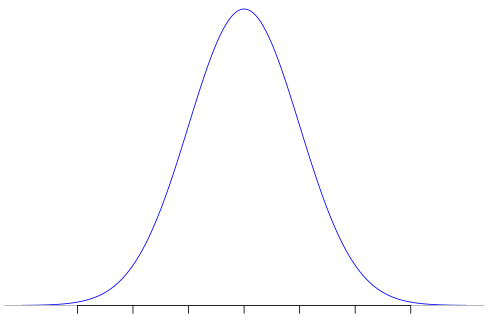
MATH 140 **Name** ______________________ **Date:**

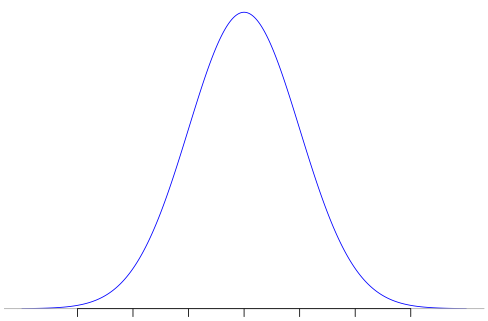
Worksheet: Normal Distributions and Z-scores

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 the `pnorm`() function in R or the `pnorm`() table below.

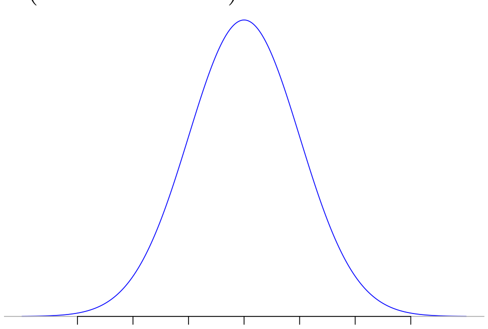
   (a) $P(z < 1.53)$



   (b) $P(z > -0.54)$



   (c) $P(-1.2 < z < 1.6)$

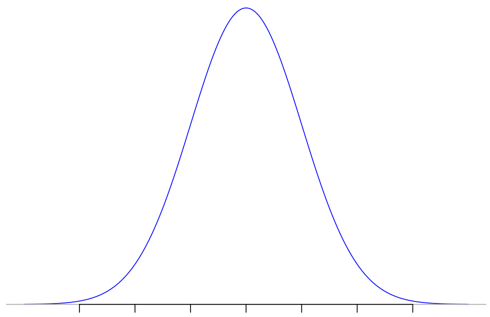


`pnorm`(z) = the proportion of the $N(0,1)$ distribution less than z

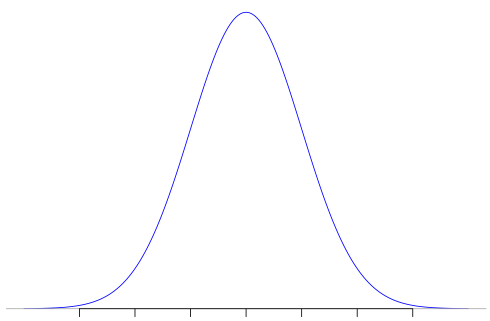
`pnorm`(-1.20) = .1151	`pnorm`(-0.80) = .2119	`pnorm`(-0.54) = .2946	`pnorm`(0.40) = .6554
`pnorm`(1.53) = .9370	`pnorm`(1.60) = .9452	`pnorm`(2.10)=.9821	`pnorm`(2.29) = .9890

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 the `pnorm()` function in R, or the table on page 1.

   (a) In $N(14, 3)$, find $P(X > 16.4)$

   (b) In $N(10, 2.5)$, find $P(8 < X < 11)$

3. The household income in a certain community is normally distributed with a mean of \$61,000 and a standard deviation of \$17,000. Find the z-score for the income \$100,000, and then determine the proportion of households with incomes exceeding \$100,000.