Venn diagrams are a way to use circles to show which objects have a property.

Objects inside a circle have the property and objects outside the circle do not.

NOTE: Polygons have straight sides.

1. a) Which shape has both properties? Put its letter inside both circles.

   ![Shapes diagram](image)

   - dark
   - triangles

   b) Which shape has neither property? Put its letter outside both circles.

   ![Shapes diagram](image)

   - light
   - polygons

2. Complete the Venn diagrams.

   a) ![Shapes diagram](image)

   - dark
   - triangles

   b) ![Shapes diagram](image)

   - light
   - polygons

3. The World's Highest Waterfalls

   | Waterfalls in Norway | Waterfalls higher than 750 m |

   | A Angel | Venezuela | 979 m |
   | B Tugela | South Africa | 850 m |
   | C Uligord | Norway | 800 m |
   | D Monge | Norway | 774 m |
   | E Mutarazi | Zimbabwe | 762 m |
   | F Yosemite | United States | 739 m |
   | G Pliean | Australia | 715 m |
   | H Espelands | Norway | 703 m |
   | I Lower Mar Valley | Norway | 655 m |
   | J Tyssestrengene | Norway | 647 m |
**PDM6-2: Bar Graphs**

A bar graph has 4 parts:
- a vertical and horizontal axis
- a scale
- labels (including a title)
- data (given by the bars)

The bars in a bar graph can either be vertical or horizontal. The scale tells how much each square on the axis represents. The labels indicate what the data in the bars is.

1. | Pets Owned by Students | Number of Students |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Cat</td>
<td>12</td>
</tr>
<tr>
<td>Dog</td>
<td>15</td>
</tr>
<tr>
<td>Reptile</td>
<td>6</td>
</tr>
<tr>
<td>Bird</td>
<td>3</td>
</tr>
<tr>
<td>Other</td>
<td>10</td>
</tr>
</tbody>
</table>

   **Pets Owned by Students**
   - Other
   - Bird
   - Reptile
   - Dog
   - Cat
   - Number of Students

   - 0
   - 5
   - 10
   - 15
   - 20
   - 25
   - 30
   - 35
   - 40

   a) Complete the bar graph.

   b) What scale was used in the bar graph? Do you think it was a good choice? Why or why not?

   c) Would you predict similar results for the students in your class? Explain.

2. **A Votes Received in an Election**

   - Number of Votes
     - 0
     - 10
     - 20
     - 30
     - 40
     - 50
   - Dan
   - Amelia
   - Gisela

   **B Votes Received in an Election**

   - Number of Votes
     - 47
     - 47
     - 47
     - 47
     - 47
   - Dan
   - Amelia
   - Gisela

   a) Find the scale on each bar graph.

   b) Which graph makes it easier to tell the difference in votes for each candidate?

   Graph A: start at ____, count by ____ , stop at ____.
   Graph B: start at ____, count by ____ , stop at ____.

   c) Who won the election?
3. Complete the bar graph to display the following data.

<table>
<thead>
<tr>
<th>Recorded Temperatures by City (in °C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brandon, MB</td>
</tr>
<tr>
<td>Medicine Hat, AB</td>
</tr>
<tr>
<td>Iqaluit, NU</td>
</tr>
<tr>
<td>Yarmouth, NS</td>
</tr>
<tr>
<td>Thunder Bay, ON</td>
</tr>
</tbody>
</table>

HINT: Use the letters B, M, I, Y, and T as short forms for the city names on your graph.

4. A skateboard company had $50,000 in sales in 2004, and $52,000 in sales in 2005. Show this data using the following two scales.

- **Graph A**
  - **Sales ($1000)**
  - **Year**

- **Graph B**
  - **Sales ($1000)**
  - **Year**

a) Which graph makes it appear as though the sales in 2005 were three times the sales in 2004?
b) Which graph makes it appear as though the sales in 2005 were only slightly more than the sales in 2004?
c) Which graph do you think best represents the data? Explain.

5. What scale would you use if you had to plot the following numbers? (Say what numbers the scale would stop and start at, and what size the intervals would be). Explain your choices.

a) 3, 2, 7, 9, 10
b) 14, 2, 16, 4, 8
c) 250, 1,000, 2,000
d) 12,000, 11,500, 12,500
1. Two classrooms collected coats for charity from November to April.

a) When you glance at the graphs, which class appears to have collected more coats? ________

Why? ____________________________

b) When you look closely at the scales, which class actually collected more? ________

c) Why are most of Class B's data so low on the graph?

_______________________________

_______________________________

d) To compare the data, complete the graph on the left.

A double bar graph compares two sets of data. The graph you drew in Question 1 d) is a double bar graph.

e) In which month(s) did class A collect more coats than class B?

f) During one month in this period, Class B put an ad in a newspaper asking for coats. Which month do you think that was?

2. Draw a double bar graph using the data below. Include a title and labels.

<table>
<thead>
<tr>
<th>Favourite Sporting Activities</th>
<th>Baseball</th>
<th>Basketball</th>
<th>Tennis</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Girls</td>
<td>42</td>
<td>32</td>
<td>73</td>
<td>56</td>
</tr>
<tr>
<td>Boys</td>
<td>75</td>
<td>50</td>
<td>43</td>
<td>80</td>
</tr>
</tbody>
</table>
The leaf of a number is its right-most digit.

The stem is all its digits except the right-most digit.
NOTE: The stem of a one-digit number is 0 since there are no digits except the right-most one.

1. Circle the stem and underline the leaf.
   a) 5 stem is 0.
   b) 37
   c) 1 2 4
   d) 5 1
   e) 9 0 0 0
   f) 7

2. In each group of numbers, circle the stems and write the stems from smallest to largest.
   a) 2 3 9 8 3 4 6 5 2 8 2 5
   b) 3 6 3 9 4 6 5 1 3 7 9 4 5
   c) 1 0 7 8 8 7 7 5 1 0 4 9 6
   0 2 3 6

3. In the data set 3 8 2 9 2 6 4 2 4 3 3 4, the stems are 2, 3 and 4.
   To build a stem and leaf plot, follow these steps.

   **Step 1:**
   Write the stems in order, from smallest to largest.

<table>
<thead>
<tr>
<th>stem</th>
<th>leaf</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
</tr>
</tbody>
</table>

   **Step 2:**
   Then write each leaf in the same row as its stem.

<table>
<thead>
<tr>
<th>stem</th>
<th>leaf</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>9</td>
</tr>
<tr>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
</tr>
</tbody>
</table>

   **Step 3:**
   Finally put the leaves in each row in order, from smallest to largest.

<table>
<thead>
<tr>
<th>stem</th>
<th>leaf</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
</tr>
</tbody>
</table>

   For each plot, put the leaves in the correct order. Then list the data from smallest to largest.

<table>
<thead>
<tr>
<th>stem</th>
<th>leaf</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>5 1</td>
</tr>
<tr>
<td>4</td>
<td>8 5 1</td>
</tr>
<tr>
<td>5</td>
<td>6 2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>stem</th>
<th>leaf</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>1</td>
<td>9 3</td>
</tr>
<tr>
<td>2</td>
<td>5 8 0</td>
</tr>
</tbody>
</table>

   4. Use the following data to create stem and leaf plots.
   a) 8 7 1 3 1 8 1 0
   b) 9 9 9 7 1 0 3 9 9 1 0 1
   c) 7 7 9 1 1 0 5 9 7 1 1 2 1 1 4 9 6 7 8

5. Stem and leaf plots make it easy to find the lowest and highest data values.
   i) Look for the smallest leaf in the first row to find the lowest data value.
   ii) Look for the largest leaf in the last row to find the highest data value.

   The range of a set of data is the difference between the lowest and the highest value.
   Find the range of the data sets in questions 3 and 4.
1. **The Temperature in my Backyard this Week**

   ![Temperature Graph]

   a) What is the scale?
   
   Start at _____, count by _____, stop at _____.

   b) What is the title?
   
   ____________________________________________

   c) What day was the coolest?
   
   ____________________________________________

   d) What day was the warmest?
   
   ____________________________________________

   e) What was the range of temperatures over the week?
   
   ____________________________________________

2. **Shoe Sales over the Past Year**

   ![Shoe Sales Graph]

   a) In which month did the shoe store make the largest profit? The smallest profit?

   b) How much profit did the shoe store make in January? In May?

   c) In which months did the shoe store make more than $4000?

   d) On which date do you think a star athlete signed shoes in the store?
      February 1st    April 1st    July 1st    October 1st
      Justify your answer.
The bar graph and the line graph below both show the price of CDs on sale.

**Using a ruler, you could draw an arrow across from the '5 CD' bar to show 5 CDs cost $25.**

**Similarly you could draw a line up from the '5 CD' mark and then across to the $25 mark.**

1. Draw arrows (using a ruler!) on the line graph above to find the cost of...
   a) 3 CDs: $_________  
   b) 4 CDs: $_________  
   c) 6 CDs: $_________

2. To find out how many CDs you can buy for $20, you could draw arrows as shown.

   Draw arrows (using a ruler!) on the line graph to find how many CDs you can buy for:
   a) $15: _____ CDs
   b) $25: _____ CDs
   c) $30: _____ CDs

3. These graphs show how much money Sally will earn painting houses in the summer.

   a) On both graphs, show how much Sally would make for working:  
      i) 3 hours  
      ii) 4 hours  
   b) Draw arrows on the line graph to show how much Sally will earn in 3 1/2 hours.  
   c) Extend the line graph to show how much Sally could make in:  
      i) 6 hours  
      ii) 1/2 hour  
   d) Explain an advantage of a line graph over a bar graph.

Probability & Data Management 1
A broken line graph is a good choice to display data if you want to predict what will happen outside the range of your data or between data points.

1. As the temperature rises, crickets chirp more frequently.
   
   About how many times would you predict the cricket would chirp at:
   
   a) 15°  
   b) 25°  
   c) 35°  
   
   d) About how high would the temperature be if the cricket chirped 240 times a minute?

   Explain how you found your answer.

2. Would you use a broken line graph or a bar graph to display the data? Explain your choice of graph.
   
   a) Will next week's temperature be warmer or cooler?

<table>
<thead>
<tr>
<th>Day</th>
<th>Su</th>
<th>M</th>
<th>T</th>
<th>W</th>
<th>Th</th>
<th>F</th>
<th>Sa</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temp (°C)</td>
<td>23</td>
<td>25</td>
<td>24</td>
<td>22</td>
<td>18</td>
<td>17</td>
<td>15</td>
</tr>
</tbody>
</table>

   b) Which city was warmest yesterday?

<table>
<thead>
<tr>
<th>City</th>
<th>Toronto</th>
<th>Hamilton</th>
<th>Quebec</th>
<th>Montreal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temp (°C)</td>
<td>27</td>
<td>24</td>
<td>19</td>
<td>25</td>
</tr>
</tbody>
</table>

   c) Will next year's profit be more or less than this year’s?

<table>
<thead>
<tr>
<th>Month</th>
<th>J</th>
<th>F</th>
<th>M</th>
<th>A</th>
<th>M</th>
<th>J</th>
<th>J</th>
<th>A</th>
<th>S</th>
<th>O</th>
<th>N</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Profit ($1000)</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>6</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>

3. Company's Earnings by Year

   a) Did the company's earnings increase or decrease over time?

   b) What did the company do to make it look like their earnings increased over time?
PDM6-8: Continuous and Discrete Data

Data is **continuous** if all numbers between data values are possible. Otherwise, the data is **discrete**. Non-numerical data is always discrete.

1. Is the data discrete or continuous?

   a) Shoe sizes: $5 \quad 5 \quad 6 \quad 6\frac{1}{2} \quad 7 \quad 7 \quad 7 \quad 8 \quad 8\frac{1}{2}$

      Is size $6\frac{1}{4}$ possible? **No** The data is **discrete**.

   b) Length of pencils (cm): $8 \quad 3 \quad 12 \quad 17.1 \quad 13.4 \quad 19 \quad 18.6$

      Is length 8.5 cm possible? 18.7 cm? **Yes** The data is **continuous**.

   c) Number of games won by contestants: $7 \quad 6 \quad 8 \quad 12 \quad 4 \quad 0 \quad 3$

      Can there be half a **game**? The data is **discrete**.

   d) Distance Jenn runs each day (in km): $15 \quad 15 \quad 20 \quad 22 \quad 22 \quad 25$

      Can there be half a **km**? The data is **continuous**.

   e) Number of runners Jenn sees every day? $7 \quad 14 \quad 16 \quad 8 \quad 12 \quad 14$

      Can there be half a **runner**? The data is **continuous**.

2. Decide whether the data on each axis is discrete or continuous. Explain your answer.

   a) ![Graph of weekly TV watching](image)

      - **Su** to **Sa**: **Discrete**
      - **Count**: **Continuous**

   b) ![Weekly temperature graph](image)

      - **Temperature (°C)**: **Continuous**
      - **Time (minutes)**: **Continuous**

   c) ![Weekly distance walked graph](image)

      - **Distance (km)**: **Continuous**
      - **Time (minutes)**: **Continuous**
When data is continuous, you can use a **continuous line graph** to predict what happens in between data values.

1. How far from home was Katie after 10 minutes?
   
   ![Graph A](image)
   
   a) [Distance (km)]
   
   [Time (min)]
   
   [ ] km

   ![Graph B](image)
   
   b) [Distance (km)]
   
   [Time (min)]
   
   [ ] km

   ![Graph C](image)
   
   c) [Distance (km)]
   
   [Time (min)]
   
   [ ] km

2. Draw a continuous line graph, then answer the question.
   
   a) How much money did Tom earn for 3½ hours work?

<table>
<thead>
<tr>
<th>Hours Worked</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Money Earned ($)</td>
<td>0</td>
<td>10</td>
<td>20</td>
<td>30</td>
<td>40</td>
</tr>
</tbody>
</table>

   ![Graph D](image)

   b) How far did Natalia walk in 2 ½ minutes?

<table>
<thead>
<tr>
<th>Time (minutes)</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distance Walked (metres)</td>
<td>0</td>
<td>100</td>
<td>200</td>
<td>300</td>
<td>400</td>
</tr>
</tbody>
</table>

   ![Graph E](image)

3. Sometimes graphs are drawn with solid lines (to show trends) even when data is not continuous.

   The Effect of Time spent-studying
   
   ![Graph F](image)

   a) Describe any trends you see in the graph.

   b) Which data on the graph is not continuous? Explain.

   c) Do you think the student would score over 90% if they studied for more than an hour? Explain and discuss with your peers.
Scatter Plots are used to show whether there is a relationship between two sets of data. Each dot represents one set of data.

1. Five students recorded their age in years and their height in cm and then made a scatter plot.

<table>
<thead>
<tr>
<th>Age</th>
<th>Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tanya</td>
<td>11</td>
</tr>
<tr>
<td>Jomar</td>
<td>12</td>
</tr>
<tr>
<td>Kevin</td>
<td>11</td>
</tr>
<tr>
<td>Melanie</td>
<td>11</td>
</tr>
<tr>
<td>Mona</td>
<td>12</td>
</tr>
</tbody>
</table>

Each dot shows the height and age of one person.

a) Circle Melanie’s dot.

b) Which two people are the same height? How is this shown on the scatter plot?

2. Age and Height

a) How many 5-year-olds are part of the data?

b) Were 10-year-olds on average taller or shorter than 9-year-olds?

c) Was every 10-year-old taller than every 9-year-old?

d) As age increases from 1 to 10, does height tend to increase or decrease?

e) How does the scatter plot show this?

3. Age and Height

a) As age increases from 20 to 60, does height increase too? Does it decrease? Or is it not affected by age?

b) How does the scatter plot show your answer to part a)?

Probability & Data Management 1