

The Final (Sample)

- (1.) Simplify the following:

$$(-3x^3y)^{-3} \frac{4y^2x^{-2}y^{-1}}{(-x^{-2}y^2)^2} =$$

$$\frac{3x^3y^{-2}}{(2x^{-1}y^4)^{-2}} \cdot \frac{y^{-5}}{12x^{-2}} =$$

- (2.) Solve for x in

$$\frac{12x - 9}{7} = \frac{12 - 9x}{6}$$

- (3.) Find the slope, x and y intercepts, and graph $4y - 10x + 2 = 12 + 2y - 6x$.

- (4.) An item's value has been falling by 6.8% per year. By what factor will it change in 5 years? If its value is \$12,500 today, what will it be in 5 years?
- (5.) If the value of something increased by 9% in one year, and then decreased by 4% the next year, by what percentage did the value change over the two-year period?
- (6.) If the natural gas costs 0.70 British Pounds per liter, how much does it cost in dollars per gallon? (1 liter = 1.057 quarts, 1 Pound = \$1.65.)
- (7.) If you deposit \$21,300 in a bank account with an APR of 3.75% compounded weekly, what will the balance be 34 years from now, assuming no withdrawals and no further deposits are made?

(8.) You're given a 3D-model of any shape with the following dimensions:

$$\text{Height/Radius} = 5 \text{ m}$$

$$\text{Surface Area} = 120 \text{ m}^2$$

$$\text{Volume} = 110 \text{ m}^3$$

We rescale this model so that the new height/radius is 2.5 meters. What are the surface area and volume of this new model?

(9.) There is a population of 200 tigers in a national park. They are being illegally poached at a rate of 5 every 2 weeks. Assume the population is otherwise unchanging, and write a linear model.

(b.) What is the x -intercept and what does it signify?

(c.) According to your model, how many tigers will be left in 1 year?

(10.) Lortab has a half-life of 4.75 hours in the bloodstream. At 9 am you take 500 mg. How much of it will remain in your bloodstream at 5 pm?

(b.) At what time will it reach 215 mg in your bloodstream?

(c.) How long will it take to reach 12% of its original amount?

(d.) What is the approximate (exact) half-life?

(11.) The doubling time of some town is 7 months.

(a.) How long will it take for this population to grow to 5 times its initial size?

(b.) If there are initially 10,000 people in this town, how many will there be in 7 years?

(12.) Of the 50 international students, 30 can speak **Spanish**, 20 can speak **French**, and 15 can speak **Dutch**. There are 15 students that can speak Spanish only, and there are 3 that can speak Spanish & Dutch only. 7 students can speak French & Spanish only, and 5 can speak French & Dutch only.

How many students can speak all three languages, and how many cannot speak any of the three languages?

(13.) How many gallons of paint do you need in order to paint a cylindrical (part (b) circular) tank with a radius of 450 feet and a height of 870 feet, if a gallon of paint covers 20 square yards of surface?

(14.) What will your monthly payment be for a:

\$200,000, 30-year loan with an APR = 6.5% compounded monthly?

\$200,000, 15-year loan with an APR = 4.5% compounded monthly?

How much would you pay in interest for both loans?