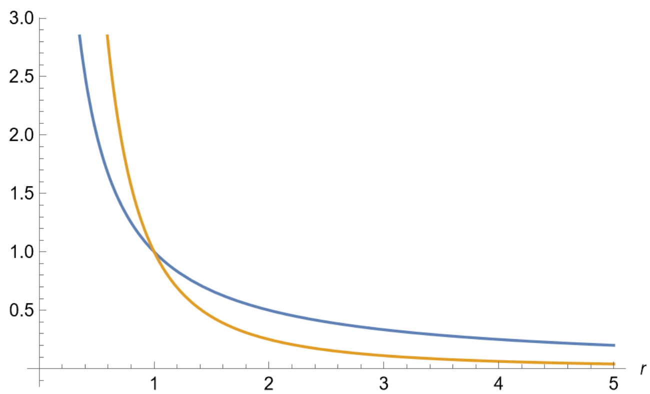
On the same axes, sketch:

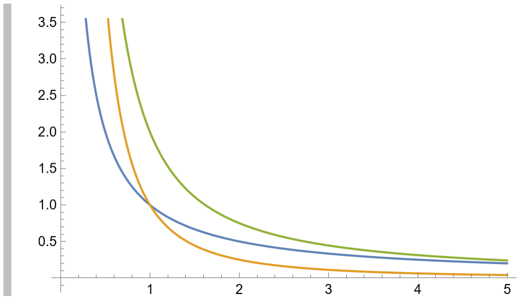
- $1/r$
- $1/r^2$
- $1/r + 1/r^2$

**Solution** When making a "sketch" you are expected to get the general shape and important features of the graph correct, without having all of the details that a formal graph would have. Look at limiting casess (like very large or very small values of the variable) to determine the overall trends. Your sketches should include the following features.

- For the sketch of $1/r$ (blue), the function goes to infinity when $r$ is very small and goes to zero when $r$ is very large.
- For the sketch of $1/r^2$ (orange), the function also goes to infinity when $r$ is very small and goes to zero when $r$ is very large. The important point here is to pay attention to which function is larger in which region. For small values of $r$, the function $1/r^2$ is larger. (Plug in r=0.01 to convince yourself.) For large values of $r$, the function $1/r$ is larger. (Plug in r=100 to convince yourself.)
- The functions $1/r$ and $1/r^2$ are both equal to 1 when $r = 1$, so the graphs cross at that point.




- To sketch the function $1/r+1/r^2$ (green), you much add the previous functions pointwise, which means to pick a value for $r$ and evaluate $1/r$ and $1/r^2$ separately, add these values together and plot the sum. For example the function $1/r + 1/r^2$ evaluated at $r = 1$ is 2.
- For very small values of the function $1/r + 1/r^2$, the term $1/r^2$ dominates, more and more so as $r$ gets smaller and smaller, so that the green graph approaches the orange one, asymptotically.
- For very large values of the function $1/r + 1/r^2$, the term $1/r$ dominates, more and more so as $r$ gets larger and larger, so that the green graph approaches the blue one, asymptotically.


3.5
3.0
2.5
2.0
1.5
1.0
0.5
1
2
3
4
5