again, the rules are:  
Version #1: Start with any number of gems in one pile. With each turn, a player may remove 1, 2, or 3 gems. The person who takes the last gem wins.  
Version #2: Start with any number of gems in one pile. With each turn, a player may remove 1, 2, or 3 gems. The person who takes the last gem loses.  
Additional Challenge: You can vary the number of gems that can be removed on each turn – but this number has to be stated before the game starts.
- *Two-Pile NIM*. This variation of NIM is new for us.  
Version #1: Start with any number of gems in two piles. With each turn, a player may remove as many gems as desired, but from only one pile. The person who takes the last gem wins.  
Version #2: Start with any number of gems in two piles. With each turn, a player may remove as many gems as desired, but from only one pile. The person who takes the last gem loses.
- *Become a NIM Grand Master by Challenging the NIM Machine!*  
This is the ultimate challenge, and may take you a couple of weeks before you can do it! In order to officially defeat the machine, you have to win three rounds. With each round, the machine gets to decide three things:
  - Which of the four versions of NIM we will play.
  - How many gems we start with.
  - (The biggest challenge!) If we are playing *One-Pile NIM*, then the machine gets to decide (before the game begins) how many gems you can remove with each turn.
  - You will have the advantage of deciding who goes first. If you don't make any mistake, then you should win!

#### *For Thursday:*

- **A Generous King**  
There are 12 people standing in line to receive their gift from the king. The king gives the first person one gold coin and the second person 2 gold coins. The third person has 3 times as much as the second; the fourth person has 4 times as much as the third; the fifth person has 5 times as much as the fourth, and so on. How many gold coins does the last (twelfth) person get?
- Keep working on **Nim** (from Tuesday's assignment, above).
- Keep working on the **Math Clock**. (See last week's assignment for details.)

# Percents – Practice Test

**Do the problems in this column in your head, if you can.**

1) Convert to a percent:

- a)  $\frac{1}{4}$
- b)  $\frac{3}{10}$
- c)  $\frac{5}{6}$
- d)  $\frac{3}{25}$
- e) 0.7
- f) 0.032

2) Convert to a fraction:

- a) 65%
- b) 27%
- c)  $16\frac{2}{3}\%$

3) Convert to a decimal:

- a) 39%
- b) 2.07%

4) What is...

- a) 50% of 14?
- b) 10% of 5400?
- c) 25% of 18?
- d) 200% of 35?
- e) 90% of 3000?
- f)  $87\frac{1}{2}\%$  of 320?

5) a) 18 is what % of 24?

b) 70 is what % of 350?

c) 2800 is what % of 3500?

6) 42 is 10% of what number?

7) **Show your work for these problems.**

a) What is 23% of 400?

b) 130 is what percent of 160?

8) **Increase/Decrease Problems**

a) What is 240 decreased by 18%?

b) Going from 40 up to 50 is what percent increase?

c) A store is having a 60%-off sale. What is the reduced price of a pair of pants that were originally priced at \$59?

## Practice Test Answers

- 1) a) 25%  
b) 30%  
c)  $83\frac{1}{3}\%$   
d) 12%  
e) 70%  
f) 3.2%

- 2) a)  $\frac{13}{20}$   
b)  $\frac{27}{100}$   
c)  $\frac{1}{6}$

- 3) a) 0.39  
b) 0.0207

- 4) a) 7  
b) 540  
c)  $4\frac{1}{2}$

- d) 70  
e) 2700  
f) 280

- 5) a) 75%  
b) 20%  
c) 80%

- 6) 420

- 7) a) 92  
b) 81.25%

- 8) a) 196.8  
b) 25%  
c) \$23.60

## Percents – Sheet #7

- 1) Find each answer by using the easiest method possible. Show work on a separate sheet for those problems that can't be done in your head.
  - a) What is  $12\frac{1}{2}\%$  of 160?
  - b) What is 75% of 280?
  - c) What is 15% of 280?
  - d) What is 1% of 87?
  - e) What is  $16\frac{2}{3}\%$  of 1200?
  - f) What is  $87\frac{1}{2}\%$  of 16?
  - g) What is 700% of 40?
  - h) What is 0.58% of 300?
  - i) 60 is what percent of 150?
  - j) 52 is what percent of 108?
  - k) 24 is what percent of 36?
  - l) 300 is 25% of what?
  - m) 21 is 6% of what?
- 2) What is ...
  - a) 72 increased by 2%?
  - b) 240 decreased by  $33\frac{1}{3}\%$ ?
  - c) 5 increased by 60%?
  - d) 610 decreased by 4.3%?
- 3) Increase and decrease.
  - a) Going from 80 up to 90 is what percentage increase?
  - b) Going from 90 up to 100 is what percentage increase?
  - c) Going from 100 down to 90 is what percent decrease?
  - d) Going from 400 down to 325 is what percentage decrease?
- 4) Calculate an exact answer.
  - d) What is 38% of 410?
  - e) What is 420% of \$700?
  - f) 3500 is what percent of 4200?
  - g) 2 is what percent of 7500?
  - h) 120 is  $33\frac{1}{3}\%$  of what number?
  - i) 90 is  $37\frac{1}{2}\%$  of what number?

5) A tent normally listed for \$480 is on sale for a 35% discount. What is the new discounted price?

6) Larry borrowed \$2000 from a bank at 7% interest compounded annually. What does he owe, in total, after 4 years?

7) A bike, originally priced at \$480, was sold at a discount for \$345.60. What was the percentage discount rate?

8) *Challenge!*  
Calculating the cost of driving.

a) John bought a new car for \$39,000 and then sold it for \$20,000 two years later. By what percentage has the value depreciated (i.e. decreased)?

b) Over those two years, what was the total operating cost and the cost per mile given that he spent \$1500 per year on insurance, \$450 annually on repairs and maintenance, an average of \$220 monthly for interest payments, \$850 annually for other costs (parking, tolls, tax, etc.) and drove it 12,000 miles per year? (Use 15 miles/gallon for gas mileage, and \$1.30/gallon for the cost of gas. Don't forget about depreciation cost from part a!)

c) Gas was what percent of the total operating cost for the two years? (Rounded to three significant figures.)