1 Estimations and Models

1.1

How many tacos would it take to feed all Sonoma State Students for lunch today?

a) 200
b) 2,000
c) 20,000
d) 200,000

1.2

If every student at Sonoma State held hands, how long of a chain would they make?

a) 1 mile
b) 10 miles
c) 100 miles
d) 1,000 miles

1.3

How many people holding hands to stretch around the world at the equator?

a) 2,500,000,000 people
b) 250,000,000 people
c) 25,000,000 people
d) 2,500,000 People

2 Place Value Notation

2.1

Write 5,400,000,000 in Scientific Notation

a) 5.4×10^9
b) 5.4×10^8
c) 5.4×10^{10}
d) 5.4×10^7

2.2

Which of these is 10110_2 in decimal form?

a) 18
b) 20
c) 22
d) 24

2.3

Convert 123.12_5 to a base 10 number

a) 35.28
b) 38.28
c) 40.0
d) 37.28

2.4

Which base needs the most digits to represent 50?

a) Binary
b) Base 10
c) Base 5
d) Hexadecimal

2.5

How many digits do you need to represent one million in base 5?

a) 5
b) 7
c) 8
d) 9

3 Units and Dimensions

3.1

How many years are in 1 billion seconds?

a) 1 year
b) 100 years
c) 30 years
d) 50 years

3.2

How many meters per second are the cars on the 101 travelling?

a) 3000 meters/second
b) 300 meters/second
c) 30 meters/second
d) 3 meters/second

3.3

Tuition is $3638 per semester. Show the unit conversions and convert this to cost per unit taken. Which is closest?

a) 250 USD/Unit
b) 500 USD/Unit
c) 100 USD/Unit
d) 1000 USD/Unit

3.4

About how many marathons would it take to run around the equator?

a) 650,000 Marathons
b) 962 Marathons
c) 1538 Marathons
d) 1962 Marathons

3.5

EXTRA CREDIT: Which of these has the same dimensions?

A) $1/2 \, gt^2$

B) $1/2 \, mv^2$

C) mgh

a) A and B
b) B and C
c) A and C
d) None

4 Linear Functions

4.1

In the last decade, the value of the slope is closest to

a) 1 ppmv per year
b) 2 ppmv per year
c) 5 ppmv per year
d) 10 ppmv per year

4.2

In the decade of data from 1960 to 1970, the value of the slope is closest to

a) 0.1 ppmv per year
b) 0.2 ppmv per year
c) 1 ppmv per year
d) 5 ppmv per year

4.3

What will the carbon dioxide concentration be in 2050 if the rate over the last decade is sustained?

a) 500 ppmv
b) 470 ppmv
c) 430 ppmv
d) 400 ppmv

4.4

What would the carbon dioxide concentration be today if we had remained at the rate of increase from 1960 to 1970?

a) 500 ppmv
b) 400
c) 370
d) 300

4.5

If we express this curve as $y = mx + b$ which is closest to b? Here, y is the concentration and x is the year.

a) 3000 ppmv
b) -3000 ppmv
c) 300 ppmv
d) -300 ppmv

5 Areas and Volumes

5.1

Which of these shapes have the same area?

1) A 3 meter by 4 meter rectangle

2) A 2 meter by 8 meter rectangle

3) A 2 meter by 6 meter rectangle

a) 1 and 2
b) 1, 2, and 3
c) 1 and 3
d) None

5.2

The amount of carpet needed to cover the floor in our classroom is closest to

a) 10 sq m
b) 50 sq m
c) 100 sq m
d) 200 sq m

5.3

The solar panels on the ETC are rated at 3000 W or 3 kW which means that they deliver 3 kW of power at noon on a sunny day. If these panels collect 100 W per meter squared, how much area do they take up?

a) 3 x 10^{-3} sq km
b) 3 x 10^{-4} sq km
c) 3 x 10^{-5} sq km
d) 3 x 10^{-6} sq km

5.4

EXTRA CREDIT: Is the surface area to volume ratio greater for a cube or a sphere?

a) Sphere
b) Cube
c) Same
d) Cannot Determine

5.5

What is the area of this piece of paper in square centimeters?

a) 240 cm^2
b) 600 cm^2
c) 100 cm^2
d) 1200 cm^2

6   Exponential Functions

6.1

The mass of mold on my pizza is 2 grams right now. Mold scientists tell me
it will grow according to the function

$$\text{Mold (grams)} = 2e^{0.08t}$$

Where t is the number of hours from now. How many grams of mold will
there be in a twelve hours?

a) 5 grams
b) 10 grams
c) 0.5 grams
d) 1 gram

6.2

How long until I have 20 grams of mold?

a) 30 hours
b) 10 hours
c) 5 hours
d) 100 hours

6.3

I have a mold problem. I'm observing mold growth at the rate shown on the
graph. If the mold growth continues to observe exponential growth, what
will the mass of mold be after 6 days total?

a) 160 grams
b) 320 grams

c) 640 grams
d) 400 grams

6.4

How many days will have passed when the mold growth reaches 640 grams?

a) 5 days
b) 6 days
c) 7 days
d) 8 days

6.5

EXTRA CREDIT: Write the mathematical expression for the function graphed in the two problems above. Ignore Multiple choice options and write out your answer.

a) None
b) None
c) None
d) None