

1. Electric candles are priced as follows: one for \$9.98; two for \$14.96; and three for \$19.98. If a restaurant owner purchases 14 candles, what is the maximum amount of money that can be saved by not buying them individually?

A. \$34.94

B. \$35.00

**C.** \$44.84

D. There is no savings.

$$19.98(4) + 14.96 = 94.98$$

$$14(9.98) = 139.72$$

2. Suppose a car uses 4.3 gallons of gasoline traveling 96 miles, and its owner wants to know how many gallons would be needed to travel a distance of 200 miles. Which of the following proportions could be used?

A.  $\frac{4.3 \text{ g}}{96 \text{ mi}} = \frac{200 \text{ mi}}{x \text{ g}}$

B.  $\frac{4.3}{200} = \frac{96}{x}$

**C.**  $\frac{4.3 \text{ g}}{96 \text{ mi}} = \frac{x \text{ g}}{200 \text{ mi}}$

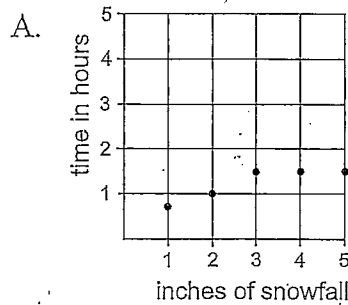
D.  $\frac{96}{200} = \frac{x}{4.3}$

3. You are given the following linear equation:  $y = -2x + 3$ .

In your **Answer Document**, identify the slope of the line. Display the graph of the line.

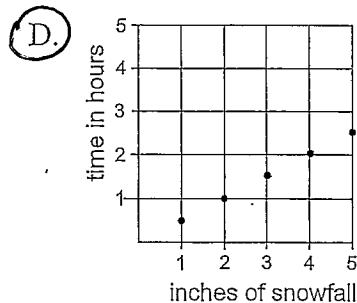
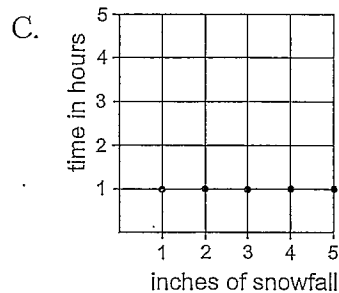
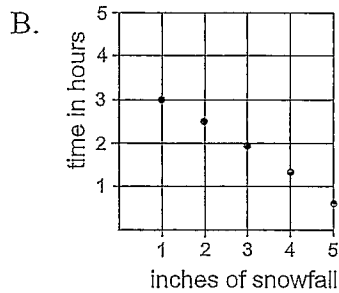
See attached page

4. The time it takes to shovel snow from a driveway is directly related to the amount of snow on the driveway. Which graph best portrays this relationship?



\* directly related = as  $x$  increases so does  $y$

indirectly related = as  $x$  increases  $y$  decreased



5. Two rectangular boxes have equal length ( $l$ ) and equal width ( $w$ ), but the height of one box is twice the height ( $h$ ) of the other box. What is the difference between the surface areas of the two boxes?

- A.  $2wh + 2lh$ .
- B.  $2lw + 2wh + 2lh$
- C.  $2lw + 4wh + 4lh$
- D.  $8lw + 8wh + 8lh$

*See attached page for work*

6. Karen wants to gift wrap a carton that measures 18" x 12" x 5". A gift shop has rolls of wrapping paper that are 30" wide with a total area of 30 ft<sup>2</sup>. The shop also carries rolls that are 36" wide, with a total area of 85 ft<sup>2</sup>.

In your **Answer Document**, explain which type of wrapping paper would be best for Karen to buy if she does not want much leftover paper. Support your explanation by showing your work.

*see attached page*

7. Two points lie on a line for which the slope is undefined. Which of the following sets of ordered pairs could represent the two points?

- A. (-1, -2), (-1, 2)
- B. (-1, -2), (-2, 1)
- C. (1, -2), (-1, -2)
- D. (-2, -1), (-1, -2)

*\*vertical lines are undefined and any 2 pts have same x*  
*\*horizontal lines have 0 slope and any 2 pts have same y.*

8. Jeans are on sale at 40% to 60% off. What is the lowest possible price you could expect to pay for a pair of jeans originally priced at \$50?

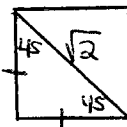
- A. \$10
- B. \$20
- C. \$30
- D. \$40

*\$50 x .6 = \$30*  
*\$50 - \$30 = \$20*

9. The diagonal measure of a square tile is  $\sqrt{2}$  cm. Which of the following are the possible dimensions of the tile, in

centimeters?

- A. 1 cm x 1 cm
- B. 2 cm x 2 cm
- C. 1 cm x 2 cm
- D.  $\sqrt{2}$  cm x  $\sqrt{2}$  cm



$$a^2 + b^2 = c^2$$

$$x^2 + x^2 = (\sqrt{2})^2$$

$$2x^2 = 2$$

$$x^2 = 1$$

$$x = 1$$

10. To create a circle graph, one must divide the circle into segments, each including a central angle. What is the measure of a central angle for a segment that depicts  $\frac{1}{10}$  of a family budget?

- A. 1°
- B. 10°
- C. 18°
- D. 36°

$$\frac{360^\circ}{10} = 36$$

11. The general equation of a circle is  $(x - a)^2 + (y - b)^2 = r^2$ . If the graph of a specific circle with its center at the origin passes through the point (4, 0), what is the equation of the circle?

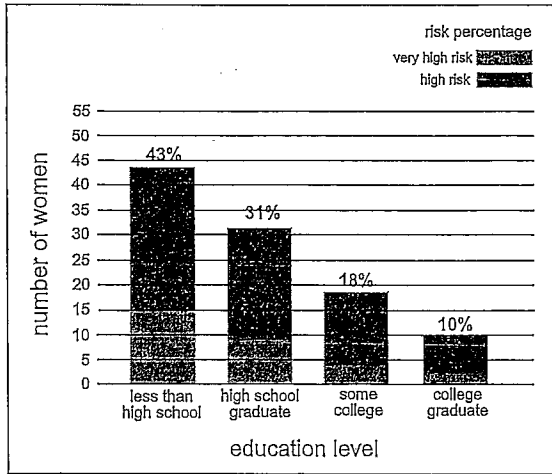
- A.  $x^2 + y^2 = 4^2$
- B.  $x^2 + (y - 4)^2 = 4^2$
- C.  $(x - 4)^2 + y^2 = 4^2$
- D.  $(x - 4)^2 + y^2 = 0$

*center (a, b) = (0, 0)*  
*radius 4. distance from center to 0*



12. Data collected in a survey of women related to heart disease is displayed below.

**Women at Risk For Heart Disease**



In your **Answer Document**, write a one-sentence conclusion that can be reached from this data.

*See attached page*

13. To settle a dispute about room temperature, an office manager asked each employee to identify a preferred temperature. Results include the following: 68, 68, 70, 70, 70, 70, 71, 71, 71, 72, 72, 74, 75, 80, and 82.

If the average preferred temperature is set, how many workers will think the office is too cool?

- (A) 4
- B. 6
- C. 9
- D. cannot be determined

14. Two men want to know the probability of an arrow hitting a bull's-eye when it is shot at the target.

In your **Answer Document**, describe an experiment that might determine the approximate probability of a hit.

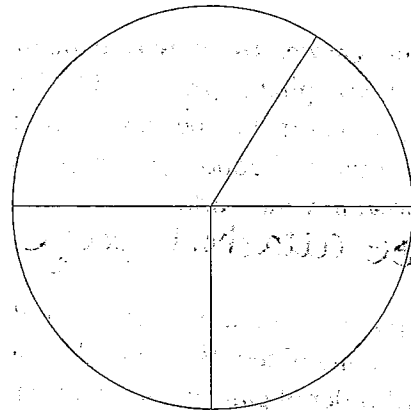
*See attached page*

15. A certain TV channel allocates 12 minutes of each half hour to commercial breaks. What is the probability ( $p$ ) that, when a viewer turns on that channel, the viewer will immediately see a commercial?

- A.  $p = 0.12$
- B.  $p = 0.20$
- (C)  $p = 0.40$
- D.  $p = 0.60$

$$\frac{\text{possible}}{\text{total}} = \frac{12}{30} = .4$$

16. A circular region is sectioned as shown below. What is the approximate probability that, if a flea lands on the circular region, it will land on a section that is smaller than  $\frac{1}{4}$  of the region?



- (A)  $\frac{1}{6}$
- B.  $\frac{1}{3}$
- C.  $\frac{1}{2}$
- D.  $\frac{2}{3}$



17. Store A charges 10¢ for each copy that is made. Store B charges \$1.50 for 10 copies or fewer and 5¢ per copy after that. For how many copies will the cost be the same at both stores?

- A. 15
  - B. 20
  - C. 25
  - D. 30
- $10x = 1.50 + .05(x-10)$   
 $10x = 1.50 + .05x - 0.5$   
 $10x = 1. + .05x$   
 $\frac{0.05x = 1}{0.05 \quad 0.05}$

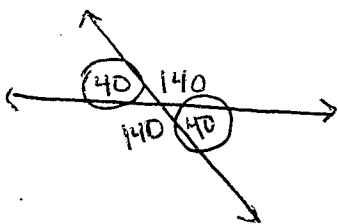
18.  $(\frac{4}{5})^{-3} = ?$

- A.  $\frac{125}{64}$
- B.  $\frac{5}{64}$
- C.  $\frac{5}{-12}$
- D.  $\frac{15}{12}$

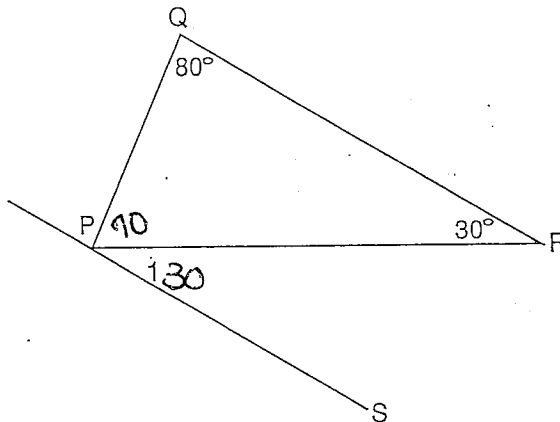
$\frac{4^{-3}}{5^{-3}} = \frac{5^3}{4^3}$

19. If two of the four angles formed by intersecting lines have measures 40° and 140°, what is the sum of the two smallest angles formed by the two intersecting lines?

- A. 40°
- B. 80°
- C. 180°
- D. cannot be determined



20. In order for line S to be parallel to  $\overline{QR}$ , the measure of angle 1 must be:



- A. 20°
- B. 30°
- C. 110°
- D. 150°

For lines to be parallel alternate int  $\angle$ 's must be  $\cong$

21. Order these numbers from least to greatest.

- $2\sqrt{2}$      $\pi$      $\sqrt{3}$     2.5  
 2.828    3.1415    1.732

change all to decimal to compare.

- A.  $\sqrt{3}, 2.5, 2\sqrt{2}, \pi$
- B.  $\sqrt{3}, 2.5, \pi, 2\sqrt{2}$
- C.  $2\sqrt{2}, \pi, \sqrt{3}, 2.5$
- D.  $\sqrt{3}, 2\sqrt{2}, 2.5, \pi$

22. Use deductive reasoning to identify a logical conclusion. What is the logical conclusion?

All squares are rectangles.  
Figure PQRS is a square.  
Therefore, \_\_\_\_\_?

- A. a square is not a rectangle.
- B. a rectangle is not a square.
- C. figure PQRS is not a rectangle.
- D. figure PQRS is a rectangle.

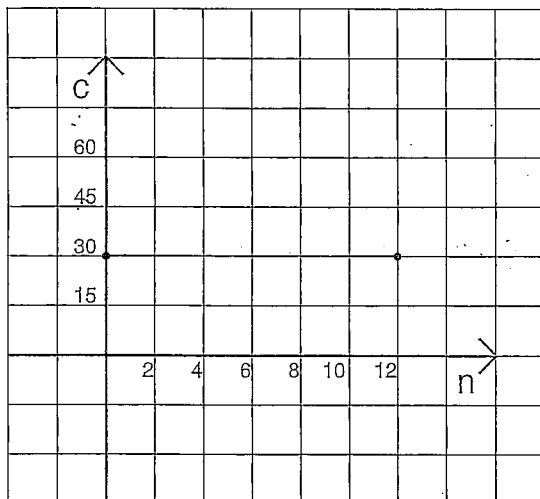


23. A landscaper plots the positions of his plantings on a coordinate plane. If he places a dogwood tree at (3, 0), a pear tree at (-2, 8), and a flowering bush at (3, -4), how much farther from the bush is the pear tree than the dogwood tree?

use distance formula

- A. 4 units
- B. 9 units**
- C. 13 units
- D.  $\sqrt{89}$  units
- dogwood to bush  
 $= \sqrt{(3-3)^2 + (-4-0)^2}$   
 $= 4$
- pear to bush  
 $= \sqrt{(3-(-2))^2 + (-4-8)^2}$   
 $= \sqrt{25 + 144}$   
 $= \sqrt{169} = 13$

24. Analyze this graph. Which real situation could it represent?



# of people in room does not affect heat cost.

as n ↑ y should ↑

- A. cost (c) of heating a room that seats 12 people (n)**
- B. cost (c) of up to a dozen (n) oranges at 50¢ per orange
- C. cost (c) of up to twelve (n) 10¢ candy sticks
- D. cost (c) of re-paving a 12-mile stretch (n) of highway

25. A roadside stop sign has a side length of 13 inches. If the ratio of similarity between the stop sign and a pictured stop sign in a drivers' manual is 39:1, what is the approximate side length of the picture in the drivers' manual?

- A.  $\frac{1}{3}$  inch**
- B.  $\frac{2}{3}$  inch
- C. 1 inch
- D. 3 inches

$$\frac{39}{1} = \frac{13}{x}$$

26. The formula for calculating the time (t), in seconds for a package to fall from an altitude of h feet is  $h = \frac{1}{2}(32)t^2$ . The crew of a plane drops packages of leaflets from a height of 3,200 feet. Approximately how many seconds are required for a package to reach the ground?

- A.  $\pm 10\sqrt{2}$
- B.  $\pm 5\sqrt{2}$
- C.  $5\sqrt{2}$
- D.  $10\sqrt{2}$**

$$3200 = 16t^2$$

$$\sqrt{200} = \sqrt{t^2}$$

$$\sqrt{100} \cdot \sqrt{2} = t$$

$$10\sqrt{2}$$



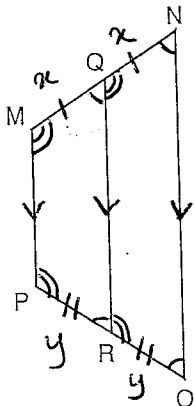
27. What is the probability that a new student will be elected class president if the odds are 225:1 that the student will not be elected?

- A. 0
- B.  $\frac{1}{225}$
- C.  $\frac{1}{226}$
- D.  $\frac{225}{226}$

28. Ben's dog, Bitsy, had a litter of puppies. Ben sold each puppy for \$50, and his expenses related to caring for the litter came to \$100. In your **Answer Document**, write an algebraic expression to represent how much profit Ben made from the sale of the puppies. Explain your answer.

*See attached page*

29. Trapezoid MNOP is divided by connecting the midpoints of the two sides, as shown. Is trapezoid MQRP similar to trapezoid QNOR?



$$\frac{x}{y} = \frac{x}{y}$$

- A. yes
- B. no
- C. cannot be determined
- D. if and only if PQ is congruent to OQ

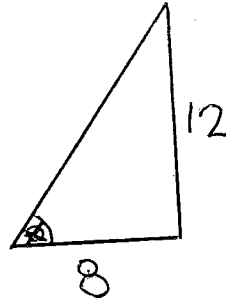
30. The base of a ladder is 8 feet from a wall. The top of the ladder rests on the wall at a point 12 feet from the ground. What is the tangent of the angle of elevation at the base of the ladder?

A.  $\frac{3}{2}$

B.  $4\sqrt{13}$

C.  $\frac{2}{3}$

D. 208



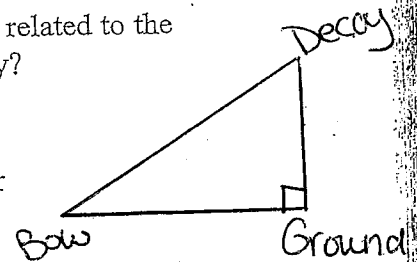
$\tan x = \frac{\text{opp leg}}{\text{adj leg}}$

$\tan x = \frac{12}{8}$

~~Other scribbled-out options~~

31. An archer raises his bow and shoots a decoy. The path of the falling decoy is perpendicular to the ground. Which geometric figure might best be drawn to simplify solving a problem related to the distance from bow to decoy?

- A. a rectangle
- B. a right circular cylinder
- C. a right triangle
- D. an isosceles trapezoid



32. The average value of car prices on a certain used car lot is less than the median price on the lot. Which of the following middle conclusions is true?

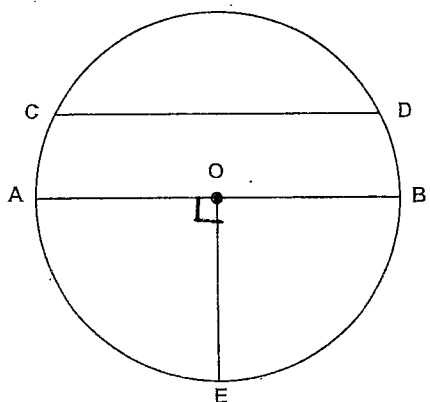
- A. There are some extremely low-priced cars on the lot.
- B. There are some extremely high-priced cars on the lot.
- C. The price of most cars is equal to the median.
- D. cannot be determined



33. What is the approximate height of a can of lemonade?

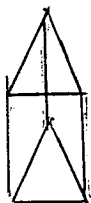
- A. 11 mm
- B. 11 cm
- C. 11 m
- D. 11 km

34. OE is perpendicular to AB. Which of the following will provide proof that OE is also perpendicular to CD?



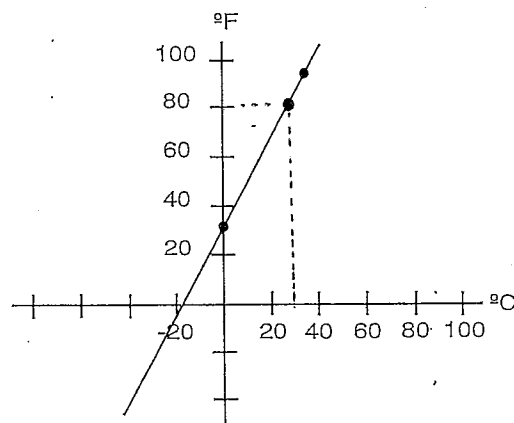
- A. The measure of  $\angle AOB$  is  $0^\circ$ .
- B. The slope of segment  $\overline{CD}$  is 0.
- C. The slopes of  $\overline{AB}$  and  $\overline{CD}$  are equal.
- D. The slopes of  $\overline{OE}$  and  $\overline{AB}$  are negative reciprocals.

35. A certain triangular prism has an isosceles triangle as its base. Which of the following describes the net for the triangular prism?



- A. 2 isosceles triangles, 2 congruent rectangles, 1 other rectangle
- B. 2 isosceles triangles, 2 congruent rectangles, 1 scalene triangle
- C. 2 isosceles triangles, 3 congruent rectangles
- D. 2 isosceles triangles, 2 congruent rectangles

36. Temperature may be measured in degrees Fahrenheit (F) or degrees Celsius (C). The relationship between the scales is graphed below.



According to the graph, if a daytime temperature is measured as  $80^\circ\text{F}$ , what is the day's approximate temperature when measured in Celsius?

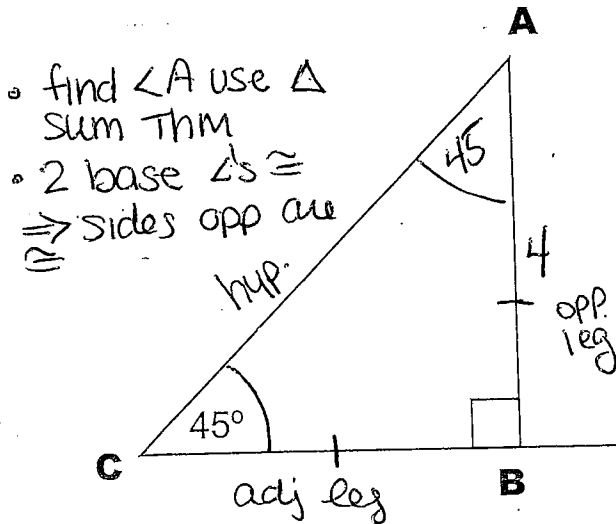
- A.  $27^\circ$
- B.  $53^\circ$
- C.  $80^\circ$
- D.  $107^\circ$

37. Let  $n$  be an integer greater than 1, and let  $x$  be a real number. Which of the following statements is true?

- A. The number  $b$  is an  $n$ th root of  $x$  if and only if  $b^n = x$ .  $2^3 = 8 \checkmark$
- B. The number  $b$  is an  $n$ th root of  $x$  if and only if  $\sqrt[n]{x} = x^n$ .  $\sqrt[3]{8} = 8^3$
- C. The  $n$ th root of  $x$  is an imaginary number.
- D. The  $n$ th root of  $x$  is larger than  $x$ .



38. A warehouse cable rises to a height of 4 feet at an angle of  $45^\circ$ , as shown.



Which of the following equations must be true?

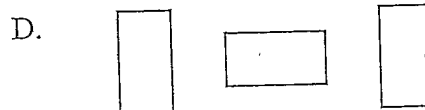
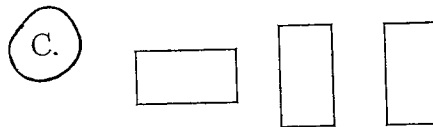
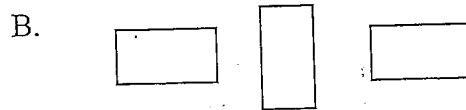
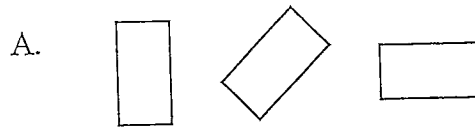
- A.  $\sin c = 1$
- B.  $\cos c = 1$
- C.  $\tan c = 1$
- D.  $\cos c = \tan c$

$$\sin = \frac{\text{opp. leg}}{\text{hypotenuse}}$$

$$\cos = \frac{\text{adjacent leg}}{\text{hypotenuse}}$$

$$\tan = \frac{\text{opp leg}}{\text{adj leg}}$$

39. A rectangular mat on a table is rotated  $90^\circ$  and then translated sideways onto a cart. Which graphic displays the transformation?



40. When political polls are conducted and one candidate is determined to be "leading," it is not certain that the "leading" candidate will win. In your Answer Document, explain why.

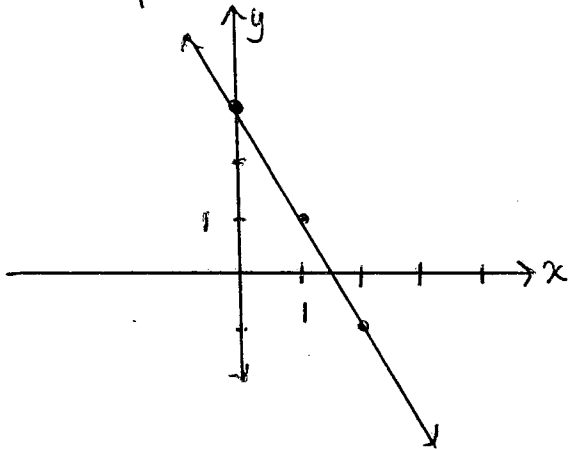
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#3.

Slope = -2



- be sure to label x & y axis
- label units on axis

#5  $SA = 2B + Ph$   
 $= 2lw + (2l + 2w)h$

$SA_1 = 2lw + 2lh + 2wh$

$SA_2 = \frac{2lw + 4lh + 4wh}{2lh + 2wh}$

subtract

#6.

① Find SA of carton

$SA = 2B + Ph$   
 $= 2(18 \cdot 12) + 60(5)$   
 $= 432 + 300$   
 $= 732 \text{ in}^2$

divide by 144 to convert to  $\text{ft}^2$ .

$\approx 5.08 \text{ ft}^2$

The  $30 \text{ ft}^2$  roll would be best for Karen to buy so she does not have much left over. She only needs  $5.08 \text{ ft}^2$   $30 = 24.92 \text{ ft}^2$  left compared to  $79.92$  for  $85 \text{ ft}^2$

#12. The lower the education a woman has the higher the risk she has of heart disease.

#4. The men should first throw a specific # of darts at a target. For example, they throw 50 darts at the target. They should keep a tally of the # of times they hit the bull's eye. To find the probability they should divide the # of bull's eye hits to the # of total throws. For example. They hit the bull's eye 7 times  $\frac{7}{50} = 0.14$  Finally, they should convert the decimal to a percent. Example. 14%.

#28  $P = 50x - 100$

Profit is found by taking revenue (money received from selling dogs)  $50x$  and subtracting the costs  $100$   $x$  represents the number of puppies in the litter.

- #40
- ① Not all voters are polled
  - ② Biased polls (democrats, women) etc
  - ③ Some polled may not vote
  - ④ Sample size (larger sample size better than smaller)