

- 1) Suppose 5 sophomores, 3 juniors, and 4 seniors are candidates for a prestigious mathematics award of which three will be handed out. In how many different ways can the recipients of these three awards be selected if:
 - a) any candidate may receive an award?
 - b) only a junior and a senior may receive an award?
 - c) one person from each class receives an award?

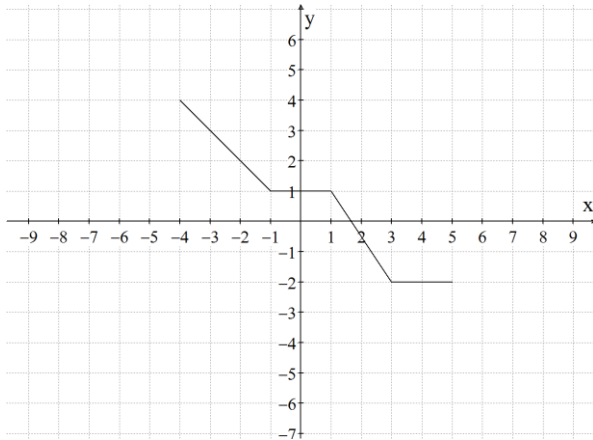
- 2) You have learned in your previous work on counting that the number of arrangements of the letters MATH is $4!$. Because there are four choices for the first position, three for the second, two for the third, and one for the last, so $4 \cdot 3 \cdot 2 \cdot 1 =$ the total number of arrangements. In this problem you will explore the number of arrangements when letters repeat.
 - a) How many unique arrangements are there of MOM? List them.
 - b) How many arrangements are there of LOOK? List them.
 - c) How many arrangements of TOOT? List them.
 - d) How many arrangements of SLEEPER? Do not list them but show your work that produces your answer.

- 3) A rancher plans to use 230 yd of fencing to enclose a rectangular corral and to divide it into two parts by a fence parallel to the shorter sides of the corral. Find the dimensions of the corral if its area is 2100 yd^2 .

- 4) Find an equation of a line which is
 - a) parallel to the line through the points $(9, -1)$ and $(-7, 4)$ which passes through the point $(4, 3)$
 - b) the perpendicular bisector of the segment from $(-7, 8)$ to $(11, -4)$

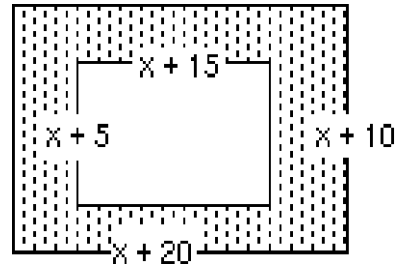
- 5) You operate a toy factory, and have received a large order for 500 of a Rosebud sled. There are Level 1 workers who make \$15 per hour, Level 2 workers who make \$18.75 per hour, and Top Level workers who make \$27.50 an hour. On the assembly line Level 1 workers complete 4 toys an hour, Level 2 finish 5 and Top Level workers complete 6. There are 100 hours of assembly line time available and you have \$2000 for salaries. How many "worker-hours" of each should you schedule?
 - a) Define the variables.
 - b) Write a system of 3 equations to model the data.
 - c) Write a matrix equation for this system.
 - d) Solve the problem and explain the solution.

- 6) How much water must be evaporated from a 400 L tank of a 2% salt solution to obtain a 5% solution?
- 7) The graph of $f(x)$ is given below. State the piecewise rule for function f .



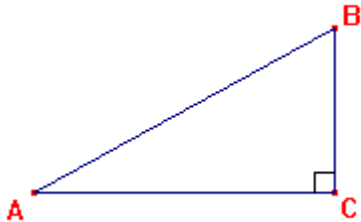
- 8) Using the function graphed in problem 7, sketch the graph of
- $f(x+3)$
 - $\frac{1}{2}f(2x)$
- 9) a) State the piecewise rule for the graph you made in 8a.
- b) Compare your answers to 7 and 9a. Make a conjecture as to how a translation effects the rule for a function.
- 10) a. Find all values of x for which: $|2x-13|=9$
- b. Find all values of x for which: $|2x-13|>9$
- (Write as a set and graph on a number line)
- 11) **NC** Solve for x :
- $x^2-12x+32=0$
 - $x^4-12x^2+32=0$
 - $x-12\sqrt{x}+32=0$
- 12) A store had two brands of fresnari on sale at \$7.00 and \$10.00. It was discovered that the average selling price of all the fresnari was \$9.00. What was the ratio of the number of \$7.00 fresnari sold to the number of \$10.00 fresnari sold?

- 13) Determine x , if the shaded area between the two rectangles is 960 square units.



The inverse function keys on the calculator (\sin^{-1} , \cos^{-1} , \tan^{-1}) are used to determine an angle when its sine, cosine, or tangent is known.

Example: Find angle A and angle B in this triangle:



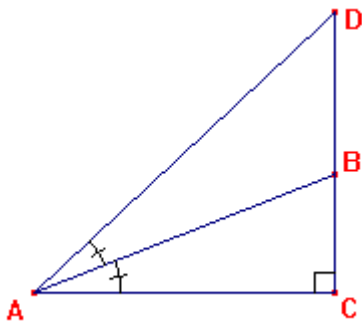
$$AB = 7 \text{ and } BC = 5$$

$$\sin(A) = \frac{5}{7}$$

$$A = \sin^{-1}\left(\frac{5}{7}\right) = 45.6^\circ$$

$$B = \cos^{-1}\left(\frac{5}{7}\right) = 44.4^\circ = 90^\circ - A$$

- 14)



$A(0,0)$, $D(9,12)$, C is on the x -axis

- Find the lengths AD and $\angle DAC$.
- Find the coordinates of B .
- Find the equation of the altitude from C to \overline{AD} .

