Math 3 **9.4 Normal Calculations** Unit 9

*SWBAT use the invNorm, normalcdf, and z-scores to find unknown proportions and scores.*

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|  | Normalcdf( | InvNorm( |
| **The Normal Curve:** | The area under the normal bell curve can represent either a probability, or a percentage. |
| **When to use it:** | * Use the normalcdf function to find the area under the curve when two “bounds” or scores are known.
 | * Use the invNorm function to find the number line value when the area under the curve **to the left** of that value is known
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| **How to Use it:** | $$normalcdf\left(Lower, Upper, μ, σ\right)$$ | $$invNorm\left(Area to the left, μ, σ\right)$$ |

**Example 1:** The lengths of adult carp in a lake are normally distributed with a mean length of 16.0 inches and a standard deviation of 2.0 inches. What percent of the adult carp in the lake are between 12 and 18 inches in length?

1. Sketch a bell curve.
2. Label the relevant lower bound and the upper bound.
3. Shade the relevant area under the curve.
4. Use the calculator to find the value.

**You Try!** The average GPA at ECF is 3.57 with a standard deviation of 0.32. What percent of students at ECF have a GPA that is less than 3.15?

1. Sketch a bell curve.
2. Label the relevant lower bound and the upper bound.
3. Shade the relevant area under the curve.
4. Use the calculator to find the value.

**Example 2:** Graduating seniors at a certain high school with GPAs in the top 20% are eligible for a special college scholarship. Grade point averages for seniors at that high school are normally distributed with a mean of 2.35 and a standard deviation of 0.15. What is the minimum grade point average that a senior at that school must have in order to qualify for the scholarship?

1. Sketch a bell curve and note the median on the number line for a reference point.

***Note:*** *Recall that the median separates the top 50% from the bottom 50%.*

***Second Note:*** *Values and percentiles increase from left to right*.

1. Draw a vertical line at the right end and denote the top 20% as 0.20
2. Use subtraction to determine the area to the left of the vertical line.
3. Label this bottom 80% under the curve as 0.80

**Example 3:** The SAT math test has a mean of 500 and a standard deviation of 100. What score would you need to be placed in the following percentages?

1. Top 15%
2. Lower 20%
3. Top 25%
4. Lower 10%
5. Middle 40%

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