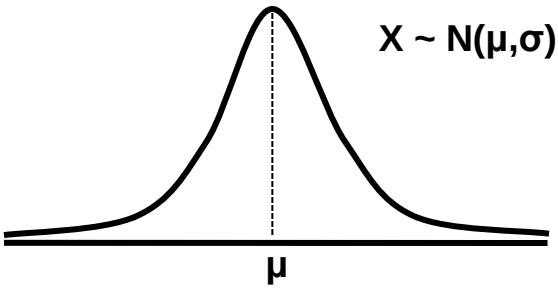
Solving Problems Involving Normal Curves Review Sheet

Normal Curve Characteristics:

	Any Normal	Z (Stnd Normal)
Shape	Symmetric mound	Symmetric mound
Center	Mean of μ	Mean of 0
Spread	Std Dev of σ	Std Dev of 1



Mean = Median = Mode (middle of the graph)
Area to *left* or *right* of mean is 50%; total area under the curve adds to 1

Z-Scores:

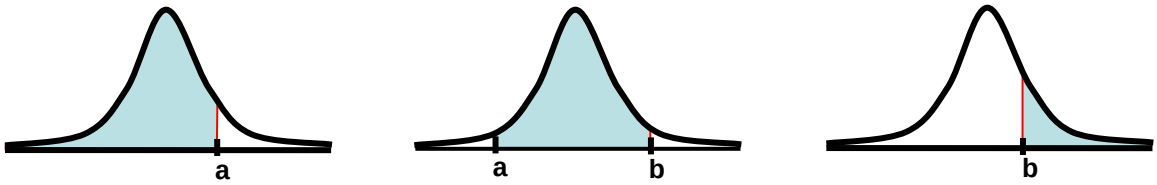
Positive values are above the mean and negative values are below

Formula: $z = \frac{x - \mu}{\sigma}$ **= number of standard deviations (σ), x is away from mean μ**

When comparing separate events, the smaller of two z scores is worse

Find probabilities (area under the curve) : normalcdf(LB, UB, μ, σ)

2nd VARS



Using	P(x < a)	P(a < x < b)	P(x > b)
Z-table	Z_a value from table	$Z_b - Z_a$ value from table	$1 - Z_b$ value from table
Calculator	normalcdf(-E99,a,μ,σ)	normalcdf(a,b,μ,σ)	normalcdf(b,E99,μ,σ)

Z-Table:

Measures the area to the *left* of a value. For example, z = 1.68

z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
0.0	0.5000	0.5040	0.5080	0.5120	0.5160	0.5199	0.5239	0.5279	0.5319	0.5359
0.1	0.5398	0.5438	0.5478	0.5517	0.5557	0.5596	0.5636	0.5675	0.5714	0.5753
0.2	0.5793	0.5832	0.5871	0.5910	0.5948	0.5987	0.6026	0.6064	0.6103	0.6141
0.3	0.6179	0.6217	0.6255	0.6293	0.6331	0.6368	0.6406	0.6443	0.6480	0.6517
1.3	0.9032	0.9049	0.9066	0.9082	0.9099	0.9115	0.9131	0.9147	0.9162	0.9177
1.4	0.9192	0.9207	0.9222	0.9236	0.9251	0.9265	0.9279	0.9292	0.9306	0.9319
1.5	0.9332	0.9345	0.9357	0.9370	0.9382	0.9394	0.9406	0.9418	0.9429	0.9441
1.6	0.9452	0.9463	0.9474	0.9484	0.9495	0.9505	0.9515	0.9525	0.9535	0.9545
1.7	0.9554	0.9564	0.9573	0.9582	0.9591	0.9599	0.9608	0.9616	0.9625	0.9633
1.8	0.9641	0.9649	0.9656	0.9664	0.9671	0.9678	0.9686	0.9693	0.9699	0.9706

gives us a value of 0.9535, which mean 95.35% of the area under the curve is to the left of 1.68 (smaller than it). 4.65% of the area under the curve lies to the right, using the complement rule of probability (1 – P(event) = P(complement)

Name: _____

1. **A national physical fitness test uses a mile run in its high school fitness test. The time for this event for boys is normally distributed with a mean μ = 450 seconds and a standard deviation σ = 50 seconds. What is the probability that a randomly selected boy's time is under 335 seconds?**

   A) 0.0107 B) 0.5107 C) 0.4893 D) 0.9893

2. **The actual amount in a 12-oz soft drink container is normally distributed with mean μ = 12.23 oz and a standard deviation σ = 0.04 oz. What is the probability that a randomly selected bottle contains between 12.13 and 12.19 ounces of soda?**

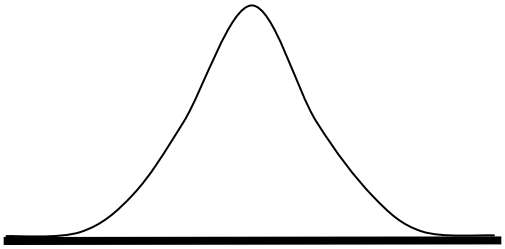
   A) 0.1525 B) 0.1649 C) 0.8351 D) 0.8475

3. **The tread life of a particular brand of tire is normally distributed with a mean μ = 60,000 miles and a standard deviation σ = 2500 miles. What is the probability that a randomly selected tire will last longer than 57,500 miles?**

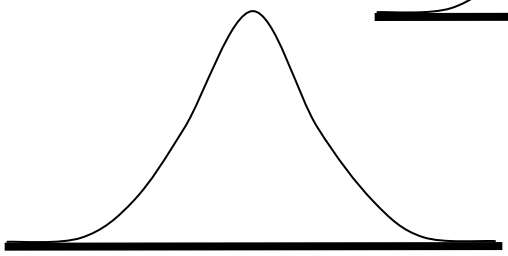
   A) 0.8413 B) 0.1587 C) 0.7266 D) 0.2266

Determine the probability of the *standard normal* random variable *Z* and for problems 4 thru 6; *label* and *shade* the area using the graphs to the right

4. **P(Z < 1.93) = _____**



5. **P(Z > 0.92) = _____**



6. **P(-1.23 < Z < 1.56) = _____**