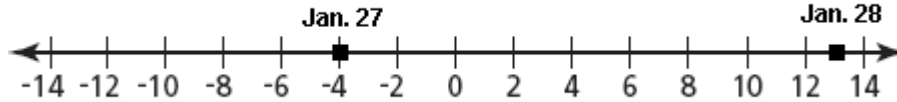


- 31) The temperature in St. Cloud, Minnesota was  $-4^{\circ}\text{F}$  (Fahrenheit) on January 27 and  $13^{\circ}\text{F}$  on January 28.  
**Part A** asks you to plot these temperatures on the number line below, making sure to label both points with the appropriate date

**ANSWER:**

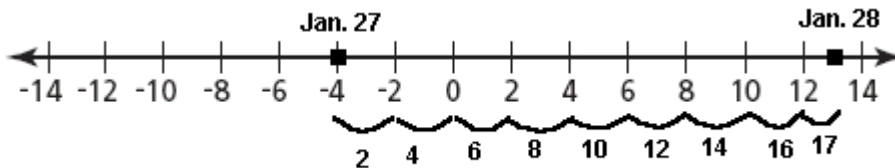


**Part B** asks: How many degrees warmer was it on January 28 than on January 27 ?

$$13 - (-4) = 13 + 4 = 17$$

**ANSWER: It was 17 degrees warmer.**

Another way of doing this would be to count the spaces between the numbers:



- 32) The table below shows geographic information about Antarctica .

**ANTARCTICA**

Area	$1.4 \times 10^7$ square kilometers
Lowest elevation	$-2.56 \times 10^3$ meters

Write the numbers, in standard form, for the area and the lowest elevation of Antarctica.

The numbers as you see them above are written in scientific notation. You can get your answer by simply using your calculator to multiply  $1.4$  by  $10^7$ , and  $-2.56$  by  $10^3$ . Here is how it is done without the use of a calculator.

When multiplying a number by a positive power of 10, the decimal point is moved that number of place to the right. Therefore, to change  $1.4 \times 10^7$  square kilometers to standard form all you have to do is move the decimal point 7 places to the right.  $1.4$  is really the same as  $1.400000000000\dots$  (with an infinite number of zeros). Moving the decimal point 7 places to the right will result in **14,000,000** . (What you have done is moved the decimal 1 place past the 4 and then in a sense added 6 zeros for a total move of 7 places).

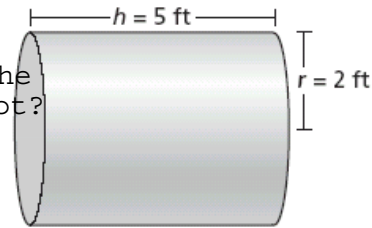
In the same manner, we can write  $-2.56 \times 10^3$  meters in standard form.

Simply move the decimal point 3 places to the right. Moving it 2 places to the right gets it past the 5 and 6. We need to move it 1 more space for a total move of 3. Therefore, add one 0. In standard notation,  $-2.56 \times 10^3$  will be **-2560**.

**ANSWER:** area 14,000,000 square kilometers  
lowest elevation -2560 meters

33) You are presented with the diagram of the tank shown below.

**PART A:** What is the surface area of the **entire** tank to the nearest square foot?



[not drawn to scale]

On page 2 of your test booklet you are presented with various formulas. Here is the one related to this problem.



Right Circular Cylinder

$$\text{Total Surface Area} = 2\pi rh + 2\pi r^2$$

$$\text{Volume} = \pi r^2 h$$

You are interested in the formula for the total surface area. It is:  $2\pi rh + 2\pi r^2$   
In the case of our tank, **h = 5** and **r=2**. For  $\pi$ , use the proper key on your calculator.  
Here is what you should enter on your calculator:  $(2^2 \text{ below means } 2^2)$   
(Depending on your calculator, you may be able to enter  $2\pi$  rather than  $2*\pi$ .  
You may also be able to enter  $2^2$  rather than  $2^{\wedge}2$ ).

$$2*\pi*2^2*5 + 2*\pi*2^2$$

Your answer will be: 150.7964474

To the nearest square foot, your answer is **151**.

**ANSWER:** 151 square feet.

**PART B:** One can of paint will cover 25 square feet. How many cans of paint must Chris purchase to paint the entire surface area of the tank?

Using your answer of 151 square feet, you are really being asked now how many cans of paint will be required to paint this tank. You are told that 1 can will cover 25 square feet, so what you want to figure out is how many 25 there are in 151. In other words, you want the answer to  $151 \div 25$ .  $151 \div 25 = 30$  with a remainder. If you buy 30 cans of paint you will not have enough to paint the complete tank. You will need 31 cans of paint to complete your paint job.

**ANSWER:** 31 cans of paint.

(You can use your calculator to get your answers, but show what you have done on your exam booklet. For example, show what your steps are, and what you are multiplying, dividing, adding or subtracting.)

- 34) Juan attends a carnival. The admission fee is \$8. Tickets for rides cost \$4 each. Juan needs one ticket for each ride. Write an equation Juan can use to determine the number of ride tickets,  $r$ , he can buy if he has \$32 before he pays the admission fee.

You are told that each ticket costs \$4.  $r$  tickets will therefore cost 4 times  $r$  dollars or simply  $4r$ . He will have to pay the admission fee of \$8 regardless of how many tickets he buys. This means that carnival will cost him the admission of \$8 plus the price of the tickets  $4r$ . The total cost can be represented as  $4r + 8$  or  $8 + 4r$ .

You are told that Juan has \$32 to spend. This means that the  $4r + 8$  must equal 32:

**ANSWER:  $4r + 8 = 32$**

To determine the number of tickets Juan can buy, solve the above equation for  $r$ .

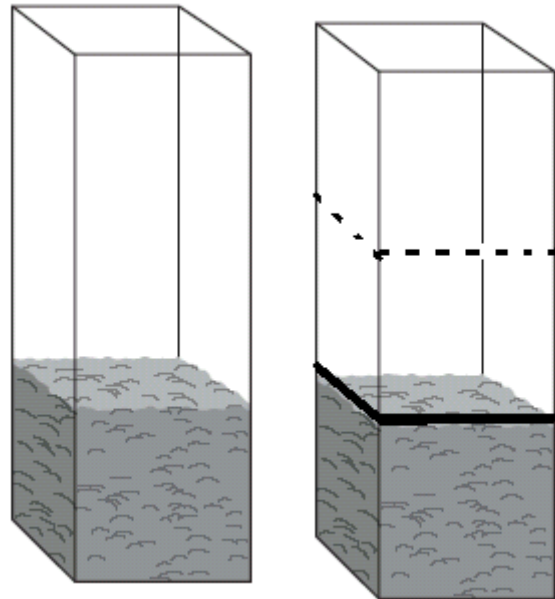
$$\begin{aligned} 4r + 8 &= 32 && \text{Subtract 8 from both sides.} \\ 4r &= 24 && \text{Divide both sides by 4.} \\ r &= 6 \end{aligned}$$

**ANSWER: Juan can buy 6 ride tickets.**

- 35) You are asked to estimate the weight of dirt in the planter at the right if it were completely filled. As you see by the line on the tank all the way to the right, the dirt in the planter takes up approximately one-third of the planter. To answer the question, therefore, all you have to do is to multiply the weight of the dirt in the planter by 3 to obtain the weight of the dirt in a full planter. At this point the dirt weighs 8 pounds.

$$8 \times 3 = 24$$

**ANSWER: 24 pounds**



- 36) You are presented with the data at the right, and asked to create a double bar graph.

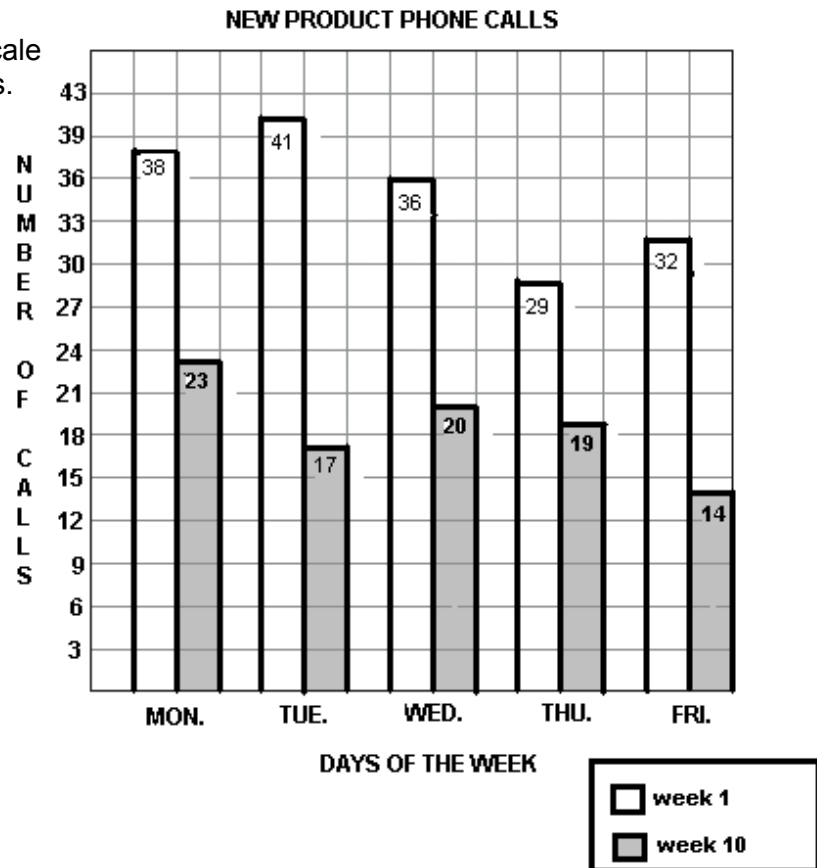
Below is the bar graph. I have entered the number of calls at the top of each bar to make the information clearer.

(To determine the thickness of the vertical bars, I first counted how many squares there are across the grid. There are 15. I am graphing the data for 5 days. 15 divided by 5 is 3. So I decided that each vertical bar will be one unit wide and the space between each day will be one unit wide. That will account for 3 units.)

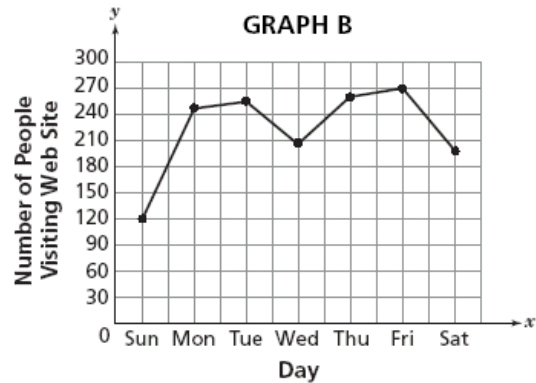
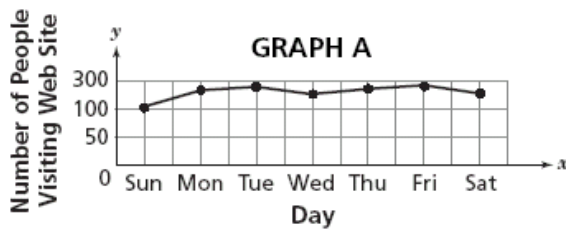
NUMBER OF PHONE CALLS

Day	Week 1	Week 10
Monday	38	23
Tuesday	41	17
Wednesday	36	20
Thursday	29	19
Friday	32	14

(To determine the vertical scale I counted the horizontal lines. There were 16. Looking at the chart, I saw that the greatest number was 41. 41 divided by 16 is 2 and a remainder. I therefore used multiples of 3 for the vertical scale.)



- 37) Dean recorded the number of people who visited his web site each day for a week. He graphed the data in two different ways. The two ways are pictured below.



Which one of the two graphs is misleading?

**ANSWER:** I would say that GRAPH A is misleading.

**REASON:** The y-scale on Graph A is misleading because it is not consistent. From 50 to 100 is 50, and then it skips from 100 to 300 -- a jump of 200. This results in a graph that is almost a straight line rather than one like Graph B which truly shows major increases or decreases from one day to the other.

- 38) The table below shows the number of Earth days it takes for two of Jupiter's moons to make one full orbit around Jupiter.

How **much longer**, in Earth days, does it take for Themisto to orbit Jupiter than it does for Callisto to orbit Jupiter? Write your answer in standard form.

**JUPITER'S MOONS**

Name	Orbit Time (in Earth Days)
Callisto	$1.67 \times 10^1$
Themisto	$1.3002 \times 10^2$

**ANSWER:** Look back at question 32 to remind yourself how to change a number from scientific notation to standard form.

Callisto  $1.67 \times 10^1 = 16.7$       Themisto  $1.3002 \times 10^2 = 130.02$

Now simply subtract:

$$\begin{array}{r} 29 \ 10 \\ 130.02 \\ \underline{16.7} \\ 113.32 \end{array}$$

**113.32 Earth days.**