

Math 142
Exam 1 VERSION A
February 18, 1998

Name _____
Roster Number _____
Section _____ SEAT _____

scantron	
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TOTAL	

The work on this exam is my own _____
(signature required)

Please read all directions.

Each question is worth 5 points.

Be sure any written work to be read by me is legible.

There are 2 pages with writing on both sides of each page.

When you are done, put your exam and scantron in your envelope.

There is a five point deduction for any error in your name, roster number, section number, version letter (on your scantron) or missing signature. There is a 10 point deduction if I have to grade the scantron by hand.

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PUT YOUR NAME AND VERSION LETTER (A) ON YOUR SCANTRON!

There are 16 multiple choice questions to answer on your scantron. There is no partial credit on this part. The scantrons will not be returned, so please mark your answers on the exam too.

1. A child has 75 cents to purchase candies. Let x be the number of gummy worms which cost 3 cents each and y be the number of sour balls which cost 4 cents each. If the child wants to buy 4 more gummy worms, how will this change the number of sour balls he can buy?

- (A) 4 more (B) 3 more (C) 3 fewer (D) 4 fewer (E) none of the above

2. A company does a study on the demand for their product, custom folding lawn chairs. The company finds that if they charge \$30 per chair they can sell 100 chairs. If the price is raised by \$5 then they will sell 20 fewer chairs. Let x be the number of lawn chairs sold. Find the demand equation for custom lawn chairs, $D(x) =$

- (A) $-4x + 430$ (B) $-.25x + 55$ (C) $-.25x + 5$ (D) $-4x + 400$ (E) none of the above

3. The cost to make 100 custom lawn chairs is \$2000. The company finds that if they make no chairs that they still have a cost of \$500. Find the cost equation for making lawn chairs. Let x be the number of lawn chairs made. $C(x) =$

- (A) $15x + 500$ (B) $20x + 500$ (C) $20x$ (D) 2000 (E) none of the above

4. What is the domain of $f(x) = \sqrt{\ln x}$?

- (A) $x \geq e$ (B) $x > 0$ (C) $x \geq 0$ (D) $x \geq 1$ (E) $x > 1$

5. Given $f(x) = \frac{1}{2x}$ find $f(x+h)$.

- (A) $\frac{1}{2x} + h$ (B) $\frac{1}{2x+h}$ (C) $\frac{1}{2x+2h}$ (D) $\frac{1}{2x} + \frac{1}{h}$ (E) none of the above

6. Given $f(x) = \sqrt{x+1}$ and $g(x) = \sqrt{4-x}$, what is the domain of the quotient, f/g ?

- (A) $[-1, 4]$ (B) $[-1, 4)$ (C) $(0, 4)$ (D) $x \neq 4$ (E) none of the above

7. Given $y = 3|x-1|$ how has the parent function $f(x) = |x|$ been changed?

- (A) expanded by a factor of 3 and shifted left by 1 unit (B) expanded by a factor of 3 and shifted right by 1 unit
(C) contracted by a factor of 3 and shifted left by 1 unit (D) contracted by a factor of 3 and shifted right by 1 unit
(E) None of the above

8. Given $f(x) = \frac{1}{x}$ and $g(x) = \frac{1}{x^2-1}$ what is $(f \circ g)(-\sqrt{2})$?

- (A) 1 (B) -3 (C) -2 (D) does not exist (E) none of the above

9. Given $f(x) = x^2$ and $g(x) = \sqrt{x-2}$, what is the domain of $(f \circ g)(x)$?

- (A) \mathbb{R} (B) $x \neq 2$ (C) $x > 2$ (D) $x \geq 2$ (E) none of the above

10. The isotope ^{245}Pu has a half-life of 10 hours. If we start with 1 kg of this isotope, approximately how much will be left after 2 hours?

- (A) .93 kg (B) .87 kg (C) .80 kg (D) not enough data (E) none of the above

11. A population of wolves is increasing at a rate of 15% each year. Initially there were 10 wolves. Which of the equations below models the number of wolves? t is in years and $P(t)$ is the population at time t . $P(t) =$

- (A) $10(.15)t$ (B) $10(.15)^t$ (C) $10(1.15)t$ (D) $10(1.15)^t$ (E) none of the above

12. Solve for x exactly: $\frac{1}{100} = 10^{2x}10^5$. $x =$

- (A) $3/2$ (B) $-1/5$ (C) $-7/2$ (D) 0 (E) none of the above

13. You have \$500 invested in an account paying 6% compounded monthly. Exactly how many years will it take for your money to double?

- (A) $\ln\left(\frac{2}{1.06}\right)$ (B) $\frac{\ln 2}{\ln(1.06)}$ (C) $\ln\left(\frac{2}{1.005^{12}}\right)$ (D) $\frac{\ln 2}{12\ln(1.005)}$ (E) none of the above

14. A furniture company has measured its sales for each level of spending on advertising. They found the following results where x is the amount (in thousands of dollars) spent on advertising per week and y is the value of the products sold (in thousands of dollars).

x	1	2	3	4	5
y	10	20	40	45	50

Choose a model that will reasonable extrapolate the data and find the expected value of the products sold (in thousands of dollars) when \$8,000 is spent on advertising.

- (A) 44 (B) 63 (C) 85 (D) 92 (E) 212

15. We are given the following data for the percentage of households with a gizmo. x is the number of months since gizmos were introduced and y is the percentage of households having one or more gizmos. Choose the best model for this data.

x	1	6	12	18	24
y	1	5	10	30	55

- (A) linear (B) quadratic (C) exponential (D) power (E) logistic

16. We are given the following data about the number of tomatoes produced per row and the daily high temperature. x is daily high temperature in degrees Fahrenheit and y is the number of tomatoes produced per row. Find a model that will extrapolate the production of tomatoes at higher temperatures. Assume that at higher temperatures the function is always decreasing.

x	75	80	85	90	95	100
y	85	70	62	53	45	42

- (A) linear (B) quadratic (C) cubic (D) exponential (E) power

Answer the following questions ON THIS PAGE. Be sure your answers are simplified.

17. What are all the intercepts of $y = 2x^2 + 8x - 4$

18. Rewrite $y = 2x^2 + 8x - 4$ in standard form.

19. Solve for x EXACTLY: $\log_3(\log_3(x)) = 0$

20. Graph the following function:

$$f(x) = \begin{cases} x^2 & \text{if } x < 0, \\ x & \text{if } x > 1. \end{cases}$$

