

## Chapter 4 Selected Homework Answers

1.  $Y' = 2X + 30$   
 $Y' = 2 \times 60 + 30$   
 $Y' = 120 + 30$   
 $Y' = 150$

3. Determine the  $z$  score and use the  $z$  table. The observed score is 114, mean is 150, and standard deviation (SEE) is 60.  $z = (114 - 150)/60 = -36/60 = -.60$ .  
Answer is  $50.00 + 22.57 = 72.57$ .

5.  $Y' = 10 \times 40 + 40$   
 $Y' = 400 + 40$   
 $Y' = 440$

7.  $VO_2\max' = 10 \times (-10) + 125$   
 $VO_2\max' = -100 + 125$   
 $VO_2\max' = 25$

9. Use the  $z$  score formula to do this. Note that the standard deviation is now the standard error of estimate:  $z$  score =  $(29 - 25)/4 = 4/4 = 1.0$ . 1.0 standard deviation above the mean captures 34.13% of the observations. Thus, to determine the probability that one would be above this value, you must add this to 50:  $50.00 + 34.13 = 84.13$ .

11. Calculate the SEE from page 62 in your textbook.  $SEE = 3$ .

13. Calculate the SEE from page 62 in your textbook. Note  $s_y$  is for the final examination (i.e., 100) and the correlation between the tests is .80.  $SEE = 60$ .

15. Use the  $z$  score formula:  $z$  score =  $(X - \text{mean})/s$ . Note that  $X$  is the score you are interested in, the mean is 130 (the predicted score), and  $s$  is the SEE;  $z$  score =  $(70 - 130)/60 = -60/60 = -1.0$ . The answer is  $50.00 + 34.13 = 84.13\%$ .

17.  $Y' = 2 \times X + 40$   
 $Y' = 2 \times 50 + 40$   
 $Y' = 100 + 40$   
Answer is 140.

19. g) class absences, because it has the highest correlation with final examination score. Note that it is the absolute value that is most important. The correlation closest to 1.0 in absolute value is that which results in the best prediction. Also note that a correlation of 1.10 is impossible to obtain because the correlation must be between  $-1.00$  and  $+1.00$ .

21. Consider the absolute value of each correlation.  
Class participation,  $r = 1.10$ , must be eliminated because this value cannot be obtained

Class absences,  $r = -.78$   
Midterm examination,  $r = .72$   
Study time,  $r = .60$   
Quizzes,  $r = .58$   
Homework problems,  $r = -.30$   
Book reports,  $r = .10$

23. Simple correlation has only 1  $X$  (the predictor) and 1  $Y$  (the predicted). Multiple correlation has multiple predictors (multiple  $X$  variables) and 1  $Y$  (the predicted).

25. Determine the  $z$  score using the value, the predicted value and the SEE:  $z$  score =  $(35 - 40)/5 = -5/5 = -1.0$ . Answer is  $50.00 - 34.13 = 15.87\%$ .

27. Use the  $z$  score formula and the  $z$  table (recall that the Mean is the predicted value and the  $S$  is the SEE):  $z$  score =  $(60 - 50)/5 = 10/5 = 2.0$ . The answer is  $50.00 - 47.72 = 2.28\%$  (or approximately  $2\frac{1}{2}\%$ ).

29.  $(M + F)/2 + 3G$ , where  $G = 1$  for a boy and  $G = -1$  for a girl.

31. For a boy:  $(80 + 70)/2 + 3 \times 1 = 78$ . For a girl:  $(80 + 70)/2 + 3 \times (-1) = 72$ .

33. M1

35. M5 – calculate the coefficient of determination ( $r^2$ )  
 $(.537)^2 = 28.8\%$

37. Linearly