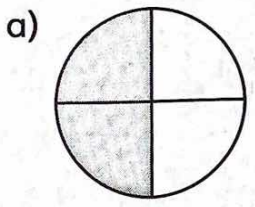
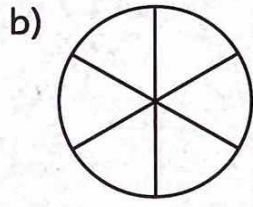


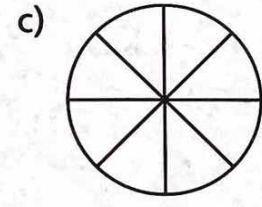
I. Shade half of the pieces.



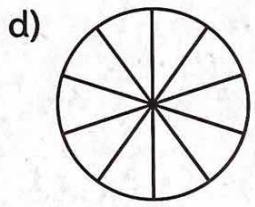
2 pieces in half a pie
4 pieces in a pie



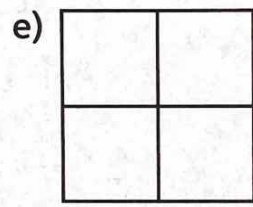
___ pieces in half a pie
 ___ pieces in a pie



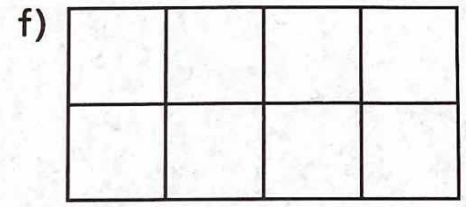
___ pieces in half a pie
 ___ pieces in a pie



___ pieces in half a pie
 ___ pieces in a pie



___ pieces in half a box
 ___ pieces in a box



___ pieces in half a box
 ___ pieces in a box

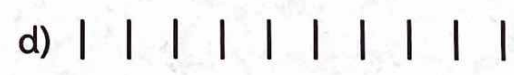
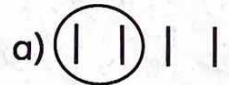
2. Divide by 2.

- a) $8 \div 2 = \underline{\quad}$ b) $4 \div 2 = \underline{\quad}$ c) $6 \div 2 = \underline{\quad}$ d) $10 \div 2 = \underline{\quad}$
 e) $20 \div 2 = \underline{\quad}$ f) $18 \div 2 = \underline{\quad}$ g) $2 \div 2 = \underline{\quad}$ h) $14 \div 2 = \underline{\quad}$

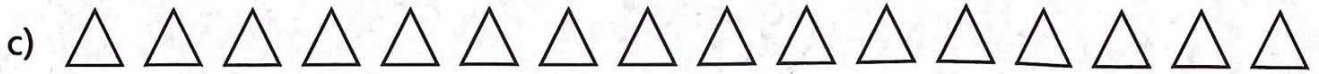
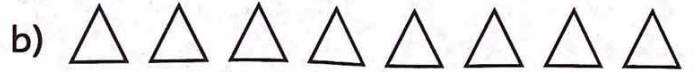
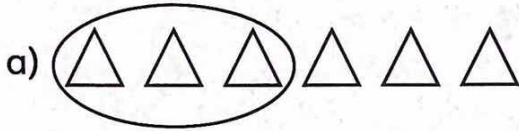
3. Fill in the table.

Number	10	8	14	16
Half the Number	5			
Sum	$\underline{5} + \underline{5} = 10$	$\underline{\quad} + \underline{\quad} = 8$	$\underline{\quad} + \underline{\quad} = 14$	$\underline{\quad} + \underline{\quad} = 16$

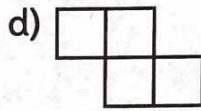
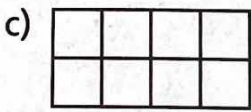
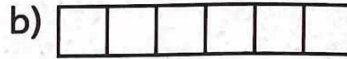
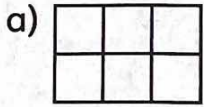
4. Circle half the lines to divide into two equal sets.



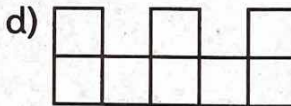
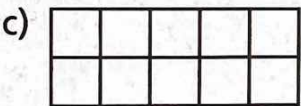
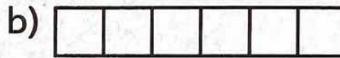
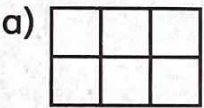
5. Circle half the triangles.



6. Shade 1 less than half of the squares.



7. Shade one more than half of the squares.



8. Is the first number more than half, half, or less than half of the second number? Hint: Find half of the second number first.

a) 2 is less than half of 6. b) 3 is _____ of 8.

c) 5 is _____ of 12. d) 6 is _____ of 10.

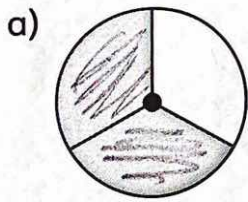
e) 9 is _____ of 18. f) 5 is _____ of 16.

g) 9 is _____ of 12. h) 10 is _____ of 14.

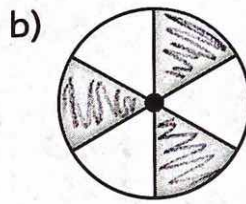
i) 6 is _____ of 8. j) 7 is _____ of 10.

k) 3 is _____ of 6. l) 4 is _____ of 6.

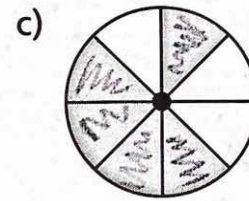
9. How many parts of the spinner are shaded? How many parts are there in total? Circle the spinner if exactly half the spinner is shaded.



_____ parts shaded
 _____ parts in total



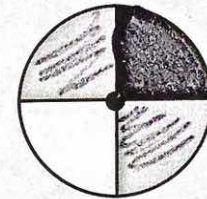
_____ parts shaded
 _____ parts in total



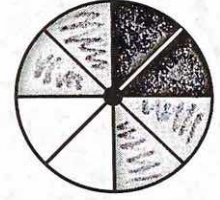
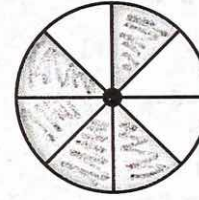
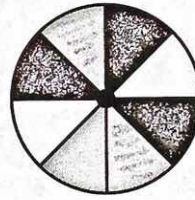
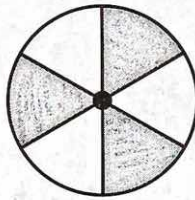
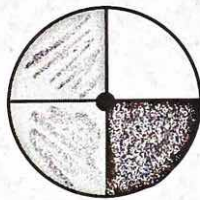
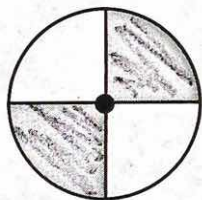
_____ parts shaded
 _____ parts in total

Half of the spinner is grey. You expect to spin grey half the time.

There is an **even chance** of spinning grey.



10. Count the shaded and unshaded regions. Circle the spinners that have an even chance of spinning grey.



11. Six marbles are in a box. Three of them are yellow.

a) Are exactly half the marbles yellow? _____

b) Is there an even chance of taking out a yellow marble? _____

12. Twelve marbles are in a box. Seven of them are green.

a) Are exactly half the marbles green? _____

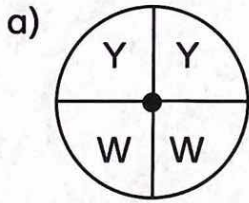
b) Is there an even chance of taking a green marble? _____

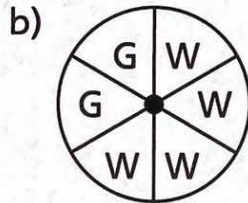
13. A hockey team plays 12 games and wins 7 of them. Does the team win more than half the games? Explain.

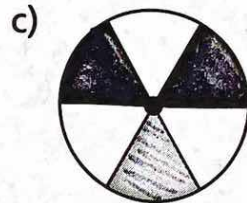
BONUS ▶ A basketball team won 4 out of their last 6 games. Based on the last 6 games, does the team have an even chance to win? Explain.

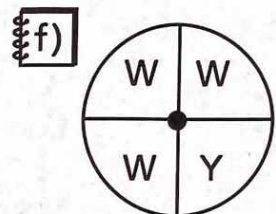
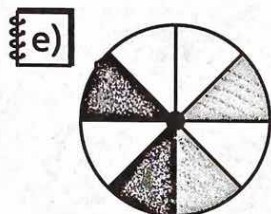
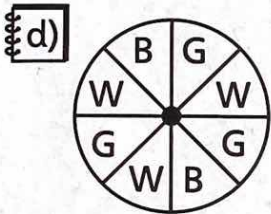
PDM3-14 Even, Likely, and Unlikely

1. How often do you expect to spin white? Write "more than half the time," "half the time," or "less than half the time."







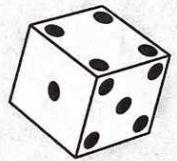


When you describe the result of a game, rolling a die, or spinning a spinner, you describe an **event**.

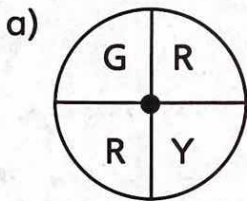
You expect an **even** event to happen exactly half the time.

You expect a **likely** event to happen more than half the time.

You expect an **unlikely** event to happen less than half the time.

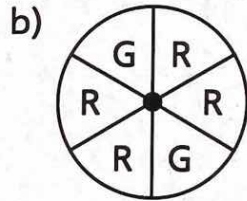


2. Describe the event as "likely" or "unlikely."



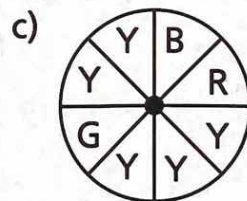
Spinning green is

_____.



Spinning red is

_____.



Spinning yellow is

_____.

3. Describe the chances of the event as "unlikely," "even," or "likely."

a) 8 marbles in a box, 4 red marbles
Event: You take out a red marble.

b) 10 marbles in a box, 6 red marbles
Event: You take out a red marble.

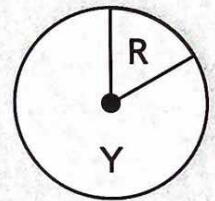
c) 6 socks in a drawer, 4 black socks
Event: You pull out a black sock.

d) 12 coins in a pocket, 3 dimes
Event: You take out a dime.

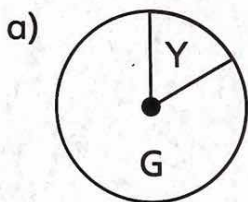
If an event cannot happen, it is **impossible**. Rolling the number 8 on a die is impossible because a die only has the numbers 1, 2, 3, 4, 5, and 6 on its faces.

If an event must happen, it is **certain**. When you roll a die, it is certain that you will roll a number less than 7.

You will **likely** spin yellow on the spinner in the picture. You are **unlikely** to spin red.

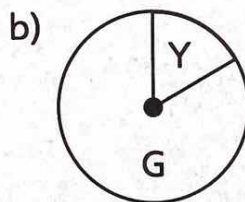


4. Write “certain,” “likely,” “unlikely,” or “impossible” to describe the chances of the event.



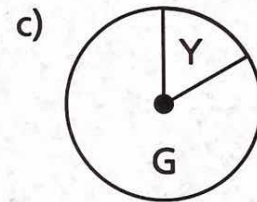
Spinning green is

_____.



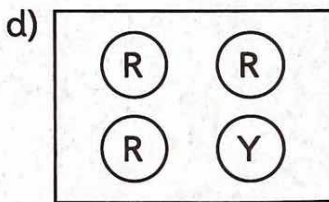
Spinning yellow is

_____.



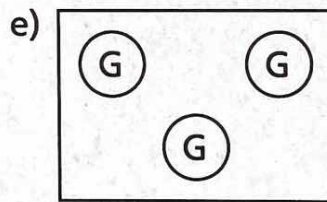
Spinning red is

_____.



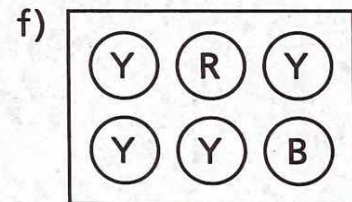
Picking red is

_____.



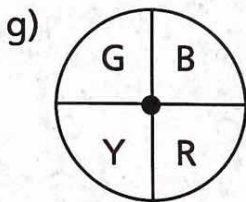
Picking green is

_____.



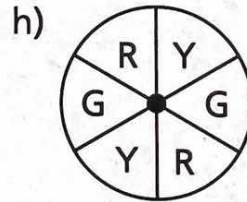
Picking yellow is

_____.



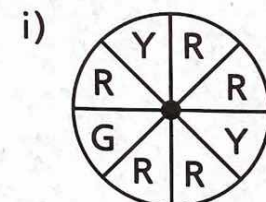
Spinning yellow is

_____.



Spinning green is

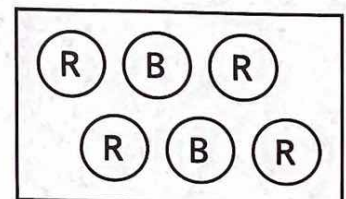
_____.



Spinning red is

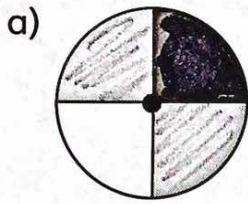
_____.

5. Which colour of marble are you more likely to take, red or blue? Explain your thinking.

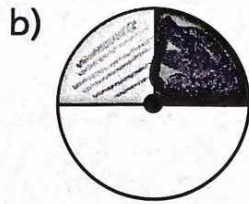


PDM3-15 Fair Games

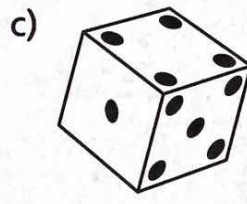
1. How many outcomes are there? Are all the outcomes equal?



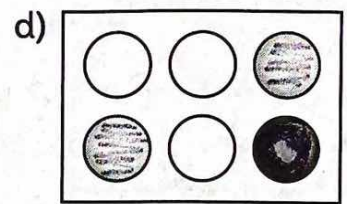
4 outcomes
Equal



3 outcomes
Not equal



6 outcomes
Equal



6 outcomes
Equal

A game is **fair** if all players have the same chances to win. You can check if a game is fair:

Step 1: Check that all outcomes are equal.

Step 2: Count how many outcomes give each player a win.

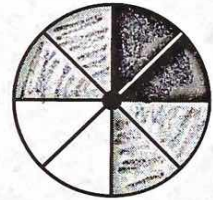
If the number of winning outcomes is the same for all players, the game is fair.

2. How many winning outcomes does each player have?

a) Player 1 wins if he spins white. Player 2 wins if she spins grey.

Player 1 has 2 winning outcomes.

Player 2 has 4 winning outcomes.



b) Player 1 wins if he tosses heads. Player 2 wins if he tosses tails.

Player 1 has 1 winning outcome.

Player 2 has 1 winning outcome.

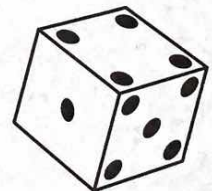


c) Player 1 wins if she rolls 1. Player 2 wins if he rolls 2. Player 3 wins if she rolls 3, 4, or 6.

Player 1 has 1 winning outcome.

Player 2 has 1 winning outcome.

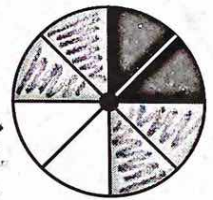
Player 3 has 3 winning outcomes.



3. In which part in Question 2 is the game fair? _____

4. Write "true" or "not true".

- a) Players spin the spinner shown. Player 1 wins by spinning black. Player 2 wins by spinning grey.



The outcomes are equal. True

- All players have the same number of winning outcomes. Not true

The game is fair. Not true

- b) Players roll a regular die. Player 1 wins by rolling a 1. Player 2 wins by rolling a 6.

The outcomes are equal. _____

All players have the same number of winning outcomes. _____

The game is fair. _____

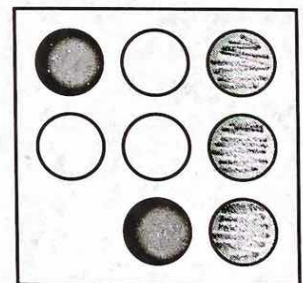
- c) Players roll a regular die. Player 1 wins by rolling a 1 or a 2. Player 2 wins by rolling a 5 or a 6.

The outcomes are equal. _____

All players have the same number of winning outcomes. _____

The game is fair. _____

- d) Players pull a marble out of the box shown without looking. Player 1 wins if he picks a grey marble. Player 2 wins if she picks a black marble.

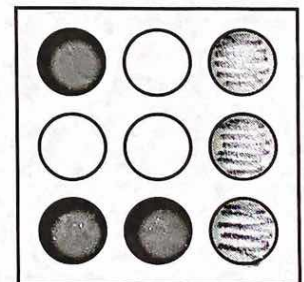


The outcomes are equal. _____

All players have the same number of winning outcomes. _____

The game is fair. _____

- e) Players pull a marble out of the box shown without looking. Player 1 wins if he picks a grey marble. Player 2 wins if she picks a black marble. Player 3 wins if he picks a white marble.



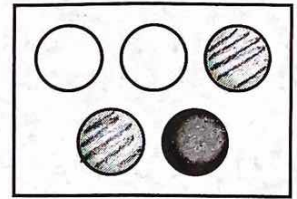
The outcomes are equal. _____

All players have the same number of winning outcomes. _____

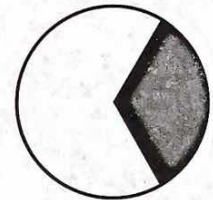
The game is fair. _____

5. Who has a better chance of winning? If the chances are the same, write "The game is fair."

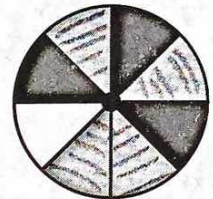
a) Players pick marbles from a box without looking. If the marble is grey, Player 1 wins. If the marble is white, Player 2 wins.



b) Players throw darts at the board in the picture. If the dart hits black, Player 1 wins. If the dart hits white, Player 2 wins.



c) Players spin the spinner in the picture. If they spin grey, Player 1 wins. If they spin black, Player 2 wins. If they spin white, Player 3 wins.



d) Players take marbles from a box without looking. If the marble is black, Player 1 wins. If the marble is white, Player 2 wins. If the marble is striped, Player 3 wins.

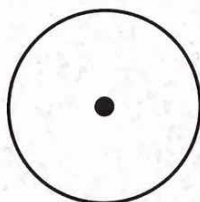


6. Anton wants to spin blue to win. Emma wants to spin yellow to win. Draw a spinner with at least 4 regions and colour according to the given chances.

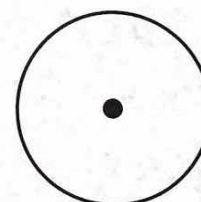
a) Anton has more chances to win.



b) Emma has more chances to win.

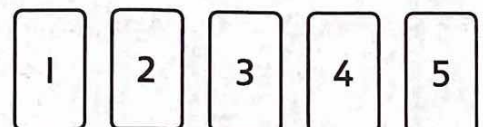


c) The game is fair.



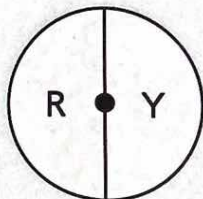
BONUS ▶ Draw a spinner with at least 6 regions so that Emma has more chances to win.

7. Players pick one of the 5 cards in the picture without looking. If the number is less than 4, Player 1 wins. If the number is 4 or more, Player 2 wins. Is the game fair? Explain.

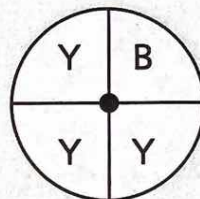


PDM3-16 Expectation

Half the spinner is red. We expect to spin red half the time.



One quarter of the spinner is blue. We expect to spin blue a quarter of the time.

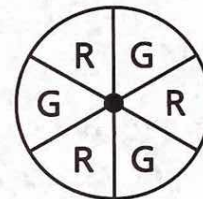


1. David wins with a red spin. Jax wins with a green spin. They spin the spinner 20 times.

a) How many times would you expect each player to win?

David: _____ times

Jax: _____ times



b) The tally shows the result of the game. Jax says the game was not fair. Do you agree? _____

Red	
Green	

2. a) Flip a coin 30 times and make a tally of the number of heads and tails.

Outcome	Tally	Count
Heads		
Tails		



b) If you flip a coin repeatedly, what fraction of the time would you expect to flip heads? Half? More than half? Less than half? _____

3. a) If you roll a die 20 times, how many times do you expect to roll an even number (2, 4, or 6)? _____

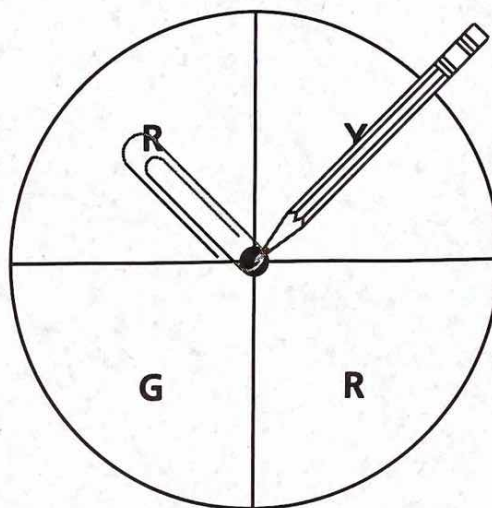
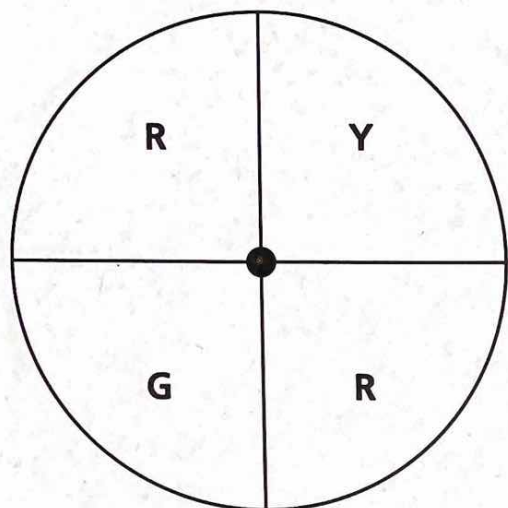
b) How many times do you expect to roll an odd number (1, 3, or 5)? _____

c) Roll a die 20 times. Make a tally of your results.

Outcome	Tally	Count
Even number (2, 4, or 6)		
Odd number (1, 3, or 5)		

Did your results match your expectations? _____

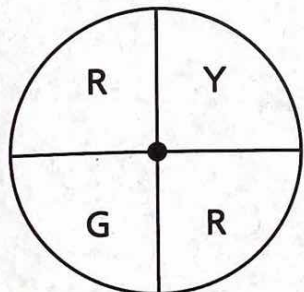
4. Use a paper clip. Hold a pencil and spin the paper clip around the tip of the pencil.



- a) If you spin the spinner 20 times, how many times would you predict spinning red? _____
- b) Spin the spinner 20 times. Make a tally of your results.
Did your results match your expectations? _____

Colour	Tally	Count
Red		
Green		
Yellow		

5. You play a board game with the spinner below.



Colour	Move
Red	forwards 1 space
Green	backwards 1 space
Yellow	miss a turn

- a) Using the spinner, are you likely to miss a turn? Explain.
- b) Using the spinner, which way are you more likely to move, forwards or backwards?
- c) Design a spinner in which you are more likely to move backwards.

PDM3-I Tally Charts

You can use **tallies** to count and record data. Each line stands for 1.
Draw the 5th line across the others.

| = 1 || = 2 ||| = 3 |||| = 4 ||||| = 5 ||||| | = 6 ||||| || = 7 ||||| ||| = 10

1. What number does the tally show?

a) ||||| || = 9

b) ||||| ||| | = 10

c) ||||| || = 7

2. Count by 5s to find the number the tally shows.

a) ||||| ||||| ||||| |||||

5, 10, 15, 20

b) ||||| ||||| ||||| ||||| |||||

25

c) ||||| ||||| |||||

15

d) ||||| ||||| |||||

||||| ||||| ||||| = 30

e) ||||| ||||| ||||| ||||| |||||

||||| ||||| ||||| = 35

f) ||||| ||||| ||||| ||||| |||||

||||| ||||| ||||| ||||| = 40

3. Multiply by 5 to find the number the tally shows.

a) ||||| ||||| ||||| |||||

4 × 5 = 20

b) ||||| ||||| ||||| ||||| ||||| |||||

35

c) ||||| |||||

15

4. Count by 5s, then count on by 1s to find the number the tally shows.

a) ||||| ||||| ||||| ||||| |||||

5, 10, 15, 20, 21, 22, 23

b) ||||| ||||| ||||| ||

22

c) ||||| ||||| ||||| ||||| ||||| ||||| | = 36

d) ||||| ||||| ||||| ||||| ||||| ||||| ||||| = 40

e) ||||| ||||| ||||| ||||| ||||| ||||| ||||| ||||| || = 42

f) ||||| ||||| ||||| ||||| ||||| ||||| ||||| ||||| ||||| ||||| = 50

5. Multiply by 5, then add the leftover tally marks to find the number the tally shows.

a) ||||| ||||| ||||| ||||| |||||

(4 × 5) + 3 = 23

b) ||||| ||||| ||

27

c) ||||| ||||| ||||| ||||| |

26

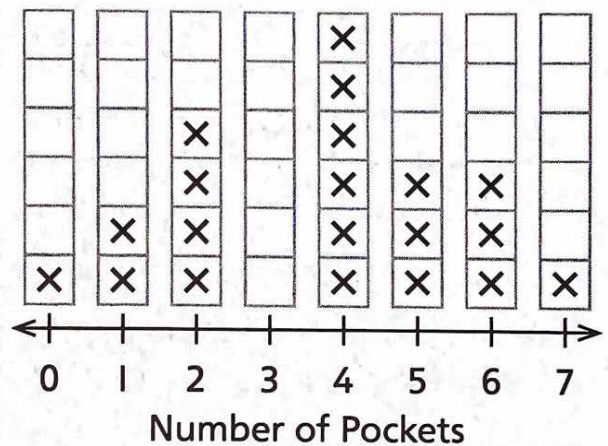
d) ||||| ||||| ||||| ||||| |||||

40

PDM3-3 Reading Line Plots

1. Students count the pockets on their clothes. The line plot shows how many students have each number of pockets.

Pockets on Our Clothes Today



- a) How many people have each number of pockets?

1 pocket _____

5 pockets _____

0 pockets _____

3 pockets _____

7 pockets _____

- b) What is the largest number of pockets? _____

What is the smallest number of pockets? _____

- c) What is the most common number of pockets? _____

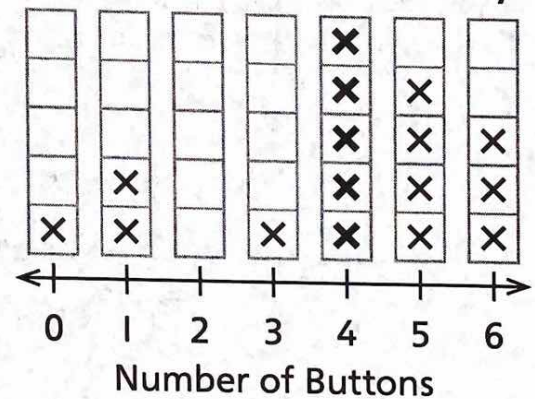
- d) How many students counted their pockets in total? _____

How do you know? _____

In the line plot in Question 1, the 4 Xs above number 2 on the number line show that 4 students have 2 pockets on their clothes.

2. Students count the buttons on their clothes.

Buttons on Our Clothes Today



- a) One student has 3 buttons. Circle the X that shows this.

- b) The thick Xs show that _____ students have _____ buttons on their clothes.

- c) What is the largest number of buttons on students' clothes in the line plot? _____

- d) What is the most common number of buttons on the clothes in the line plot? _____

How many students have that many buttons? _____

- e) How many students counted their buttons for the line plot? _____