

INTEGRATED MATH 2

EXPONENTS AND LOGS TEST

Name _____

Date _____

Section A – No calculator permitted. Show all work and circle/box your answers.

1. Simplify each expression. Write your answers with positive exponents only, and no fractional exponents.

8 marks

a) $125^{\frac{1}{3}}$

b) $(7a^{-9}b^5)(3a^3b^{-5})$

c) $\left(\frac{-2x^6}{x^4y^3}\right)^3$

2. Rewrite the following logarithmic equations as exponential equations. Do not solve.

4 marks

a) $\log_5 x = 7$

b) $\log 58 = x$

3. Rewrite the following exponential equations as logarithmic equations. Do not solve.

4 marks

a) $120 = 4^x$

b) $6^x = \frac{2}{9}$

4. Solve $\log_2(x-4) = 3$.

2 marks

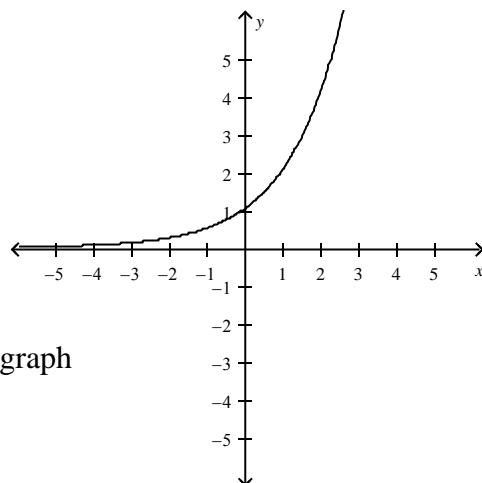
5. The graph of $f(x) = 2^x$ is shown here.

3 marks

- a) Explain why $(0, 1)$ is a point on the graph.

- b) Classify $f(x)$ as ‘growth’ or ‘decay’.

- c) As x gets smaller and smaller (as you follow the graph in the negative direction), will $f(x)$ ever reach 0?



Section B – Calculator permitted. Show all work and circle/box your answers. Round all answers to 3 significant figures, or to the nearest dollar if the problem is in dollars.

6. Evaluate $\log_6 210$. Make sure to show your work. **2 marks**
7. Solve $4^x = 800$. Show all your steps. **3 marks**
8. Pat bought a car for \$12500. The salesperson projected that the value of the car would depreciate (decline) by 20% per year. Predict the value of Pat's car five years from now. **3 marks**
9. Susie received \$500 for her birthday and is considering investing it. Calculate the final amount of money that Susie will have if she invests the \$500 for 5 years at 3.5% interest compounded annually. **3 marks**
10. Sam is going to invest some money in an account that earns 6% interest each year, and in 10 years he wants the value of the account to be \$10,000. How much will he have to invest now, so that he will have \$10,000 in 10 years? **4 marks**

10. In the year 2000, the population of the Philippines was 76.5 million, with a growth rate of 1.02%. If the population continues to increase at this rate, what will the population be in the year 2020?

3 marks

11. A certain species of tiger has been decreasing at an annual rate of 5.7%. The current population is about 770 tigers. This species will be considered "critically endangered" when the population falls below 400.

a) If the population continues to decline at the same rate, after how many years (**to the nearest whole number**) will the species be classified as "critically endangered"? Show all your work clearly.

5 marks

b) Pretend you are a World Wildlife Fund representative, and you are sent to discuss the tiger situation with the people in the area where the tigers live.

4 marks

- (i) Sketch a graph that you will show to the people to help them understand the situation.
- (ii) Label the axes on your graph and give it a title.
- (iii) Label the key points on your graph with the proper coordinates.
- (iv) Write one or two sentences summarizing the meaning of the graph and the key points on it.

