## Unit 5 Lesson 7: Connecting Representations of Functions

### 1 Which are the Same? Which are Different? (Warm up)

#### Student Task Statement

Here are three different ways of representing functions. How are they alike? How are they different?

$y=2x$



|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| $p$ | -2 | -1 | 0 | 1 | 2 | 3 |
| $q$ | 4 | 2 | 0 | -2 | -4 | -6 |

### 2 Comparing Temperatures

#### Student Task Statement

The graph shows the temperature between noon and midnight in City A on a certain day.



The table shows the temperature, $T$, in degrees Fahrenheit, for $h$ hours after noon, in City B.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| $h$ | 1 | 2 | 3 | 4 | 5 | 6 |
| $T$ | 82 | 78 | 75 | 62 | 58 | 59 |

1. Which city was warmer at 4:00 p.m.?
2. Which city had a bigger change in temperature between 1:00 p.m. and 5:00 p.m.?
3. How much greater was the highest recorded temperature in City B than the highest recorded temperature in City A during this time?
4. Compare the outputs of the functions when the input is 3.

### 3 Comparing Volumes

#### Student Task Statement

The **volume**, $V$, of a cube with edge length $s$ cm is given by the equation $V=s^{3}$.

The volume of a sphere is a function of its radius (in centimeters), and the graph of this relationship is shown here.



1. Is the volume of a cube with edge length $s=3$ greater or less than the volume of a sphere with radius 3?
2. If a sphere has the same volume as a cube with edge length 5, estimate the radius of the sphere.
3. Compare the outputs of the two volume functions when the inputs are 2.

### 4 It’s Not a Race (Optional)

#### Student Task Statement

Elena’s family is driving on the freeway at 55 miles per hour.

Andre’s family is driving on the same freeway, but not at a constant speed.  The table shows how far Andre's family has traveled, $d$, in miles, every minute for 10 minutes.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| $t$ | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| $d$ | 0.9 | 1.9 | 3.0 | 4.1 | 5.1 | 6.2 | 6.8 | 7.4 | 8 | 9.1 |

1. How many miles per minute is 55 miles per hour?
2. Who had traveled farther after 5 minutes? After 10 minutes?
3. How long did it take Elena’s family to travel as far as Andre’s family had traveled after 8 minutes?
4. For both families, the distance in miles is a function of time in minutes. Compare the outputs of these functions when the input is 3.



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