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MATH 101  
Spring 2024  
HW 8: Due 02/19

*"It's always helpful to learn from your mistakes because then your mistakes seem worthwhile."*

— Gary Marshall

**Problem 1.** (10pts) Showing all your work, compute the following:

- (a) The perimeter of a rectangle that is  $2 \times 8$ .
- (b) The circumference of a circle with diameter 7.
- (c) The perimeter of a square with side measure 6.
- (d) The perimeter of a 3-4-5 right triangle.

**Solution.**

(a)

$$P = 2\ell + 2w = 2(2) + 2(8) = 4 + 16 = 20$$

(b)

$$C = 2\pi r = 2\pi \cdot \frac{7}{2} = 7\pi \approx 21.9911$$

(c)

$$P = 4s = 4(6) = 24$$

(d)

$$P = a + b + c = 3 + 4 + 5 = 12$$

**Problem 2.** (10pts) Showing all your work, compute the following:

- (a) The area of a rectangle that is  $2 \times 8$ .
- (b) The area of a circle with diameter 7.
- (c) The area of a square with side measure 6.
- (d) The area of a 3-4-5 right triangle.

**Solution.**

(a)

$$A = \ell w = 2 \cdot 8 = 16$$

(b)

$$A = \pi r^2 = \pi \left(\frac{7}{2}\right)^2 = \pi \cdot \frac{49}{4} = \frac{49\pi}{4} \approx 38.4845$$

(c)

$$A = s^2 = 6^2 = 36$$

(d)

$$A = \frac{1}{2}bh = \frac{1}{2} \cdot 3 \cdot 4 = 6$$

**Problem 3.** (10pts) Showing all your work, compute the following:

- (a) The volume of a rectangular box that is  $5 \times 4 \times 10$
- (b) The surface area of a rectangular box that is  $5 \times 4 \times 10$ .
- (c) The volume of a sphere with radius 4.

**Solution.**

(a)

$$V = \ell wh = 5 \cdot 4 \cdot 10 = 200$$

(b)

$$S = 2\ell w + 2\ell h + 2wh = 2(5)4 + 2(5)10 + 2(4)10 = 40 + 100 + 80 = 220$$

(c)

$$V = \frac{4}{3} \pi r^3 = \frac{4}{3} \pi \cdot 4^3 = \frac{256\pi}{3} \approx 268.083$$