```
# 1) Put data here (replace with your values)
> weight_loss <- c(2.1,1.8,3.2,2.5,1.9,2.7,3.0,2.4,1.6,2.8)

# 2) Basic stats
> n      <- length(weight_loss)   # sample size
> mean_x <- mean(weight_loss)     # sample mean
> sd_x   <- sd(weight_loss)       # sample standard deviation (uses n-1)
> se     <- sd_x / sqrt(n)        # standard error

> cat("n =", n, "\n")
n = 10
> cat("Mean =", mean_x, "kg\n")
Mean = 2.4 kg
> cat("SD =", sd_x, "kg\n")
SD = 0.5374838 kg
> cat("SE =", se, "kg\n\n")
SE = 0.1699673 kg

 # 3) Manual t-value (H0: mu = 0)
> mu0 <- 0
> t_value <- (mean_x - mu0) / se
> df <- n - 1
> cat("t-value (manual) =", t_value, "  (df =", df, ")\n\n")
t-value (manual) = 14.12036   (df = 9 )

 # 4) p-value for one-sided test (right tail; Ha: mean > 0)
> p_one_sided <- 1 - pt(t_value, df)
> cat("One-sided p-value =", p_one_sided, "\n\n")
One-sided p-value = 9.522806e-08

# 5) Same test using built-in function (verifies result)
> tt <- t.test(weight_loss, mu = mu0, alternative = "greater")
> print(tt)
          One Sample t-test
data:  weight_loss
t = 14.12, df = 9, p-value = 9.523e-08
alternative hypothesis: true mean is greater than 0
95 percent confidence interval:
 2.088431      Inf
sample estimates:
mean of x
      2.4

# 6) Decision at alpha = 0.05
```

```
> alpha <- 0.05
> if (p_one_sided < alpha) {
+   cat("\nDecision: Reject H0 — evidence the program causes weight loss (mean > 0).\n")
+ } else {
+   cat("\nDecision: Fail to reject H0 — no significant evidence of weight loss.\n")
+ }
Decision: Reject H0 — evidence the program causes weight loss (mean > 0).
```