

Session 4.2

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Recap of last time

1. Suppose I tag and release 80 buffalo. Later, I fly over the grasslands and 20 out of 100 buffalo we see are tagged. How big would you estimate is the size of the buffalo population?

$$\frac{\text{tagged}}{\text{total}} = \frac{20}{100} \stackrel{\times 4}{=} \frac{80}{\boxed{400}}$$

2. If Jose can bake 7 cakes in 3 hours, and Nishith can bake 5 cakes in 4 hours, how many complete cakes can they, as a team, bake in 15 hours?

$$\frac{\text{cakes}}{\text{hour}} = \frac{7}{3} + \frac{5}{4} \stackrel{\times 5}{=} \frac{35}{15} + \frac{5}{4} \stackrel{\times 4}{=} \frac{35}{15} + \frac{20}{16} \approx \frac{35}{15} + \frac{19}{15} \rightarrow 35 + 19 = \boxed{54}$$

3. Formulas for *Area* and *Perimeter* for each shape:

(a) **Rectangle:** *Area* = *Length* * *Width* and *Perimeter* = 2 * *Length* + 2 * *Width*

(b) **Right triangle:** *Area* = $\frac{\text{Length} * \text{Width}}{2}$

(c) **Circle:** *Area* = $\pi * (\text{radius})^2$ and *Perimeter* = 2 * $\pi * \text{radius}$

4. Dimensions means the length and width, or the radius, depending on the context.

Main problems

1. Assortment of warm-up problems

- (a) Suppose Netflix accounts for 35% of internet usage. If Netflix subscribers use 56 gigabytes of data in a minute, how internet data would you expect was used by everyone in a minute?
- (b) If Corey saves type \$350 in 3 days and Michael saves \$500 in 7 days, how much money can they save in 15 days?

2. Find the area of each of the following figures

- (a) Square with side length 7 cm
- (b) Rectangle with dimensions 5 cm × 9 cm
- (c) Right triangle with dimensions 5 cm × 12 cm
- (d) Circle with radius 3 cm (leave it in terms of π)
- (e) Circle with radius 6 cm (leave it in terms of π)
- (f) Circle with diameter 6 cm (leave it in terms of π)
- (g) Circle with diameter 20 cm (leave it in terms of π)

3. Find the dimensions of each figure with the given clues:

- (a) Square with perimeter 28 cm

- (b) Square with area 81 cm^2
 - (c) Square with area 144 cm^2
 - (d) Rectangle with perimeter 24 cm, where $Width = 2 * Length$
 - (e) Rectangle with area 35 cm^2 , where $Width = Length + 2$
 - (f) Rectangle with area 28 cm^2 and perimeter 22 cm
 - (g) Triangle with area 6 cm^2 where $Width = Length + 1$
 - (h) Triangle with area 2 cm^2 where $Width = Length$
 - (i) Circle with perimeter 12π cm
 - (j) Circle with area $16\pi \text{ cm}^2$
 - (k) Circle with area $49\pi \text{ cm}^2$
4. Explain, in your own words, why each equation for area makes sense to you? Think of how you would break it down for your classmates?
 5. What is the area of a square of a 2×2 rectangle? 4×2 rectangle? 4×4 rectangle? As we increase one side, how does the area change? As we increase both sides, how does the area change?
 6. What is the area of a circle of radius 2? Radius 4? Radius 6? As we increase the radius, how does the area change?
 7. At a restaurant a small burger costs \$9 and a large burger costs \$16. Assuming no discounts and equal heights of the circular burger patties, if the small patty has area 12π , what would you expect to be the area of the larger patty?
 8. Suppose the target logo has three concentric circles, with diameters of length 2, 4, and 6 centimeters, respectively. What fraction of the area is red?

Extra problems

1. Problems from 2010 AMC 8