MATH 140   **Name** _____   **Date:**
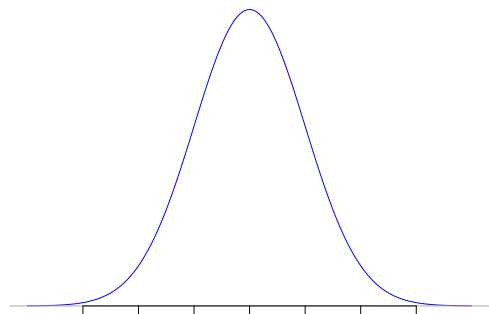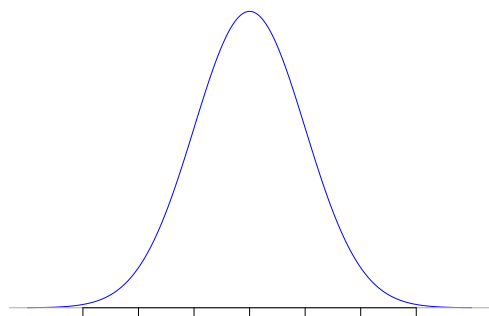**Worksheet: Normal Distributions and Z-scores**

1. In each case (i) label the tick marks of the density curve for $N(0,1)$; (ii) sketch the area under the curve corresponding to the proportion given; and (iii) determine this proportion using technology or the tables.
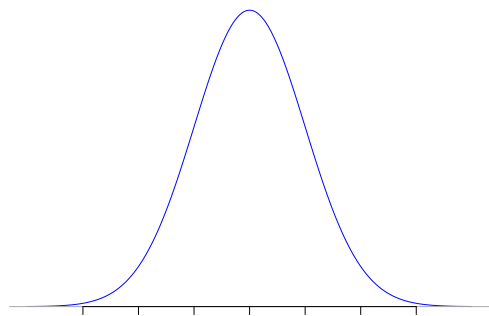
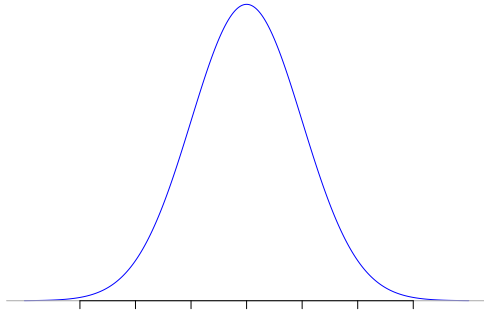   (a) $P(z < 1.52)$

   (b) $P(z > 0.54)$
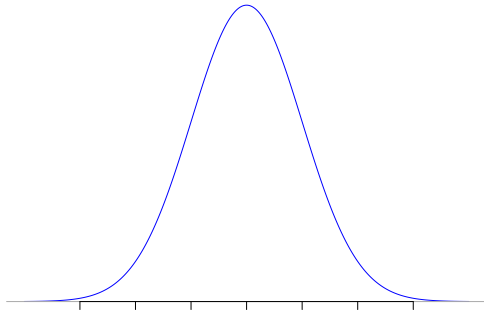
   (c) $P(1.23 < z < 2.19)$

2. In each case (i) label the tick marks of the density curve for the given normal distribution $N(\mu, \sigma)$, (ii) sketch the area under the curve corresponding to the proportion given; (iii) convert to z-scores; and (iv) determine the proportion using technology or the tables.

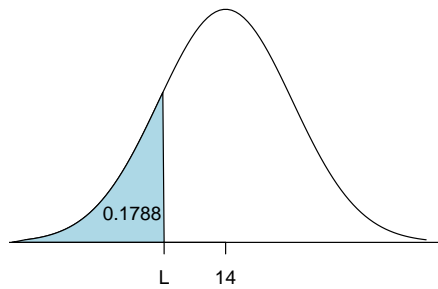(a) In $N(14, 4)$, find $P(X > 17.4)$

(b) In $N(10, 3)$, find $P(8 < X < 14)$

3. The household income in a certain community is normally distributed with a mean of \$62,000 and a standard deviation of \$10,000. Determine the proportion of households with incomes exceeding \$80,000.

4. Find the value L for which the area under the normal distribution $N(14, 4)$ to the left of L is 0.1788, as pictured below.

5. Scores on a test are normally distributed with mean 78 and standard deviation 6. How high must you score to be in the top 1% of all scores?

6. The time it takes Ralph to commute to work has a normal distribution, with a mean of 23 minutes and a standard deviation of 2.5 minutes. On 95% of occasions the commute time takes less than what amount?