

.ne eq. $\frac{3}{-\frac{5}{9}}$ 6. If Δ is defined by the equation $x\Delta y = x + xy + y$ for all real numbers x and y, what is the value of mutute # # ' ' R mutute ## # B multilite # # 'S R 而如此他教林婆死 z if $8\Delta z = 3$? R - 1. a. b. 面的机机都林塔像 而此此他恭祥後席 而如此他称林婆然 mutale # # '3 PE 5 2011mm 称林塔 然 N.

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- Assume x is a positive integer. Which of the following cannot be the average of the five numbers 7. institute # nstitute the start wite Wark inte sai 234, 256, 273, 281, and 218*x*?
 - 218 a.

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- 296 b.
- 732 c.
- d. 1822
- inte the the 2694 e.
- stitute # # # B stitute # # 13 PE alitute # # * * tinte # # '3 PR institute \$ 8. Mr. Goebel runs y yards in s seconds. What would his rate be, in yards per second, if he ran twice as far in 10 more seconds?
- $a^{k} \frac{2+y}{12}$ 面射曲線林塔梯 面动机机称林塔张 面前加速教祥等発 面动油油水带林塔路 Y. b. $\frac{y}{2(s+10)}$ c. $\frac{2y}{10s}$ 面前加坡新林塔梯 matinue ## # '\$ 1% mutute # # 'S R 而如此他教祥等张 Invitute # # * N. $d. - \frac{2y}{y}$ e. $\frac{2y}{s-10}$
 - photograph of Mark McGwire when he was a member of the Olympic USA Baseball Team in 1984. In 1987, the value of the card was \$8 and in 1997, its value was \$20. According to the card bas growthen the card was \$8 and in 1997, its value was \$20. According to the card bas growthen the card 9. The collecting of baseball cards has become a popular hobby. One baseball card shows a 1984. In 1987, the value of the card was \$8 and in 1997, its value was \$20. Assuming the value of the card has grown exponentially with $V_0 = 8$ and there is no change in growth rate, after how long will the value of the card be \$2000?

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- 56 years a.
- b. 60 years

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- c. 64 years
- d. 68 years
- mistitte ## # e. 70 years

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14. If $a + bi = \frac{3 - i}{1 + i}$, then mininte # # 3 PS 面对机机都林谱像 面对机能称林荡梯 而时间他称林塔除 Y. a. a = 2, b = -2b. a = 3, b = 1c. a = -3, b = 1d., a = 1, b = -2e. a = 4, b = 4

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15. Suppose the weight of a culture of bacteria doubles daily. If the weight of the culture at the end of k days is M grams, its weight at the end of k-3 days is

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16. Which of the following statements is true about the solutions of the equation $|x^2 - 5x| = 6$?

The equation has two solutions, both greater than 5. a.

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面站加坡森林塔梯 b. The equation has two solutions, one positive and one negative.

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- C. The equation has three solutions whose sum is 11.
- mistille ### The equation has four solutions whose sum is 10. d.
 - None of the above statements is true. e.
 - 17. A 25 foot tall ladder is placed along the vertical wall of a house. The foot of the ladder is 20 feet from the bottom of the house. If the top of the ladder slips 8 feet, then the foot of the ladder will matinte ## # # multure # # ** Astitute # # ** Istitute # # ** slide how many feet? Astitute to the
 - a. 3 ft. b. 5 ft. c. 8 ft.
 - d. 4 ft. e. 7 ft.

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18. Mary typed a six-digit number, but the two 1's she typed did not show. What appeared instead was 2002. How many different six-digit numbers could she have typed?

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- a. 5 b. 8
- c. 10 d. 15

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23. A function f is even if for each x in the domain of f, f(x) = f(-x). A function f is odd if for each x in the domain of f, f(-x) = -f(x). Which of the following statement(s) is (are) true?

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- I. The product of two odd functions is odd
- II. The sum of two even functions is even.

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- III. The product of an even function and an odd function is odd.
- If *f* is any function and the function *F* is defined by $F(x) = \frac{f(x) + f(-x)}{2}$ IV.

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then F is even.

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- b. Only I, II and III are true.
 c. Only II, III and IV are true.

 - d. Only II and III are true.
 - e. Only III and IV are true.
 - 24. The volume of wood V in a tree varies jointly as the height h and the square of the girth g (girth is the distance around). If the volume of a redwood tree is 216 m³ when the height is 30 m and the girth is 1.5 m, what is the height of a tree whose volume is 960 m³ and girth is 2m?
 - 14. 8 m. a.
 - b. 45 m.
 - c. 50 m.

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d. 75 m. 95 m. e.

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26. Given $a_3 = 5$, $a_5 = 8$ and $a_n + a_{n+1} + a_{n+2} = 7$ for all positive integers, *n*, compute a_{2001} . mutute # # '& R antitute the tet 's fr. withthe ## # 18 PR Millitte # # ** Institute # # **

8 C. d. -6 -8 而时间推翻林塔梯 e. 而此此他新林塔像

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multille m # " Institute # # " Institute mark " multinu m # 3 multinu m # 3 mating the star 面动机机新祥等 而此此他新祥後 27. Compute N so that $\frac{N}{x-5} + \frac{3}{x+4} = \frac{10x+13}{x^2 - x - 20}$ for all x > 2000. a. 4 Y. mstitute ##* 7 b. c. 10 d. 13 28. Compute the maximum value of x + y for all positive integer pairs (x, y) that satisfy 15x + 55y = 2000. a. 104 mutute # # 'S PE mythill # # B mutute ## # 'S PS 而就加根熱林等除 d 120 Y. 29. Solve $(a + bi)^2 = 5 + 12i$ for **a** and **b**. The number of solutions is 而如此他称林塔然 mythute ## # 'S PC maximue # # 3 PS R 面动抽版新林塔 a. 0 mstitute ## stitute ## Ъ. 1 c. 2 d. 3 e. 4 30. Let b be a positive integer and consider $f(x) = 2x^2 + bx + 10$. As b increases, how does the graph Y. of f(x) change? 资本 The vertex changes with the *x*-coordinate decreasing at a slower rate than the *y*-coordinate. b. The x-coordinate of the vertex increases by 1 whenever the y-coordinate of the vertex decreases by 6. c. The vertex changes with the x-coordinate decreasing while the y-coordinate remains No. 1/2 1/2 constant. The x-coordinate of the vertex decreases by 1 whenever the y-coordinate of the vertex d. decreases by 4. e. None of these. 31. The price of a computer over a 25 month period is described by $f(x) = 1050 - \sqrt[3]{9x^5} + 5x + 503$. No. If the model continues to be accurate beyond the 25 month period, approximately when will the price reach half of its initial price? a. 26 months, 29 days. b. 27 months, 19 days e. 28 months, 3 days. c. 27 months, 22 days. astitute ## # '% PK Artitute # # # 18 面的加加服務林塔路 withthe \$6 # 3 PS N.

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32. A luxury car's value is represented by the equation $y_1 = 50(0.822)^x$. A sports utility vehicle's \$1000's) of the automobile after x years. Assuming one of each model is purchased on the same day, how long will it be before the SUV is worth \$1000 mere the same day. (SUV) value is represented by the equation $y_2 = 30(0.884)^x$. In both functions, y is the value (in

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- b. 6.1 years.
- c. 7.4 years.
- d. 8.1 years.
- e. None of these.
- 33. A dress that is size x in France is size s(x) in the United States, where s(x) = x 32. A dress that is size x in the United States is size y(x) in Italy, where y(x) = 2(x+12). Which function h(x)multute # # * will convert French dress sizes to Italian dress sizes? institute ## # tinstitute \$ inte Sta

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- h(x) = 2(x 20)a.
- b. h(x) = 2(x-4)
- c. h(x) = 3x 8
- d. h(x) = x + 56

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e. h(x) cannot be determined from the information provided.

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- 2.2422the statistic states 2.8456 h 3.5362 C.
 - d. 3.8066 e. 4.3174
- hold 108 cm³. Estimate the minimum surface area for the box. 35. The Container Company is designing an open top rectangular box, with a square base, that will mistille the the stitute the the

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- 120 cm^2 a.
- b. 108 cm^2
- $c_{12} 102 \text{ cm}^2$ $d. 96 \text{ cm}^2$ 5 cm² 92 cm²

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36. Dovetail Carpentry Shop makes bookcases and desks. Each bookcase requires 5 hours of woodworking and 4 hours of finishing. Each desk requires 10 hours of woodworking and 3 hours of finishing. Each month the shop has 600 hours of labor available for woodworking and 240 atitute \$ hours for finishing. The profit on each bookcase is \$40 and on each desk is \$75. How many of each product should be made in order to maximize profit?

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a. 48 bookcases, 24 desks.

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- b. 60 bookcases, 0 desks.
- c. 57 bookcases, 4 desks.
- d. 12 bookcases, 54 desks.
- e. None of these.

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37. A rectangular field is 300 feet wide and 400 feet long. Random sampling indicates that there are, on the average, three ants per square inch throughout the field. Of the following, the number that mistime # # * most closely approximates the number of ants in the field is misitute ### mstitute \$

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- 500 thousand. a.
- b. 5 million.
- c. 50 million.
- d. 500 million.
- e. 5 billion.

38. For how many three-element sets of positive integers $\{a,b,c\}$ is it true that $a \times b \times c = 2310$?

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- 32 a. b. 36 45 Ninte 新林 资序 c. 40
- d. 43

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mytute # # 3 PS 面对机机称样等除 39. Let f be a linear function with the properties that $f(1) \le f(2)$, $f(3) \ge f(4)$ and f(5) = 5. matinue ## # '& K matitule # # '& K Which of the following statements is true? 而时间推荐林塔张 mailtant to the second

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- · 3 1% Astitute \$ 5 \$ a. f(0) < 0.
 - b. f(0) = 0.
 - c. f(1) < f(0) < f(-1)

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d. f(0) = 5e. f(0) > 5

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40. The number of distinct real values x which satisfy the equation $(x^2 - 5x + 5)^{x^2 - 9x + 20} = 1$ is

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