

```
;;
;; *****
;; Sample Solutions
;; CS 135 Fall 2019
;; Assignment 01, Problem 2
;; *****
;;
```

```
;; 2a)
```

```
(define (volume r)
  (* (* 4/3 pi) (expt r 3)))
```

```
;; 2b)
```

```
(define phi (/ (+ 1 (sqrt 5)) 2))
```

```
(define (fib n)
  (/ (- (expt phi n)
        (expt (- phi) (- n)))
     (- (* 2 phi) 1)))
```

```
;; 2c)
```

```
(define G 6.674e-11)
```

```
(define (escape M r)
  (sqrt (/ (* (* 2 G) M) r)))
```

```
;; 2d)
```

```
(define P-ref 2e-5)
```

```
(define (log10 x) (/ (log x) (log 10)))
```

```
(define (pressure->loudness P)
  (* 20 (log10 (/ P P-ref))))
```

```
;;
;; *****
;; Sample Solutions
;; CS 135 Fall 2019
;; Assignment 01, Problem 3
;; *****
;;
```

```
(define (body-mass-index kilograms meters)
  (/ kilograms (sqr meters)))
```

```
(define (pounds->kilograms pounds)
  (* pounds 0.45369237))
```

```
(define (inches->metres inches)
  (* inches 0.0254))
```

```
(define (feet->inches feet)
  (* feet 12))

(define (body-mass-index-imperial pounds feet inches)
  (body-mass-index (pounds->kilograms pounds)
    (inches->metres (+ (feet->inches feet) inches))))
```

```
;;
;; *****
;; Sample Solutions
;; CS 135 Fall 2019
;; Assignment 01, Problem 4
;; *****
;;
```

```
;; 4a)
(define particip-wt 0.05)
(define assn-wt 0.2)
(define mid1-wt 0.1)
(define mid2-wt 0.15)
(define final-wt 0.5)
(define particip 100)

(define (final-cs135-grade mid1 mid2 final assn)
  (+ (* particip particip-wt)
    (* mid1 mid1-wt)
    (* mid2 mid2-wt)
    (* final final-wt)
    (* assn assn-wt)))
```

```
;; 4b)
(define target-grade 60)

(define (cs135-final-exam-grade-needed mid1 mid2 assn)
  (/ (- target-grade
    (* mid1 mid1-wt)
    (* mid2 mid2-wt)
    (* assn assn-wt)
    (* particip particip-wt))
    final-wt))
```