

## Chapter 5 Skills Summary

### 1. Skill: Determine the domain and range of a function

Strategy: Domain is the set of values for the independent variable and the range is the set of values for the dependent variable.

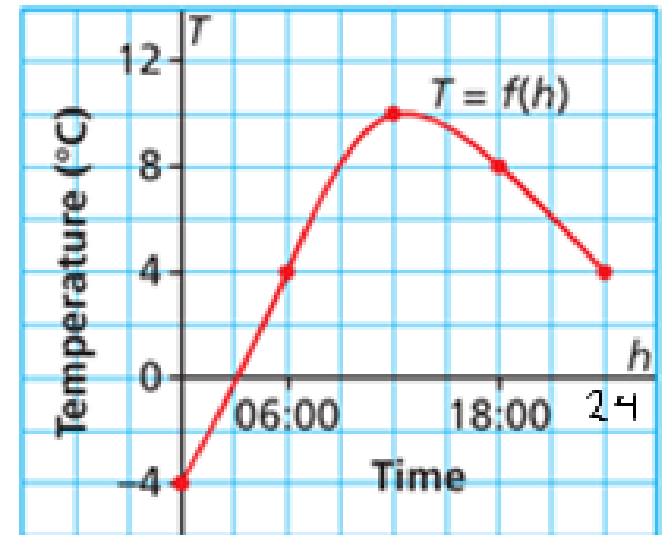
### Examples:

1. Using the graph to answer the following:

a) Determine the independent and dependent variables

ind  $\rightarrow$  time

dep  $\rightarrow$  temp



[ ] included in solution

( ) not included 0

b) Write domain and range in set notation

$$D: \{x \mid 0 \leq x \leq 24, x \in \mathbb{R}\}$$

$$R: \{y \mid -4 \leq y \leq 10, y \in \mathbb{R}\}$$

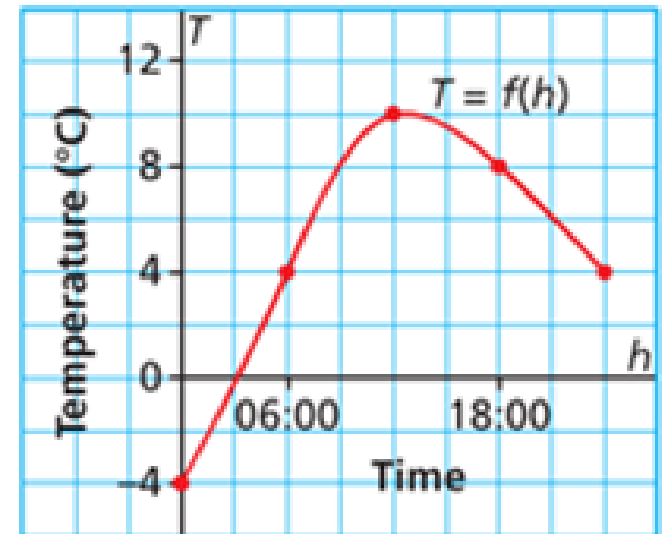
c) Write domain and range in interval notation

$$D: [0, 24]$$

$$R: [-4, 10]$$

d) Does this function represent discrete or continuous data?

continuous  $\rightarrow$  connected  
curve/line, all  
values in  
interval apply



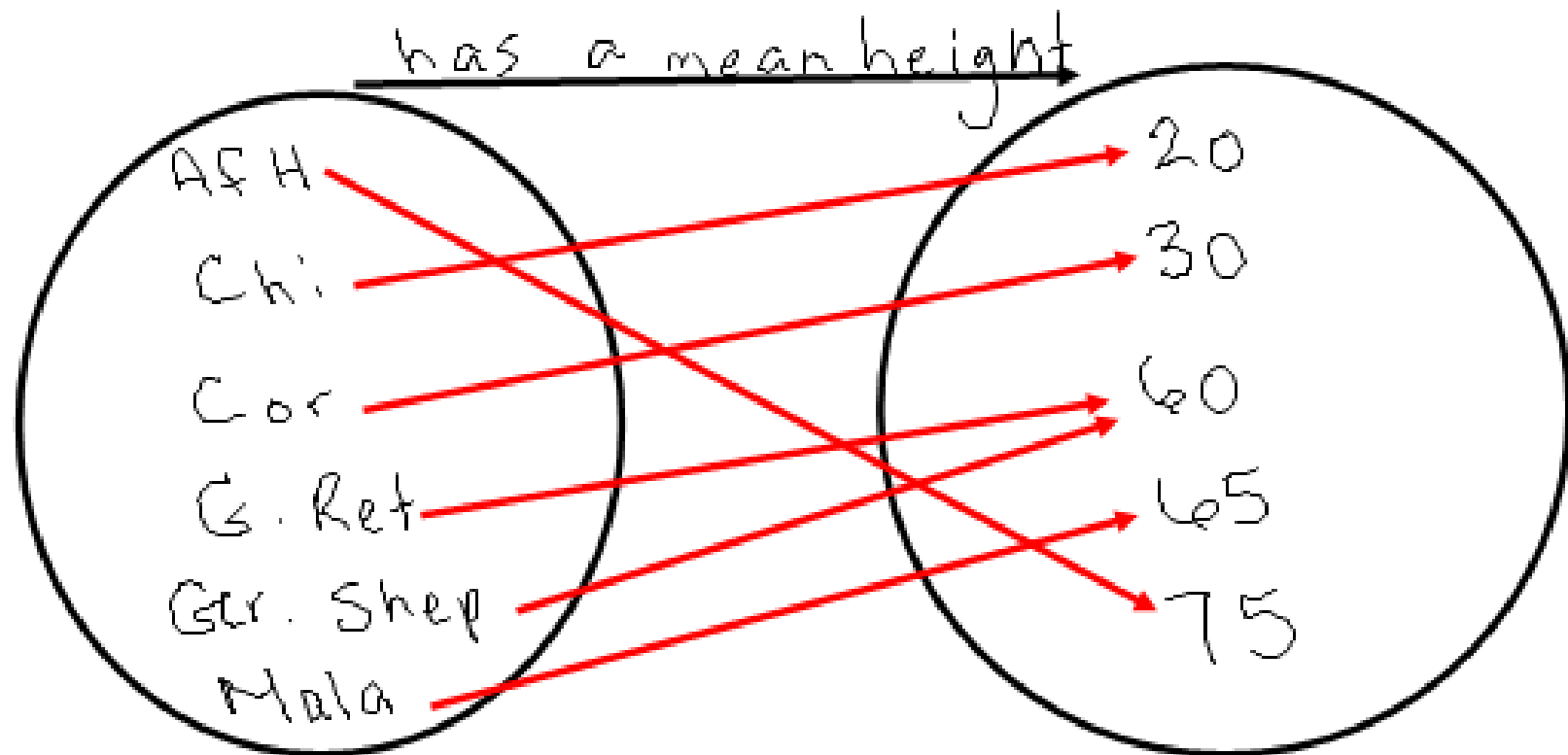
e) If the points were not connected, write the domain and range.

$$D: \{x = 0, 6, 12, 18, 24\}$$

$$R: \{y = -4, 4, 8, 10\}$$

2. Make an arrow diagram using the following table

ind	dep
Breed of Dog	Mean Height (cm)
Afghan hound	75
Chihuahua	20
Corgi	30
Golden retriever	60
German shepherd	60
Malamute	65



b) What other ways could we represent this?

Graph

Set:  $\{(AfH, 75), (Chi, 20)\}$  etc

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Afghan hound	75
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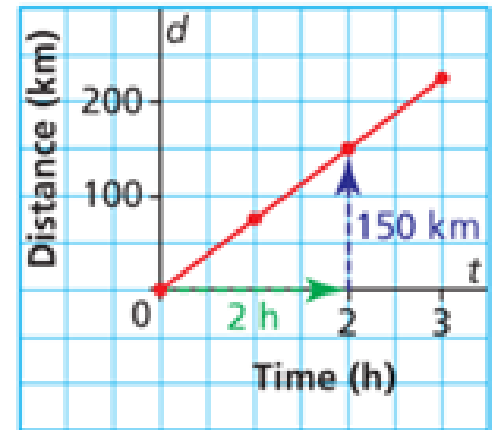
### 3. Skill: Determine the rate of change of the graph of a linear function.

Strategy: rate of change =  $\frac{\text{change in dependent variable}}{\text{change in independent variable}}$

Example:

What is the rate of change for the following graph?

Distance against Time



$$\text{Rate of change} = \text{slope} = \frac{\text{rise}}{\text{run}} = \frac{\Delta y}{\Delta x}$$

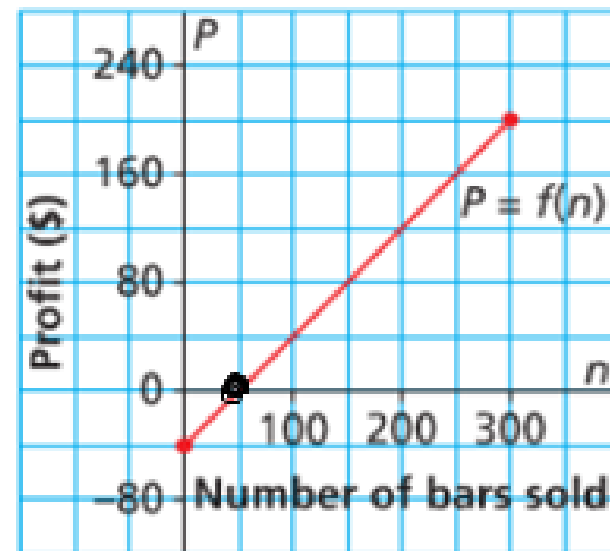
$$\frac{\text{rise}}{\text{run}} = \frac{150 \text{ km}}{2 \text{ h}} = 75 \text{ km/h}$$

represents speed

**4. Skill: Determine the intercepts of the graph of a linear function.**

Strategy: The x-intercept is the value of  $x$  when  $x$  or  $f(x)$  is 0.  
The y-intercept is the value of  $y$  when  $x$  is 0.

Example: Using the following graph state the x and y intercepts and explain what each represents.



$$x \text{ int} = 50 \text{ bars}$$

↳ when I "break even"

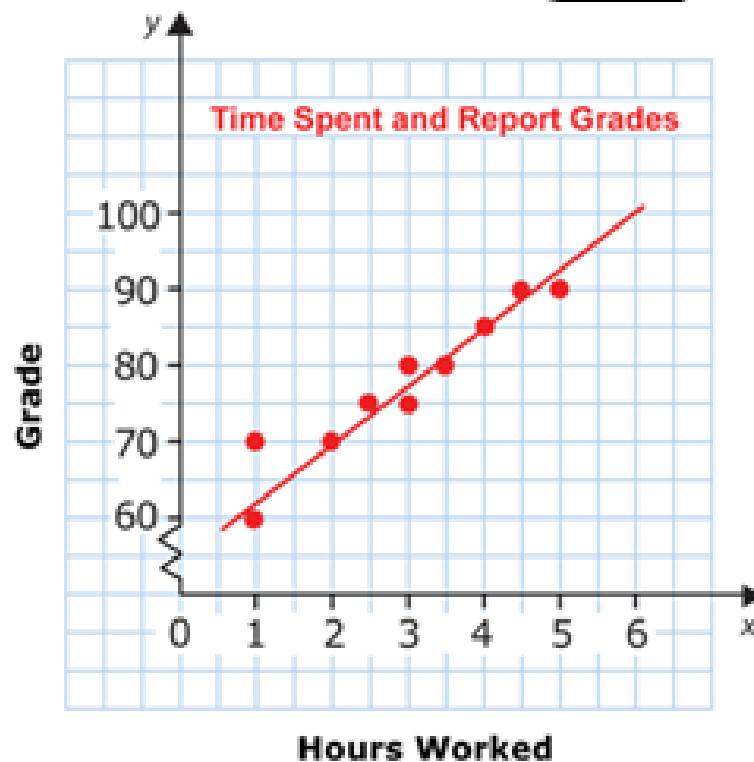
$$y \text{ int} = -40$$

↳ "start up cost"

### 5. Skill: The line of best fit.

Strategy: Graph data on a scatter plot and draw a straight line through or close to as many points as possible (use a ruler). Try to have the same number of points above and below the line.

Example: Use the following graph to predict how many hours students would need to study to receive a grade of 100.



extrapolate  $\rightarrow$  predicting outside data set

About 6 hours

\*\*\*\* r value!!!

What does the r value of a line mean?

$r = 1$  means...

$r = 0$  means...

$r = -1$  means

$r = 0.25$  means

$r = -0.78$  means

```
LinReg
y=ax+b
a=-.4931842013
b=9.779797274
rr=.9391132363
r=-.9690785501
```

**6. Skill: Using linear regression to find the correlation coefficient of a set of data.**

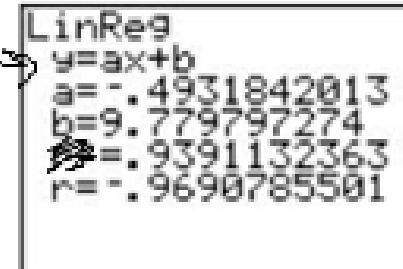
**Strategy:**  $r$  is a measure of how well the line fits the data. When  $r = 1$ , the fit is perfect. The closer  $r$  is to 1 or -1, the closer the line fits the data.

**Example:**

You used the TI-84 to input a table of values and then performed a linear regression on the data. Use the information on the screen below to answer the following:

- a) Write the linear equation for the line of best fit for the data in intercept form.

$$y = ax + b$$
$$y = -0.4932x + 9.7798$$



LinReg  
y=ax+b  
a=-.4931842013  
b=9.779797274  
r=.9391132363  
r=-.9690785501

slope-

- b) Give the value of the correlation coefficient. How well does the line fit the data? Explain how you know.

$$r$$
$$r = -0.9690785501$$

Very well, b/c it is very close to -1



**6. Skill: Finding the distance and midpoint of a line segment.**

Strategy: 1. Use the following formula to find the distance

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

2. Use the following formula for midpoint

$$M = \left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

Example: The endpoints of the diameter of a circle are E(6, 6) and F(-2, -4).

a) Determine the coordinates of the centre of the circle.

$$\begin{aligned} M &= \left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right) \\ &= \left( \frac{6 + (-2)}{2}, \frac{6 + (-4)}{2} \right) \\ &= (2, 1) \end{aligned}$$

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2. Use the following formula for midpoint

$$M = \left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

$$E \quad (6, 6) \quad F \quad (-2, -4)$$

$$M \quad (2, 1)$$

b) Determine the length of the radius.

edge of circle to middle

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$= \sqrt{(6 - 2)^2 + (6 - 1)^2}$$

$$= \sqrt{16 + 25}$$

$$= \sqrt{41}$$