|  |
| --- |
| **Part 1 – Exploring the Normal Curve** |
| Enter the function **normalPdf(X,0,1)** in **Y1**. Adjust the window settings so that –5 ≤ *x* ≤ 5 and –0.1 ≤ *y* ≤ 0.5.**1.** Describe the normal curve in your own words.  |  |
| **2.** Why is the normal curve so useful? |
| Add the function **normalPdf(X,10,2)** in **Y2**. Its arguments are the random variable (*x*), the mean (10), and the standard deviation (2). Explore the effect of these parameters on the curve by substituting different values into the **normalPdf(** command in Y2. |  |
| **3.** How is the shape of the normal curve affected by changing the mean? changing the standard deviation? |
| **Part 2 – Probability as Area** |
| Delete the function from Y2. Use the commands **Vertical –1** and **Vertical 1** on the home screen to draw vertical lines at *x* = –1 and *x* = 1. View the graph with the lines.Use the **∫f(x)dx** command from the CALCULATE menu ( ) to find the area under the curve and between the two lines. |  |
| **4.** What is the percentage of the area?Use the **ClrDraw** command by pressing y ¼ [draw] to clear the lines and shading. Then use the **∫f(x)dx** command by pressing y r [calc] to open the CALCULATE menu and choosing Option 7: from the list. This command will find the following areas. Generate a picture on your calculator to represent each of the following:**5. a.** The area within 1 standard deviation of the mean  |
|  **b**. The area within 2 standard deviations of the mean  **c**. The area within 3 standard deviations of the mean |
| Generate a picture on your calculator to represent each of the following:**6.** The entire area under the curve**7.** The area to the left of the mean |
| **8.** The area to the right of the mean |
| **9.** The area from 1 standard deviation to the left of the mean to the mean |
| **10.** The area from the mean to 2 standard deviations to the right of the mean**11.** The area to the right of a line 3 standard deviations to the right of the mean |
| **12.** The area to the left of a line 2 standard deviations to the left of the mean**13.** The area to the right of a line 1 standard deviation to the left of the meanNote that all of these areas will be the same no matter what the mean and standard deviation are! |
| **Problem 3 – Application of the Normal Distribution**  |
| A farmer harvests a crop of oranges. The oranges’ weights are normally distributed with a mean of 310 grams and a standard deviation of 15 grams. Graph the distribution in an appropriate window. Use what you’ve learned to answer the following questions. |
| **14.** Sketch the graph of the normal distribution for this data. Be sure to label the axes and scale. |
| **15.** The farmer sells all the oranges weighing 280 grams or less to a juicer. What percent of the oranges will be sold to the juicer? (Hint: Use your results from Problem 2.)**16.** The farmer sells all the oranges weighing 300 grams or more to a commercial buyer. What percent of his oranges will be sold to the commercial buyer?**17.** What does it mean if a test score is at the 75th percentile?**18.** What is the percentile rank of an orange weighing 320 grams?**19.** What is the weight of an orange at the 84th percentile? |