

# Patterns

## Math A Regents Problems

**Jan 00**  
**#3 / 2 pts**

Mary says, “The number I am thinking of is divisible by 2 or it is divisible by 3.”  
Mary’s statement is false if the number she is thinking of is

- |     |   |     |    |
|-----|---|-----|----|
| (1) | 6 | (3) | 11 |
| (2) | 8 | (4) | 15 |

**Jan 00**  
**#6 / 2 pts**

If the number represented by  $n - 3$  is an odd integer, which expression represents the next greater odd integer?

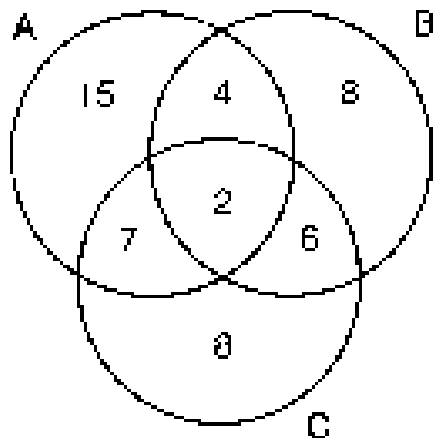
- |     |         |     |         |
|-----|---------|-----|---------|
| (1) | $n - 5$ | (3) | $n - 1$ |
| (2) | $n + 2$ | (4) | $n + 1$ |

**Jun 00**  
**#21 / 2 pts**

The formula for changing Celsius  $C$  temperature to Fahrenheit ( $F$ ) temperature is  $F = \frac{9}{5}C + 32$ . Calculate, to the nearest degree, the Fahrenheit temperature when the Celsius temperature is  $-8$ .

**Jun 00**  
**#26 / 3 pts**

The accompanying Venn diagram shows the number of students who take various courses. All students in circle  $A$  take mathematics. All in circle  $B$  take science. All in circle  $C$  take technology. What percentage of the students take mathematics or technology?



**Aug 00**  
**#26 / 32 pts**

John, Dan, Karen, and Beth went to a costume ball. They chose to go as Anthony and Cleopatra, and Romeo and Juliet. John got the costumes for Romeo and Cleopatra, but not his own costume. Dan saw the costumes for Juliet and himself. Karen went as Anthony. Beth drove two of her friends, who were dressed as Anthony and Cleopatra, to the ball. What costume did John wear?

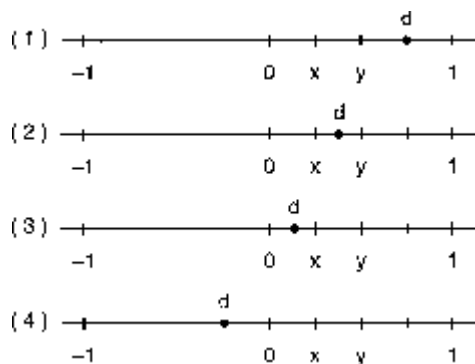
**Jan 01**  
**#1 / 2 pts**

There are 461 students and 20 teachers taking buses on a trip to a museum. Each bus can seat a maximum of 52. What is the *least* number of buses needed for the trip?

- |       |        |
|-------|--------|
| (1) 8 | (3) 10 |
| (2) 9 | (4) 11 |

**Jan 01**  
**#20 / 2 pts**

Let  $x$  and  $y$  be numbers such that  $0 < x < y < 1$ , and let  $d = x - y$ . Which graph could represent the location of  $d$  on the number line?



**Jan 01**  
**#29 / 3 pts**

Mark says, “The number I see is odd.” Jan says, “That same number is prime.” The teacher says, “Mark is correct or Jan is correct.” Some integers would make the teacher’s statement true while other integers would make it false. Give and explain *one* example of when the teacher’s statement is true. Give and explain *one* example of when the teacher’s statement is false.

# Pig

## Math A Regents Problems

**Jan 00**  
**#5 / 2 pts**

What was the median high temperature in Middletown during the 7-day period shown in the table below?

Daily High Temperature in Middletown	
Day	Temperature (°F)
Sunday	68
Monday	73
Tuesday	73
Wednesday	75
Thursday	69
Friday	67
Saturday	63

- (1) 69                      (3) 73  
(2) 70                      (4) 75

**Jan 00**  
**#9/ 2 pts**

Twenty-five percent of 88 is the same as what percent of 22?

- (1)  $12\frac{1}{2}\%$                       (3) 50%  
(2) 40%                          (4) 100%

**Jan 00**  
**#3/ 2 pts**

How many different 4-letter arrangements can be formed using the letters of the word "JUMP," if each letter is used only once?

- (1) 24                          (3) 12  
(2) 16                          (4) 4

**Jan 00**  
**#17 / 2 pts**

The party registration of the voters in Jonesville is shown in the table below.

<b>Registered Voters in Jonesville</b>	
<b>Party Registration</b>	<b>Number of Voters Registered</b>
Democrat	6,000
Republican	5,300
Independent	3,700

If one of the registered Jonesville voters is selected at random, what is the probability that the person selected is *not* a Democrat?

- (1) 0.333                      (3) 0.600  
(2) 0.400                      (4) 0.667

**Jan 00**  
**#26 / 3 pts**

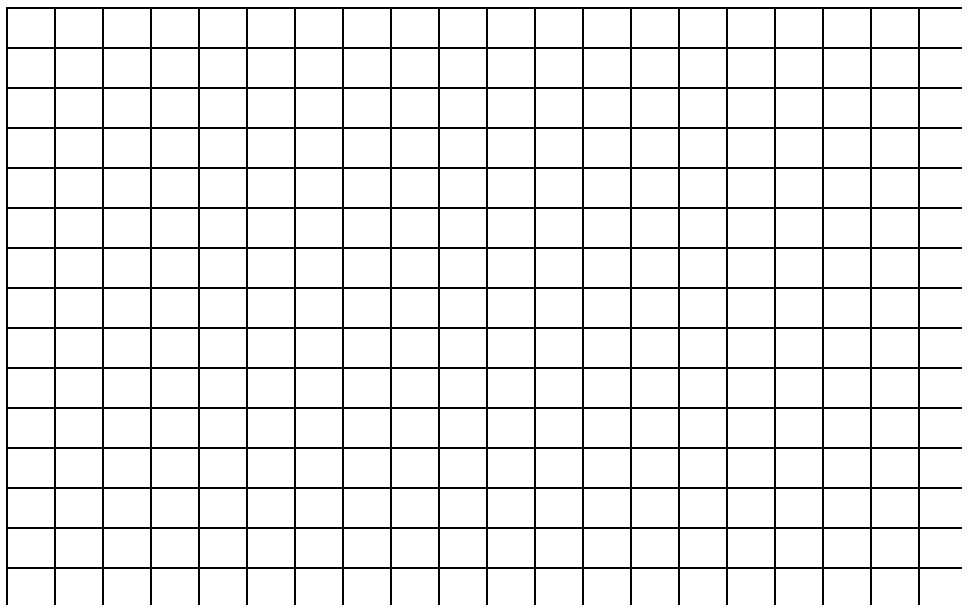
Judy needs a mean (average) score of 86 on four tests to earn a midterm grade of B. If the mean of her scores for the first three tests was 83, what is the *lowest* score on a 100-point scale that she can receive on the fourth test to have a midterm grade of B?

**Jan 00**  
**#32 / 4 pts**

In the time trials for the 400-meter run at the state sectionals, the 15 runners recorded the times shown in the table below.

400-Meter Run	
Time (sec)	Frequency
50.0–50.9	
51.0–51.9	II
52.0–52.9	IIII
53.0–53.9	III
54.0–54.9	IIII

- a) Using the data from the frequency column, draw a frequency histogram on the grid provided below.



- b) What percent of the runners completed the time trial between 52.0 and 53.9 seconds?

**Jan 00**  
**#34 / 4 pts**

Three roses will be selected for a flower vase. The florist has 1 red rose, 1 white rose, 1 yellow rose, 1 orange rose, and 1 pink rose from which to choose.

- a) How many different 3-rose selections can be formed from the 5 roses?
  
  
  
  
  
  
  
  
  
  
- b) What is the probability that 3 roses selected at random will contain 1 red rose, 1 white rose, and 1 pink rose?
  
  
  
  
  
  
  
  
  
  
- c) What is the probability that 3 roses selected at random will not contain an orange rose?

**Jun 00**  
**#16 / 2 pts**

How many different five-digit numbers can be formed from the digits 1, 2, 3, 4, and 5 if each digit is used only once?

- |     |     |     |    |
|-----|-----|-----|----|
| (1) | 120 | (3) | 24 |
| (2) | 60  | (4) | 20 |

**Jun 00**  
**#17 / 2 pts**

For five algebra examinations, Maria has an average of 88. What must she score on the sixth test to bring her average up to exactly 90?

- |     |    |     |     |
|-----|----|-----|-----|
| (1) | 92 | (3) | 98  |
| (2) | 94 | (4) | 100 |

**Jun 00**  
**#23 / 2 pts**

All seven-digit telephone numbers in a town begin with 245. How many telephone numbers may be assigned in the town if the last four digits do *not* begin or end in a zero?

**Jun 00**  
**#33 / 4 pts**

The scores on a mathematics test were 70, 55, 61, 80, 85, 72, 65, 40, 74, 68, and 84. Complete the accompanying table, and use the table to construct a frequency histogram for these scores.

Score	Tally	Frequency
40-49		
50-59		
60-69		
70-79		
80-89		


**Jun 00**  
**#34 / 4 pts**

Paul orders a pizza. Chef Carl randomly chooses two different toppings to put on the pizza from the following: pepperoni, onion, sausage, mushrooms, and anchovies. If Paul will not eat pizza with mushrooms, determine the probability that Paul will *not* eat the pizza Chef Carl has made.

**Aug 00**  
**#2 / 2 pts**

A hockey team played  $n$  games, losing four of them and winning the rest. The ratio of games won to games lost is

(1)  $\frac{n-4}{4}$                       (3)  $\frac{4}{n}$

**Aug 00**  
**#2 / 2 pts**

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- (1)  $\frac{n-4}{4}$                       (3)  $\frac{4}{n}$   
(2)  $\frac{4}{n-4}$                       (4)  $\frac{n}{4}$

**Aug 00**  
**#8 / 2 pts**

On an English examination, two students received scores of 90, five students received 85, seven students received 75, and one student received 55. The average score on this examination was

- (1) 75                      (3) 77  
(2) 76                      (4) 79

**Aug 00**  
**#11 / 2 pts**

A box contains six black balls and four white balls. What is the probability of selecting a black ball at random from the box?

- (1)  $\frac{1}{10}$                       (3)  $\frac{4}{6}$   
(2)  $\frac{6}{10}$                       (4)  $\frac{6}{4}$

**Aug 00**  
**#25 / 2 pts**

Alan, Becky, Jesus, and Mariah are four students in the chess club. If two of these students will be selected to represent the school at a national convention, how many combinations of two students are possible?

**Aug 00**  
**#29 / 3 pts**

After an ice storm, the following headlines were reported in the *Glacier County Times*:

*Monday:* Ice Storm Devastates County — 8 out of every 10 homes lose electrical power

*Tuesday:* Restoration Begins — Power restored to  $\frac{1}{2}$  of affected homes

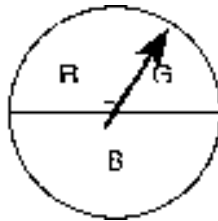
*Wednesday:* More Freezing Rain — Power lost by 20% of homes that had power on Tuesday



Based on these headlines, what fractional portion of homes in Glacier County had electrical power on Wednesday?

**Jan 01**  
**#6 / 2 pts**

At a school fair, the spinner represented in the accompanying diagram is spun twice.



What is the probability that it will land in section *G* the first time and then in section *B* the second time?

- |                   |                    |
|-------------------|--------------------|
| (1) $\frac{1}{2}$ | (3) $\frac{1}{8}$  |
| (2) $\frac{1}{4}$ | (4) $\frac{1}{16}$ |

**Jan 01**  
**#18 / 2 pts**

From January 3 to January 7, Buffalo recorded the following daily high temperatures:  $5^\circ$ ,  $7^\circ$ ,  $6^\circ$ ,  $5^\circ$ , and  $7^\circ$ . Which statement about the temperatures is true?

- |                   |                   |
|-------------------|-------------------|
| (1) mean = median | (3) median = mode |
| (2) mean = mode   | (4) mean < median |

**Jan 01**  
**#22 / 2 pts**

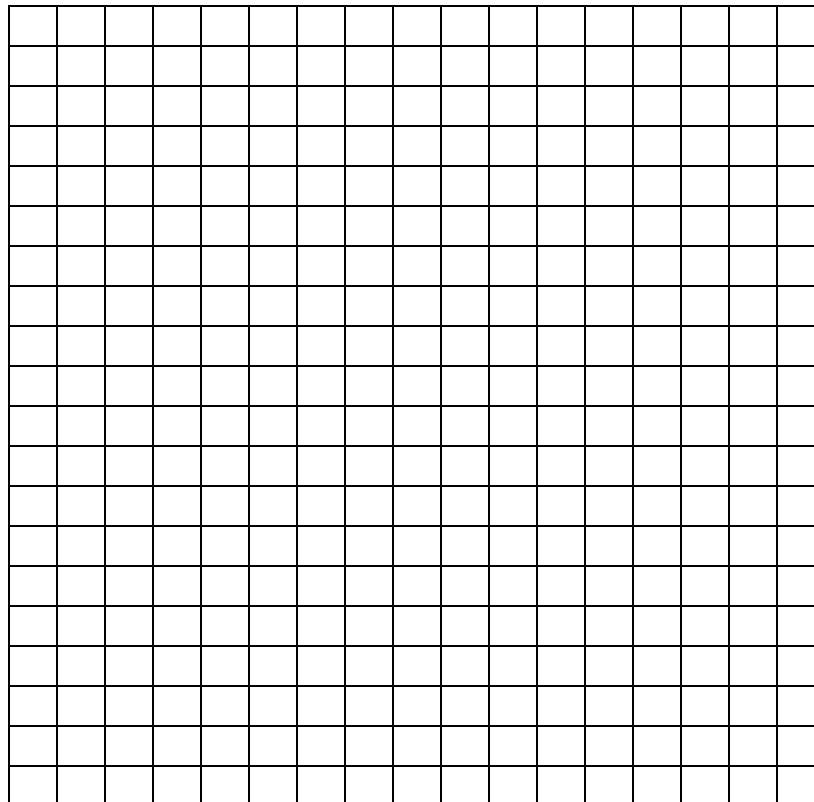
Sue bought a picnic table on sale for 50% off the original price. The store charged her 10% tax and her final cost was \$22.00. What was the original price of the picnic table?

**Jan 01**  
**#26 / 3 pts**

Sal has a small bag of candy containing three green candies and two red candies. While waiting for the bus, he ate two candies out of the bag, one after another, without looking. What is the probability that both candies were the same color?

**Jan 01**  
**#32 / 3 pts**

On a science quiz, 20 students received the following scores: 100, 95, 95, 90, 85, 85, 85, 80, 80, 80, 80, 75, 75, 75, 70, 70, 65, 65, 60, 55. Construct a statistical graph, such as a histogram or a stem-and-leaf plot, to display this data. *[Be sure to title the graph and label all axes or parts used.]*



If your type of plot requires a grid, show your work here.

# Overland Trail

## Math A Regents Problems

**Jan 00**  
**#27 / 3 pts**

A truck traveling at a constant rate of 45 miles per hour leaves Albany. One hour later a car traveling at a constant rate of 50 miles per hour also leaves Albany traveling in the same direction on the same highway. How long will it take for the car to catch up to the truck, if both vehicles continue in the same direction on the highway?

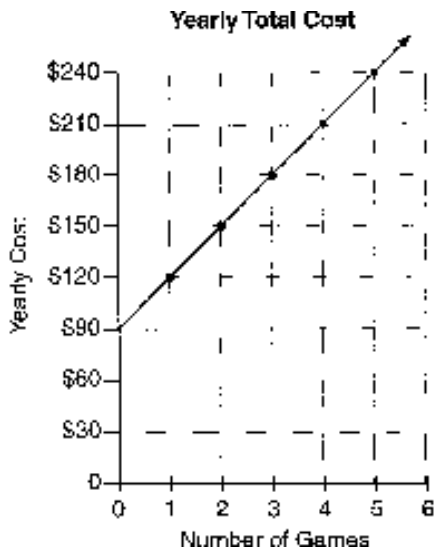
**Jan 00**  
**#35 / 4 pts**

The Excel Cable Company has a monthly fee of \$32.00 and an additional charge of \$8.00 for each premium channel. The Best Cable Company has a monthly fee of \$26.00 and an additional charge of \$10.00 for each premium channel. The Horton family is deciding which of these two cable companies to subscribe to.

- a) For what number of premium channels will the total monthly subscription fee for the Excel and Best Cable companies be the same?
  
  
  
  
  
  
  
  
  
  
- b) The Horton family decides to subscribe to 2 premium channels for a period of one year.
  1. Which cable company should they subscribe to in order to spend less money?
  
  
  
  
  
  
  
  2. How much money will the Hortons save in one year by using the less expensive company?

**Jun 00**  
**#25 / 2 pts**

The accompanying graph represents the yearly cost of playing 0 to 5 games of golf at the Shadybrook Golf Course. What is the total cost of joining the club and playing 10 games during the year?



**Jun 00**  
**#31 / 4 pts**

The owner of a movie theater was counting the money from 1 day's ticket sales. He knew that a total of 150 tickets were sold. Adult tickets cost \$7.50 each and children's tickets cost \$4.75 each. If the total receipts for the day were \$891.25, how many of *each* kind of ticket were sold?

**Aug 00**  
**#3 / 2 pts**

In the coordinate plane, what is the total number of points 5 units from the origin and equidistant from both the x- and y-axes?

- |     |   |     |   |
|-----|---|-----|---|
| (1) | 1 | (3) | 0 |
| (2) | 2 | (4) | 4 |

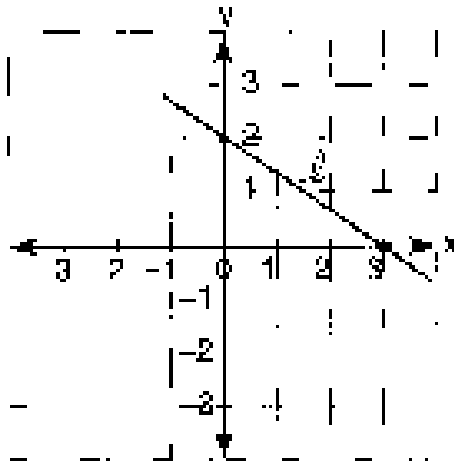
**Jan 01**  
**#04 / 2 pts**

Three times as many robins as cardinals visited a bird feeder. If a total of 20 robins and cardinals visited the feeder, how many were robins?

- |     |    |     |    |
|-----|----|-----|----|
| (1) | 5  | (3) | 15 |
| (2) | 10 | (4) | 20 |

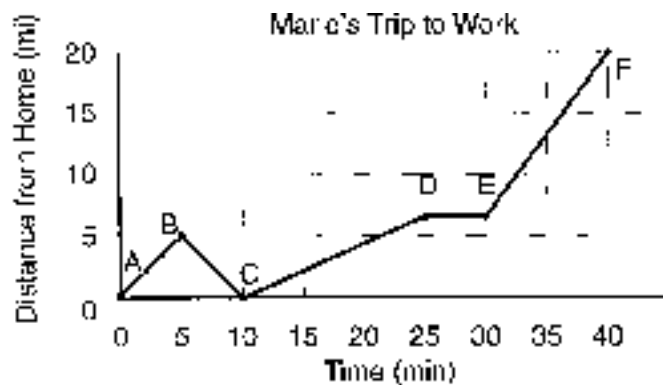
**Jan 01**  
**#15 / 2 pts**

What is the slope of line  $l$  in the accompanying diagram?



**Jan 01**  
**#21 / 2 pts**

The accompanying graph shows Marie's distance from home (A) to work (F) at various times during her drive.



- Marie left her briefcase at home and had to return to get it. State which point represents when she turned back around to go home and explain how you arrived at that conclusion.
- Marie also had to wait at the railroad tracks for a train to pass. How long did she wait?

**Jan 01**  
**#30 / 3 pts**

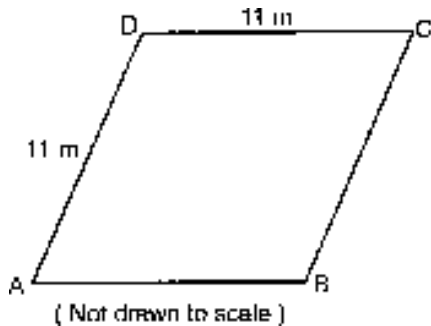
Juan has a cellular phone that costs \$12.95 per month plus 25¢ per minute for each call. Tiffany has a cellular phone that costs \$14.95 per month plus 15¢ per minute for each call. For what number of minutes do the two plans cost the same?

# Shadows

## Math A Regents Problems

**Jan 00**  
**#10/ 2 pts**

A plot of land is in the shape of rhombus  $ABCD$  as shown below.

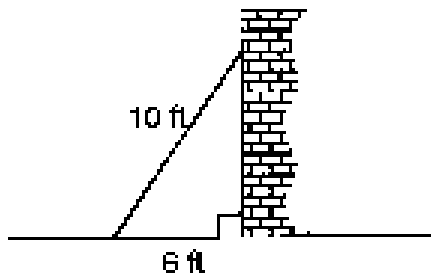


Which can *not* be the length of diagonal  $AC$ ?

- |     |      |     |      |
|-----|------|-----|------|
| (1) | 24 m | (3) | 11 m |
| (2) | 18 m | (4) | 4 m  |

**Jan 00**  
**#23 / 2 pts**

A wall is supported by a brace 10 feet long, as shown in the diagram below. If one end of the brace is placed 6 feet from the base of the wall, how many feet up the wall does the brace reach?



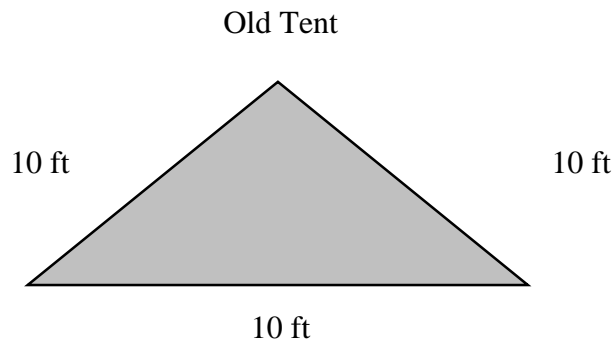
**Jan 00**  
**#25 / 2 pts**

Al says, “If  $ABCD$  is a parallelogram, then  $ABCD$  is a rectangle.” Sketch a quadrilateral  $ABCD$  that shows that Al’s statement is not always true. Your sketch must show the length of each side and the measure of each angle for the quadrilateral you draw.



**Jun 00**  
**#24 / 2 pts**

The Rivera family bought a new tent for camping. Their old tent had equal sides of 10 feet and a floor width of 15 feet, as shown in the accompanying diagram.



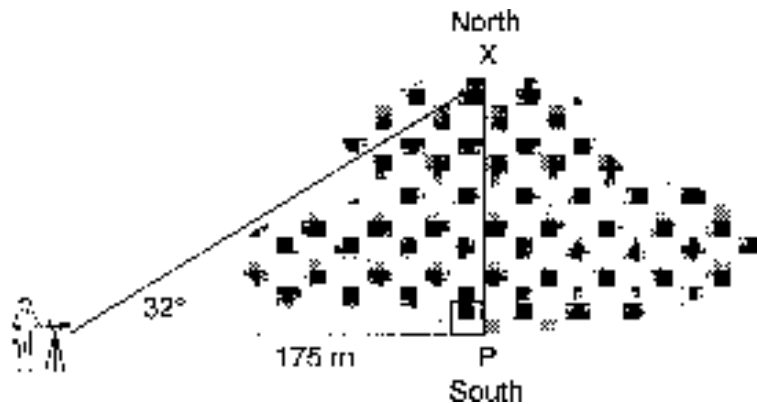
If the new tent is similar in shape to the old tent and has equal sides of 16 feet, how wide is the floor of the new tent?

**Jun 00**  
**#27 / 3 pts**

Hersch says if a triangle is an obtuse triangle, then it cannot also be an isosceles triangle. Using a diagram, show that Hersch is incorrect, and indicate the measures of all the angles and sides to justify your answer.

**Jun 00**  
**#30 / 3 pts**

A surveyor needs to determine the distance across the pond shown in the accompanying diagram. She determines that the distance from her position to point  $P$  on the south shore of the pond is 175 meters and the angle from her position to point  $X$  on the north shore is  $32^\circ$ . Determine the distance,  $PX$ , across the pond, rounded to the *nearest meter*.



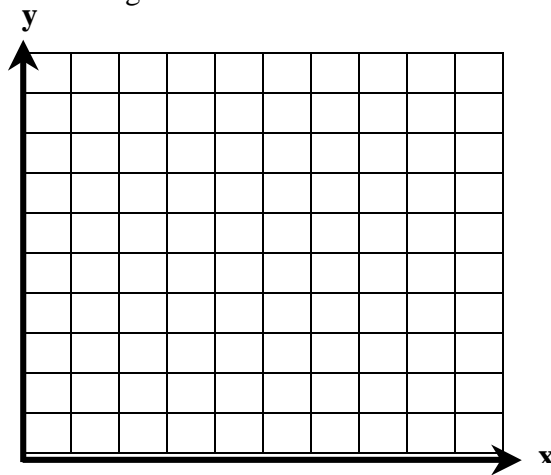
**Aug 00**  
**#18 / 2 pts**

If two sides of a triangle are 1 and 3, the third side may be

- |     |   |     |   |
|-----|---|-----|---|
| (1) | 5 | (3) | 3 |
| (2) | 2 | (4) | 4 |

**Aug 00**  
**#32 / 4 pts**

Ashanti is surveying for a new parking lot shaped like a parallelogram. She knows that three of the vertices of parallelogram  $ABCD$  are  $A(0,0)$ ,  $B(5,2)$ , and  $C(6,5)$ . Find the coordinates of point  $D$  and sketch parallelogram  $ABCD$  on the accompanying set of axes. Justify mathematically that the figure you have drawn is a parallelogram.



0

**Aug 00**  
**#33 / 4 pts**

A 10-foot ladder is to be placed against the side of a building. The base of the ladder must be placed at an angle of  $72^\circ$  with the level ground for a secure footing. Find, to the *nearest inch*, how far the base of the ladder should be from the side of the building *and* how far up the side of the building the ladder will reach.

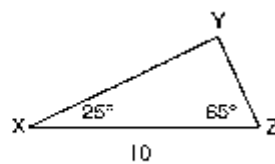
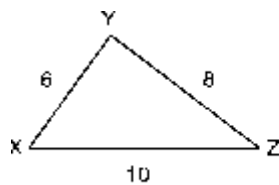
**Jan 01**  
**#2 / 2 pts**

In right triangle  $ABC$ ,  $m\angle C = 3y - 10$ ,  $m\angle B = y + 40$ , and  $m\angle A = 90$ . What type of right triangle is triangle  $ABC$ ?

- (1) scalene                      (3) equilateral  
 (2) isosceles                    (4) obtuse

**Jan 01**  
**#19 / 2 pts**

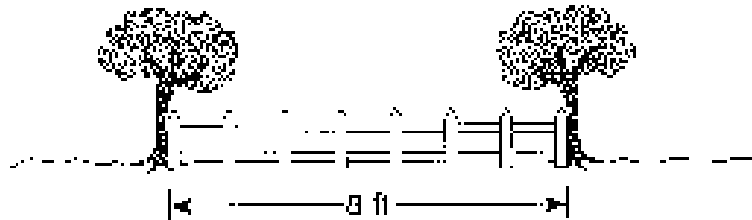
In which of the accompanying figures are segments  $XY$  and  $YZ$  perpendicular?



- (1) figure 1, only  
 (2) figure 2, only  
 (3) both figure 1 and figure 2  
 (4) neither figure 1 nor figure 2

**Jan 01**  
**#27 / 3 pts**

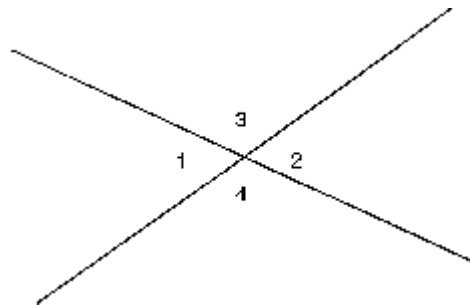
Steve has a treasure map, represented in the accompanying diagram, that shows two trees 8 feet apart and a straight fence connecting them. The map states that treasure is buried 3 feet from the fence and equidistant from the two trees.



- Sketch a diagram to show all the places where the treasure could be buried. Clearly indicate in your diagram where the treasure could be buried.
- What is the distance between the treasure and one of the trees?

**Jan 01**  
**#28 / 3 pts**

In the accompanying figure, two lines intersect,  $m\angle 3 = 6t + 30$ , and  $m\angle 2 = 8t - 60$ . Find the number of degrees in  $m\angle 4$ .



**Jan 01**  
**#35 / 4 pts**

Find, to the *nearest tenth of a foot*, the height of the tree represented in the accompanying diagram.

