Unit 6: Geometry Lesson 6.3

Coach's Corner – IV

1. A set of data is normally distributed with $\mu = 2.2$ and $\sigma = 4.5$. Determine the *z*-score for the following data values.

   a. –9.1

   b. 2.7

2. A set of data is normally distributed with $\mu = 549$ and $\sigma = 21$. Determine the data value corresponding to the following *z*-scores.

   a. $z = 2.20$

   b. $z = -3.12$

3. Some species of cuckoo birds will lay their eggs in other birds' nests so their young are raised by another species.

   A study of egg lengths showed that individual cuckoos prefer certain species and their egg lengths are comparable. The table below shows cuckoo egg lengths measured from various other birds' nests. Each set of data is fairly normally distributed.

© Thinkstock

Lengths of Cuckoo Eggs Found in Other Birds' Nests (mm)						
Meadow Pipit		**Tree Pipit**	**Hedge Sparrow**	**Robin**	**Pied Wagtail**	**Wren**
19.65	22.25	21.05	20.85	21.05	21.05	19.85
20.05	22.25	21.85	21.65	21.85	21.85	20.05
20.65	22.25	22.05	22.05	22.05	21.85	20.25
20.85	22.25	22.45	22.85	22.05	21.85	20.85
21.65	22.25	22.65	23.05	22.05	22.05	20.85
21.65	22.45	23.25	23.05	22.25	22.45	20.85
21.65	22.45	23.25	23.05	22.45	22.65	21.05
21.85	22.45	23.25	23.05	22.45	23.05	21.05
21.85	22.65	23.45	23.45	22.65	23.05	21.05
21.85	22.65	23.45	23.85	23.05	23.25	21.25
22.05	22.85	23.65	23.85	23.05	23.45	21.45
22.05	22.85	23.85	23.85	23.05	24.05	22.05
22.05	22.85	24.05	24.05	23.05	24.05	22.05
22.05	22.85	24.05	25.05	23.05	24.05	22.05
22.05	23.05	24.05		23.25	24.85	22.25
22.05	23.25			23.85		
22.05	23.25					
22.05	23.45					
22.05	23.65					
22.05	23.85					
22.25	24.25					
22.25	24.45					
22.25						

Source: http://lib.stat.cmu.edu/DASL/Datafiles/cuckoodat.html

a. Determine the mean and standard deviation for each set of eggs.

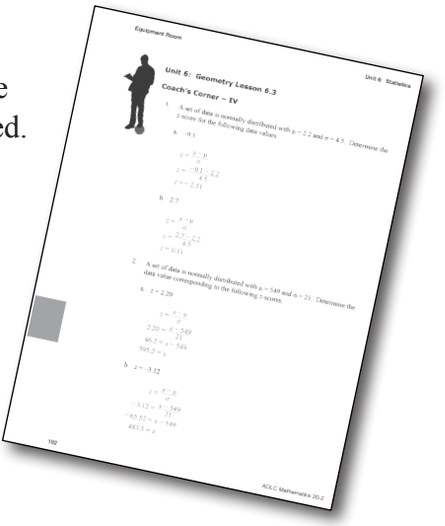
	Meadow Pipit	Tree Pipit	Hedge Sparrow	Robin	Pied Wagtail	Wren
Mean						
Standard Deviation						

b. Determine the *z*-score for an egg of 22.45 mm for each set of eggs.

c. List the birds in order from most likely to have a 22.45 mm egg to least likely to have a 22.45 mm egg. Explain your reasoning.

d. Determine the egg length that corresponds to a z-score of 0.80 for the two pipits. Explain the difference.

Please go to the *Equipment Room* to check your solutions before proceeding to *Game On!*, on the next page of this *Workbook*.


Equipment Room

Unit 6: Statistics

Unit 6: Geometry Lesson 6.3

Coach's Corner ~ IV

1. A set of data is normally distributed with $\mu = 2.2$ and $\sigma = 4.5$. Determine the z-score for the following data values.

a. -9.1

$$z = \frac{x - \mu}{\sigma}$$

$$z = \frac{-9.1 - 2.2}{4.5}$$

$$z = -2.51$$

b. 2.7

$$z = \frac{x - \mu}{\sigma}$$

$$z = \frac{2.7 - 2.2}{4.5}$$

$$z = 0.11$$

2. A set of data is normally distributed with $\mu = 549$ and $\sigma = 21$. Determine the data value corresponding to the following z-scores.

a. $z = 2.20$

$$z = \frac{x - \mu}{\sigma}$$

$$2.20 = \frac{x - 549}{21}$$

$$46.2 = x - 549$$

$$595.2 = x$$

b. $z = -3.12$

$$z = \frac{x - \mu}{\sigma}$$

$$-3.12 = \frac{x - 549}{21}$$

$$-65.52 = x - 549$$

$$483.5 = x$$

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ADLC Mathematics 20-2

After you have assessed your work, reflect on your understanding of the concepts addressed in the *Coach's Corner* exercises in the table provided.

Question Number	Got it!	Almost there…	Need to retry or ask for help.
1			
2			
3			

Unit 6: Statistics Lesson 6.3

Coach's Corner – V

1. Determine the area under the normal curve for each of the following regions:

   a. below $z = 0.36$

   b. above $z = -2.21$

   c. between $z = -1.40$ and $z = 1.40$

2. For a standard normal distribution, determine an x value such that

   a. 14% of the data lies above x

   b. 0.33 of the data lies below x

3. The timing of the first major repair, for a particular make of car, is normally distributed with a mean of 122 000 km and a standard deviation of 19 000 km.

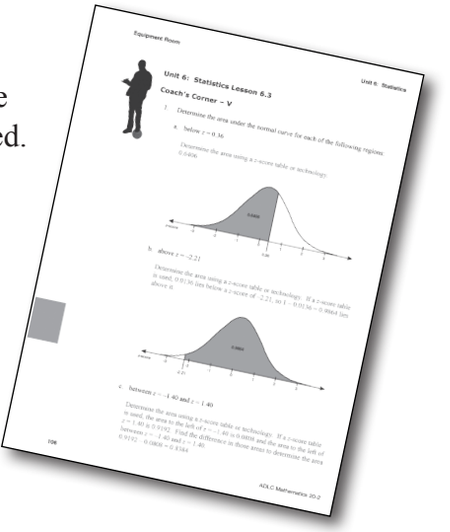
   a. Determine the percentage of cars you expect will drive

      i. more than 145 000 km before a major repair is required.

ii. between 100 000 km and 130 000 km before a major repair is required.

b. The car company is interested in providing a warranty for new cars, but doesn't want to be responsible for repairing more than 3% of the vehicles requiring their first major repair. At how many kilometres should the company set its warranty?

Please go to the *Equipment Room* to check your solutions before proceeding to *Game On!*, on the next page of this *Workbook*.


Equipment Room

Unit 6: Statistics Lesson 6.3

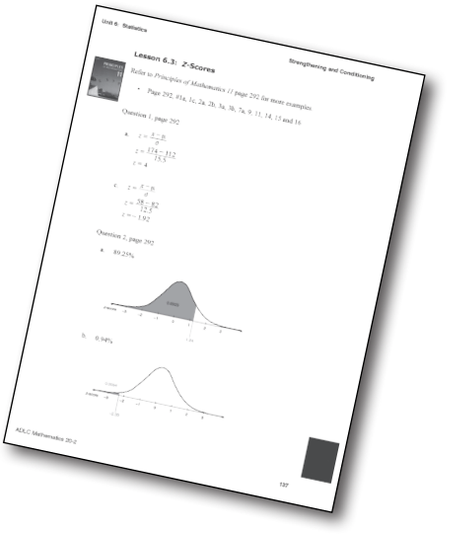
Coach's Corner – V

After you have assessed your work, reflect on your understanding of the concepts addressed in the *Coach's Corner* exercises in the table provided.

Question Number	Got it!	Almost there…	Need to retry or ask for help.
1			
2			
3			

Note: Before you complete *Game On!*, you may review your skills and get more practice by completing the following problems in *Principles of Mathematics 11*.

- Page 292, #1a, 1c, 2a, 2b, 3a, 3b, 7a, 9, 11, 14, 15, and 16


Unit 6: Statistics

Lesson 6.3: Z-Scores

Strengthening and Conditioning

Check your work in *Strengthening and Conditioning*.