Summary of GDB commands for x86-64 Systems

Command	Effect

Starting:

```
gdb
gdb <file>
```

Running and stopping

```
quit                        Exit gdb
run                         Run program
run 1 2 3                   Run program with command-line arguments 1 2 3
kill                        Stop the program
quit                        Exit gdb
Ctrl-d                      Exit gdb
      Note: Ctrl-C does not exit from gdb, but halts the current
      gdb command
```

Breakpoints

```
break sum                   Set breakpoint at the entry to function sum
break *0x80483c3            Set breakpoint at address 0x80483c3
delete 1                    Delete breakpoint 1
disable 1                   Disable the breakpoint 1
                               (gdb numbers each breakpoint you create)
enable 1                    Enable breakpoint 1
delete                      Delete all breakpoints
clear sum                   Clear any breakpoints at the entry to function sum
```

Execution

```
stepi                       Execute one instruction
stepi 4                     Execute four instructions
nexti                       Like stepi, but proceed
                            through function calls without stopping
step                        Execute one C statement
continue                    Resume execution until the next breakpoint
until 3                     Continue executing until program hits breakpoint 3
finish                      Resume execution until current function returns
call sum(1, 2)              Call sum(1,2) and print return value
```

Examining code

```
disas                       Disassemble current function
disas sum                   Disassemble function sum
disas 0x80483b7             Disassemble function around 0x80483b7
disas 0x80483b7 0x80483c7 Disassemble code within specified address range

print /x $rip               Print program counter in hex
print /d $rip               Print program counter in decimal
print /t $rip               Print program counter in binary
```

Examining data

```
print /d $rax               Print contents of %rax in decimal
print /x $rax               Print contents of %rax in hex
print /t $rax               Print contents of %rax in binary
print /d (int)$rax          Print contents of %rax in decimal after
                            sign-extending lower 32-bits.

                            You need this to print 32-bit, negative
                            numbers stored in the lower 32 bits of
                            %rax. For example, if the lower 32-bits of
                            %rax store 0xffffffff, you will see
```

```
                          (gdb) print $rax
                          $1 = 4294967295
                          (gdb) print (int)$rax
                          $2 = -1
                          (gdb)
```

```
  print 0x100               Print decimal representation of 0x100
  print /x 555              Print hex representation of 555
  print /x ($rsp+8)         Print (contents of %rsp) + 8 in hex
  print *(int *) 0xbffff890 Print integer at address 0xbffff890
  print *(int *) ($rsp+8)   Print integer at address %rsp + 8
  print (char *) 0xbfff890  Examine a string stored at 0xbffff890

  x/w   0xbffff890          Examine (4-byte) word starting at address
                            0xbffff890
  x/w   $rsp                Examine (4-byte) word starting at address in $rsp
  x/wd  $rsp                Examine (4-byte) word starting at address in $rsp.
                            Print in decimal
  x/2w  $rsp                Examine two (4-byte) words starting at address
                            in $rsp
  x/2wd $rsp                Examine two (4-byte) words starting at address
                            in $rsp. Print in decimal
  x/g   $rsp                Examine (8-byte) word starting at address in $rsp.
  x/gd  $rsp                Examine (8-byte) word starting at address in $rsp.
                            Print in decimal
  x/a   $rsp                Examine address in $rsp. Print as offset from
                            previous global symbol.
  x/s   0xbffff890          Examine a string stored at 0xbffff890
  x/20b sum                 Examine first 20 opcode bytes of function sum
  x/10i sum                 Examine first 10 instructions of function sum

  (Note: the format string for the 'x' command has the general form
     x/[NUM][SIZE][FORMAT] where

    NUM  = number of objects to display
    SIZE = size of each object (b=byte, h=half-word, w=word,
                                g=giant (quad-word))
    FORMAT = how to display each object (d=decimal, x=hex, o=octal, etc.)

    If you don't specify SIZE or FORMAT, either a default value, or the last
    value you specified in a previous 'print' or 'x' command is used.
  )
```

Useful information

```
  backtrace                 Print the current address and stack backtrace
  where                     Print the current address and stack backtrace

  info program              Print current status of the program)
  info functions            Print functions in program
  info stack                Print backtrace of the stack)
  info frame                Print information about the current stack frame
  info registers            Print registers and their contents
  info breakpoints          Print status of user-settable breakpoints

  display /FMT EXPR         Print expression EXPR using format FMT
                            every time GDB stops
  undisplay                 Turn off display mode
  help                      Get information about gdb
```