Problem Set #1 - NECAP Chapter 1 Problems

WATCH OUT for the NO CALCULATOR Problems:

Section 1.1-1.3: Real Numbers and Radicals

1.) The sum of three consecutive odd integers is 21. If x is the least of these odd integers, which equation **must** be true?

A. $3x = 21$

B. $3x + 3 = 21$

C. $3x + 4 = 21$

D. $3x + 6 = 21$

Section 1.3: Radicals

2.) Look at this equation.

$$y = \sqrt{10 + x}$$

Find one value of x that makes y an integer.

Section 1.4: Evaluating

3.) Look at this expression.

$$k(mk - k^2)$$

What is the value of this expression when $k = -1$ and $m = 2$?

A. -2

B. 0

C. 1

D. 3

Problem Set #2 - NECAP Chapter 1 Problems

Section 1.4 - Algebraic Expressions:

1.) A guitar manufacturer uses a computer-controlled machine to make electric guitars. The table below shows the total number of guitars made after 2, 4, 8, and 16 hours.

Hours (h)	Total Number of Guitars Made (g)
2	18
4	42
8	90
16	186

If g represents the total number of guitars made after h hours, which equation represents the pattern shown in the table?

A. $g = 12h - 6$
B. $g = 12h$
C. $g = 3h^2 - 6$
D. $g = 3h^2 + 6$

2.) The typical wingspan of the little blue heron is 4 inches more than half the typical wingspan of the great blue heron. If g represents the typical wingspan of the great blue heron, which expression represents the typical wingspan of the little blue heron?

A. $4\left(\frac{1}{2}g\right)$
B. $\frac{1}{2}g+4$
C. $2g + 4$
D. $\frac{1}{2}(g+4)$

3.) Section 1.6: Domain and Range of Functions

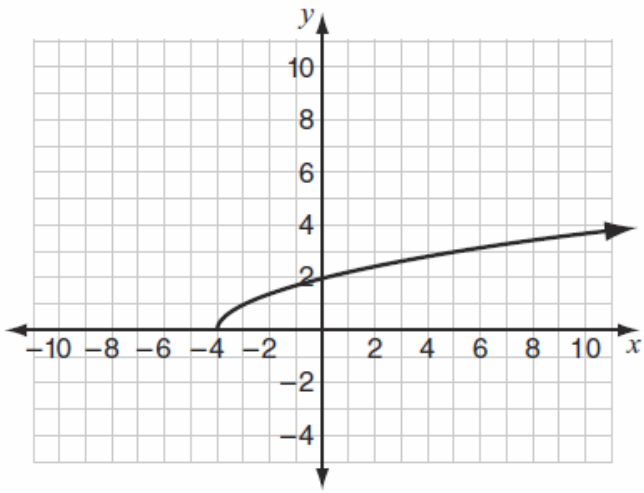
What is the range of the function $f(x)=x^2+3$ if the domain is $\{-3, 0, 3\}$?

A. $\{3, 12\}$
B. $\{-6, 3, 12\}$
C. all real numbers
D. all real numbers greater than or equal to 3

Problem Set #3 - NECAP Chapter 1 Problems

Section 1.6/1.8: Domain and Range of Functions

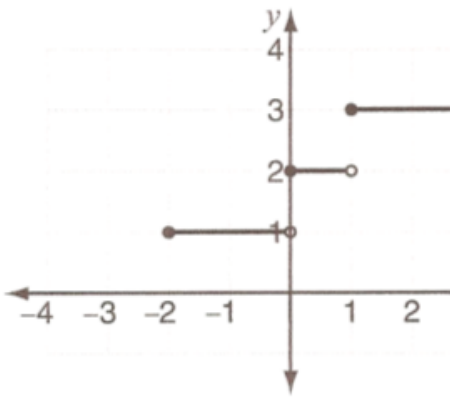
1.) Look at this graph of a function. (y is a function of x.)



What is the domain of the function?

A. all real numbers
B. all real numbers except -4
C. all real numbers greater than or equal to 0
D. all real numbers greater than or equal to -4

2.) Look at this graph of a function.



What is the range of this function?

Algebraic Equations:

3.) The sum of three consecutive odd integers is 21. If x is the least of these odd integers, which equation **must** be true?

A. $3x = 21$
B. $3x + 3 = 21$
C. $3x + 4 = 21$
D. $3x + 6 = 21$

Challenge:

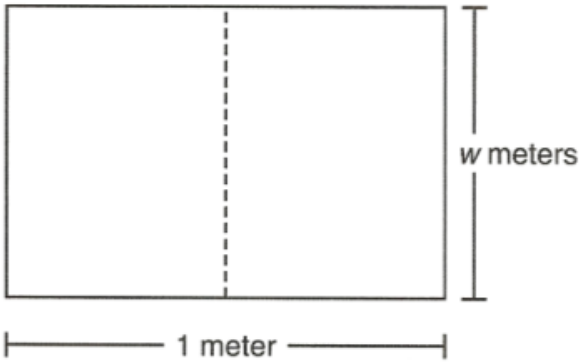
A rectangle has a length of 5 feet and a width of 3 feet. When the length and width are each increased by the same amount, the perimeter is increased by 10 feet. By how much are the length and width increased?

Problem Set #4- NECAP Chapter 2 Problems

WATCH OUT for the NO CALCULATOR Problems:

Section 2.2: Proportional Reasoning

1.) A rectangle is divided in half by a dotted line, as shown in this diagram.



not drawn to scale

Each half is similar to the original rectangle. The length of the original rectangle is 1 meter. What is the width, w, in meters, of the original rectangle?

A. $\frac{1}{4}$

B. $\frac{1}{2}$

C. $\sqrt{\frac{1}{2}}$

D. $\sqrt{2}$

Algebraic Equations:

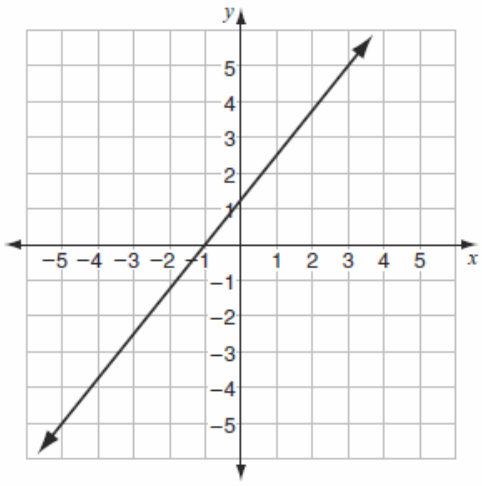
2.) Zack has \$60 to spend on a fish tank, supplies, and some fish.

- The fish tank and supplies cost \$29.50.
- Each fish costs \$2.70.

What is the maximum number of fish that Zack can buy?

Section 2.3/2.4: Graphing Linear Functions

3.) This graph shows a linear relationship between x and y.

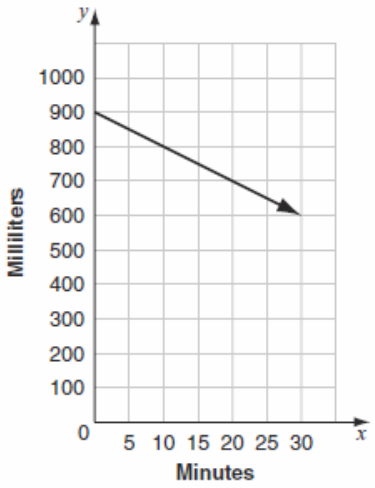


Based on the graph, what is the value of x when the value of y is 10?

Problem Set #5- NECAP Chapter 2 Problems

Section 2.3/2.4: Graphing Linear Functions

1.) A liquid solution is slowly leaking from a container. This graph shows the milliliters of solution, y, remaining in the container after x minutes.



a. What is the y-intercept of the line?

b. What is the slope of the line?

c. What does the slope of the line represent?

d. Use the graph and your answer from part b to predict the number of minutes it will take for the container to empty if the solution continues leaking at the same rate. Show your work or explain how you know.

2.)  Section 2.8: Solving Absolute Value Inequalities

Look at this inequality.

$$|x+5| \leq 2$$

List all **integer** values of x that make the inequality true.

Challenge:

When Andy, Felicia, and Tran started a company, they invested these amounts of money.

- Andy: $1000
- Felicia: $5000
- Tran: $7500

a. What fraction of the total amount invested was Andy's investment?

Andy, Felicia, and Tran decided to share the profits in the same ratio as the ratio of the amounts they invested. This year the company had a profit of $162,000.

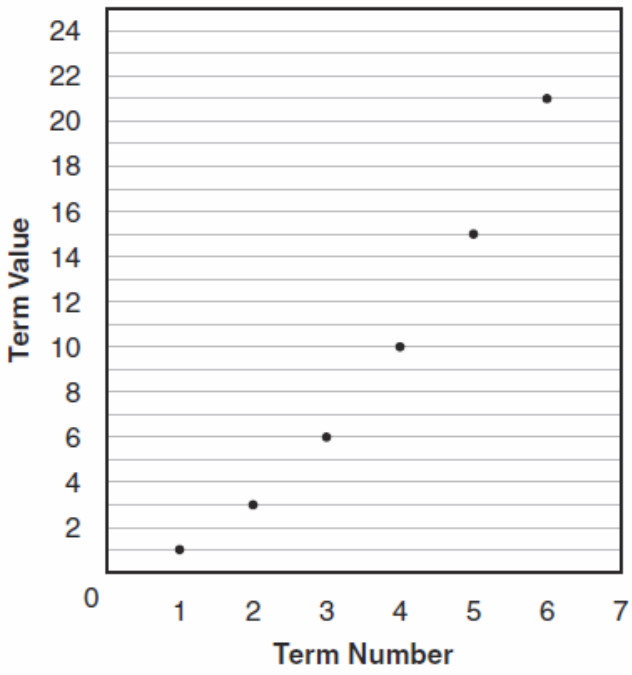
b. How much of the profit should each person receive? Show your work or explain how you know the amount of profit for each person.

Jay, Kim, and Lisa also started a company. Jay invested x dollars, Kim invested y dollars, and Lisa invested z dollars. They will share their profits in the same ratio as the ratio of the amounts they invested.

c. What fraction of the profits should Jay receive?

Problem Set #6- NECAP Graphs and Pattern Problems

1.) Look at the pattern shown in this graph.



If the pattern continues, what will be the value of Term 7 of this pattern?

A. 27
B. 28
C. 29
D. 30

2.)

What are the coordinates of the image of point $P(1, 4)$ after a **clockwise** rotation of 90° about the origin?

A. (4, –1)
B. (4, 1)
C. (1, –4)
D. (–1, –4)

3.)

What are the coordinates of the image of point $P(-3, -7)$ after a reflection about the line $y = 2$?

A. (–3, 9)
B. (–3, 11)
C. (5, –7)
D. (7, –7)

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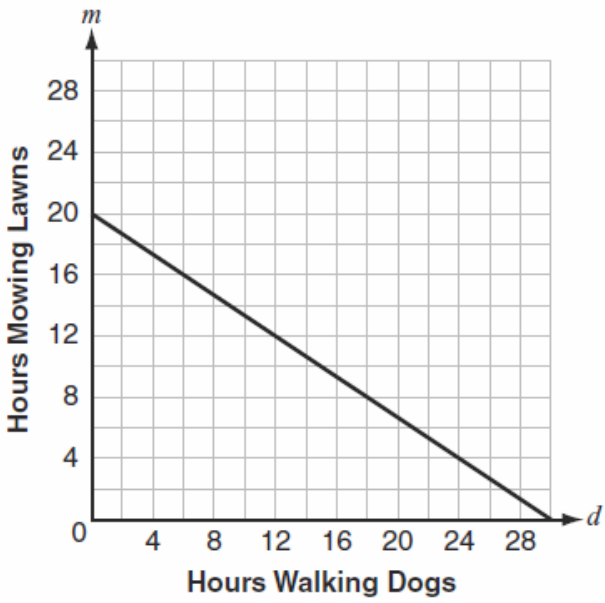
4.) Adam wants to earn a total of \$300 each week by walking dogs for d hours and mowing lawns for m hours. The graph below shows all possible numbers of hours Adam could walk dogs and mow lawns to earn exactly \$300 a week.



Last week Adam walked dogs for the same number of hours that he mowed lawns. He earned \$300. How many **total** hours did Adam walk dogs and mow lawns last week?

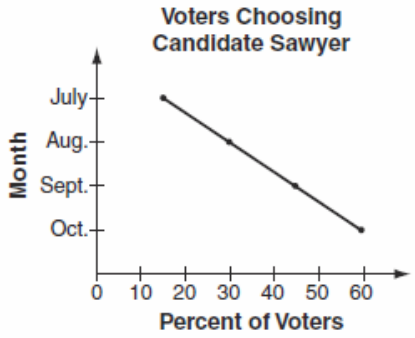
A. 20
B. 24
C. 28
D. 30

Problem Set #7- NECAP Graphs and Pattern Problems

1.) This table shows the results of polls taken during the four months preceding an election between two candidates—Sawyer and Hillman.

Percent of Voters Choosing Sawyer			
July	Aug.	Sept.	Oct.
15%	30%	45%	60%

Hillman published this graph in a newspaper.

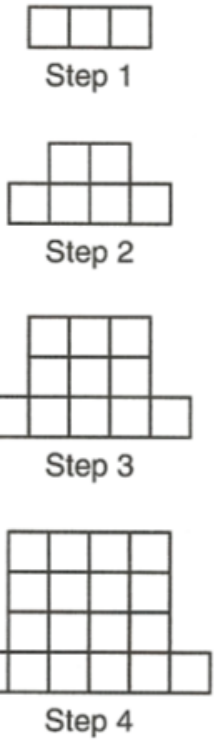


How could this graph be misleading about Sawyer's popularity?

A. The graph does not show the number of voters polled each month.
B. The graph does not show the percent of voters who chose Hillman.
C. The graph gives the impression that Sawyer's popularity is decreasing.
D. The graph gives the impression that Sawyer's popularity is changing at a constant rate.

Find the pattern:

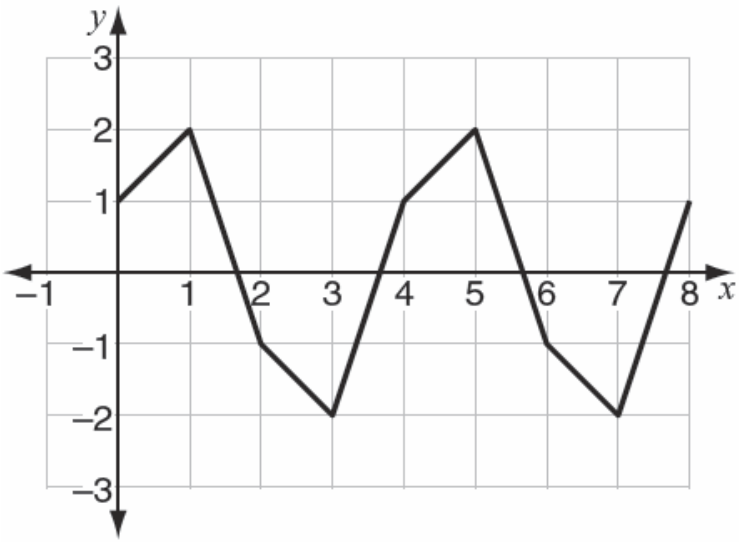
2.)



If the pattern continues, how many ☐ will be in Step 50?

A. 100
B. 102
C. 2500
D. 2502

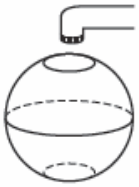
3.) Look at this function.



As the value of x increases, the y-values form a repeating pattern. If this pattern continues, what is the y-value when $x = 26$?

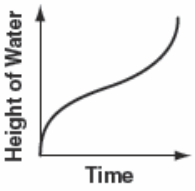
A. –2
B. –1
C. 1
D. 2

4.) Look at this container.

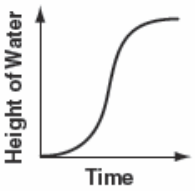


Water flows into this container at a constant rate. Which graph could represent the height of the water in the container over time?

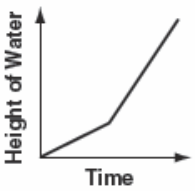
A.



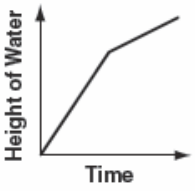
B.



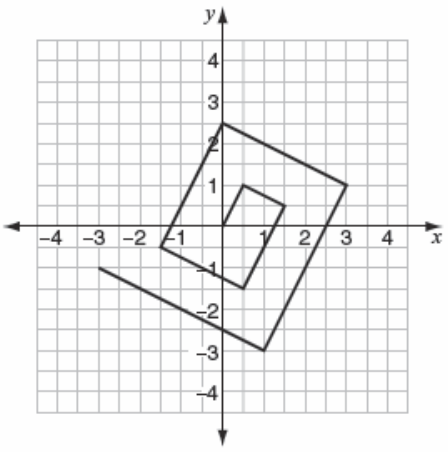
C.



D.



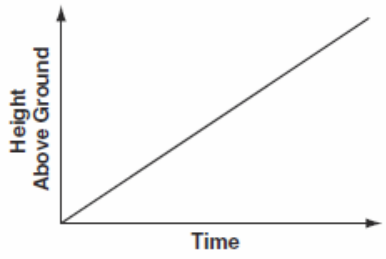
5.) Starting at the origin, Nadia drew eight line segments on this coordinate grid.



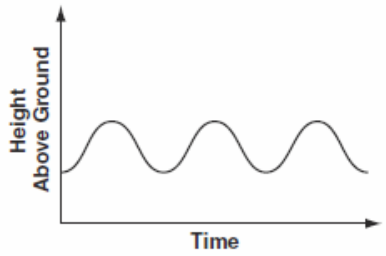
Nadia continues her pattern. What is the slope of the 25th line segment she will draw? Show your work or explain how you know.

6.) Emma pedals her bicycle at a constant rate. Which graph could show how one pedal's height above the ground changes with time?

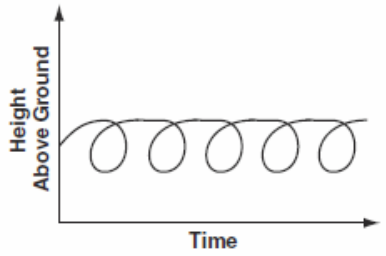
A.



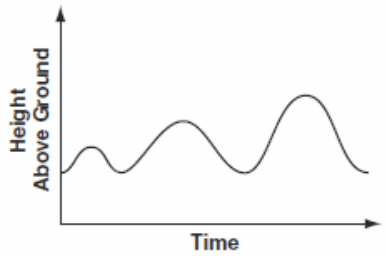
B.



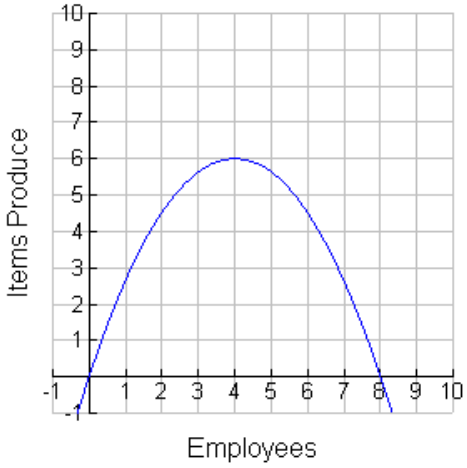
C.



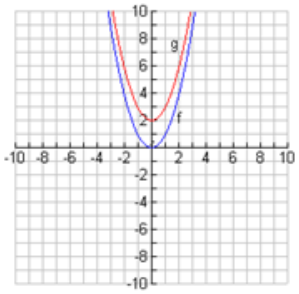
D.



7.) For what number of employees is the number of items produced per week the greatest?



8.) a) Complete the table.



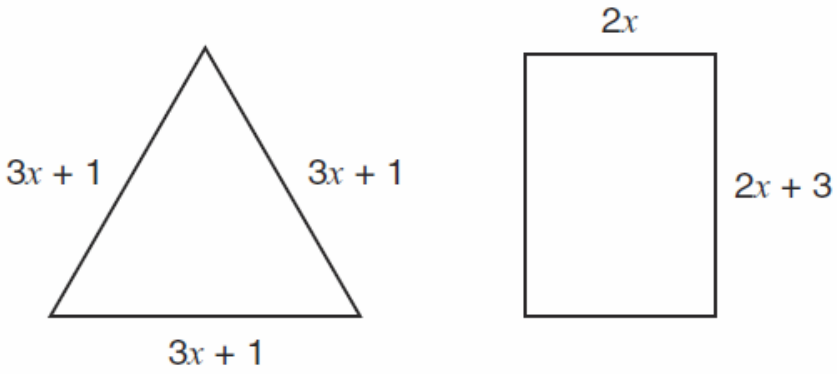
X	0	1	2	3	10	n
F(x)	0	1	4	9		
G(x)	2	3	6	11		

Problem Set #8 - NECAP Quadratics

1.) Which expression is equivalent to $(a + b)^2$?

A. $a^2 + b^2$
B. $2a + 2b$
C. $a^2 + ab + b^2$
D. $a^2 + 2ab + b^2$

2.) Look at these two shapes.



The perimeter of the triangle is equal to the perimeter of the rectangle. Which equation **must** be true?

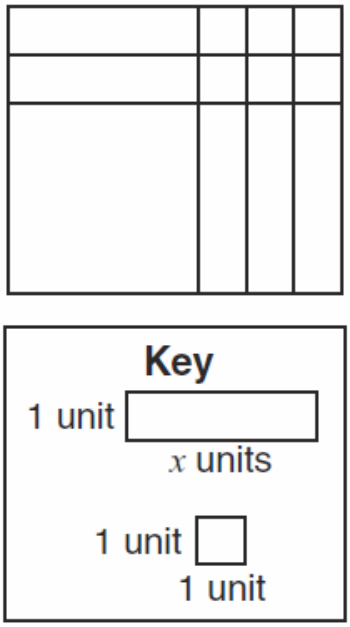
A. $3x+1=2x+2x+3$

B. $3(3x+1)=2(2x+3)$

C. $3\bullet 3x+1=2\bullet 2x+3$

D. $3(3x+1)=2(2x+2x+3)$

3.) Ariel used tiles to make this rectangle.



Which equation is modeled by Ariel's rectangle?

A. $x(5x + 6) = 5x^2 + 6x$

B. $(x + 3)^2 = x^2 + 6x + 9$

C. $(x + 2) + (x + 3) = 2x + 5$

D. $(x + 2)(x + 3) = x^2 + 5x + 6$

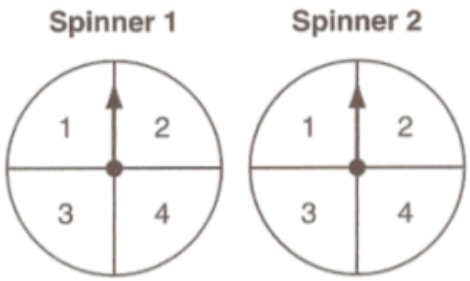
Jan 29-7:52 AM

Problem Set #9 - NECAP Chapter 11Problems

WATCH OUT for the NO CALCULATOR Problems:

1.) Al, Chris, Janet, and Tara will each give a speech to their class. In how many different orders can they give their speeches if Al must speak immediately after Tara?

2.) Look at these spinners.



Gary will spin the arrow on each spinner once and record the sum of the two numbers the arrows land on. What is the probability that the sum of the two numbers will be a prime number?

3.) A car dealer has 75 new vehicles. This table shows how the new vehicles are distributed by type and color.

	Cars	Trucks	Vans
Tan	5	2	3
Black	5	7	6
Red	4	2	2
Blue	6	6	8
Other	7	9	3

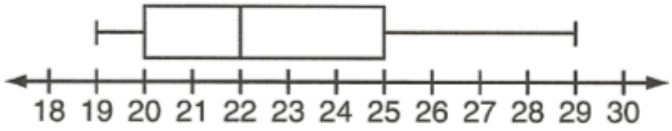
The sales manager plans to select one vehicle at random for a special promotion.

a. What is the probability that the vehicle selected will be a car?

b. If the vehicle selected is a van, then what is the probability that the van is black?

c. What is the probability that the vehicle selected will be either black or a van? Show your work or explain how you know.

4.) Andy recorded the number of points he scored in each basketball game he played last season. He used the data to make this box-and-whisker plot.



Number of Points per Game

Based on the box-and-whisker plot, which statement **must** be true?

A. Andy's mean score per game was 22 points.

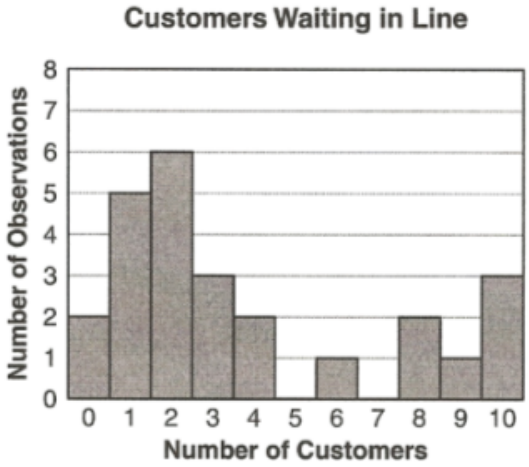
B. Andy scored more than 25 points in only 1 game.

C. In the games he played, Andy's scores had a range of 5 points.

D. In at least half the games he played, Andy scored from 20 points to 25 points.

Problem Set #10 - NECAP Chapter 11Problems

1.) Every 15 minutes on Thursday, Aisha counted the number of bank customers waiting in line. She made this bar graph from all of her observations.



a. What was the median number of customers waiting in line on Thursday?

b. What was the mean number of customers waiting in line on Thursday?

2.) A college recruiter compared the starting salaries for graduates with various majors. This table shows the results for two majors.

Major	Mean Starting Salary	Median Starting Salary	Range of Starting Salaries
Business	$39,000	$30,000	$20,000
Engineering	$35,000	$34,000	$12,000

Derrick will choose a major. He will decide between a business major and an engineering major. Use **all** of the information in the table to explain which major Derrick should choose.

Aug 26-9:44 AM