

(a) 3√2

(d) 2√3

5. If a number has more than one digit, when we take the sum of its digits, it decreases. Therefore, if we constantly repeat the process of adding the digits of the number, we ultimately end up with a single digit. For any integer x, denote this single digit by f(x). Find $f(6^5)^4$

(a) 7

(c) 9

(b) 8

(d) 4

6. What is the minimum distance from the point (0; 0) to a point on the line 5x + 12y = 60?

(a) 20/13

(c) 11/13

(b) 53/13

(d) 60/13

7. Let i be the square root of -1. Evaluate:

$$i^{1^2} + i^{2^2} - i^{3^2} - i^{4^2} + i^{5^2} + i^{6^2} - i^{7^2} - i^{8^2} + i^{2009^2} + i^{2010^2}$$

(a) 1

(c) i

(b) 1+i

(d) 1-i

8. If x and y are real numbers satisfying $x^2+y^2=1$, find the greatest possible value of x+y.

(a) √2

(c) √5

(b) √3

(d) √7

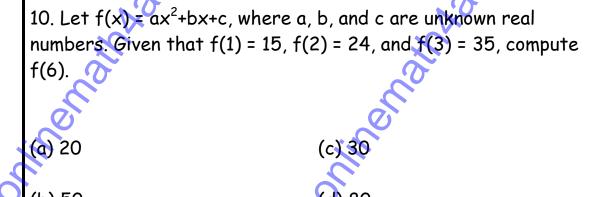
9. Two sides of a right triangle are 3 and 4. Find all possible areas of the triangle.

(a) 6, 3√7/2

(c) 5, 3√7/2

(b) 4, 3√7/2

(d) 3, 3√7/2



MAN-S (b) 50

(g) 80

(a) -2 (b) -1 11. Evaluate the following:

$$\left(-\frac{1}{2}\right)^{-1^{100}}$$

(c) -3

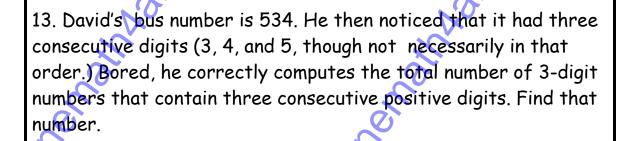
(d) 0

12. How many integers from 1 to 1000 inclusive are multiples of 2 and 3 but not 5?

(a) 196

(c) 125

(b) 133



(c) 17

(b) 42

(d) 22

14. Let $f(x) = (x^2-3x+2) / (x^2-7x+6)$. Compute the sum of all distinct values of x for which f(x) = 0

(a) 3

(c) 3

(b) - 5

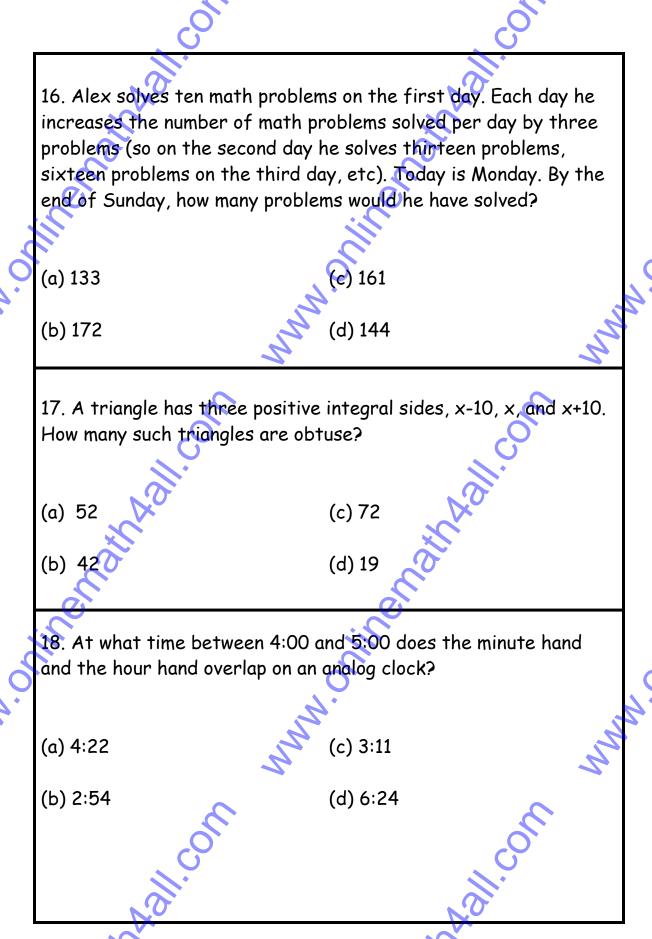
(d) -2

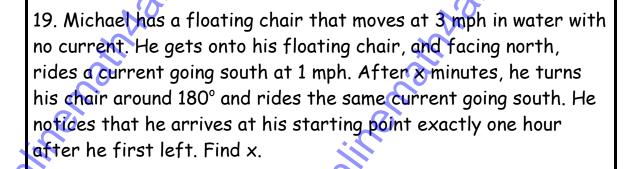
15. Let x be the answer to this problem. What is x^2 -21x+121?

(a)7

(c) 9

(b) 8





20. Evaluate the following and express your answer as a fraction in base 10.

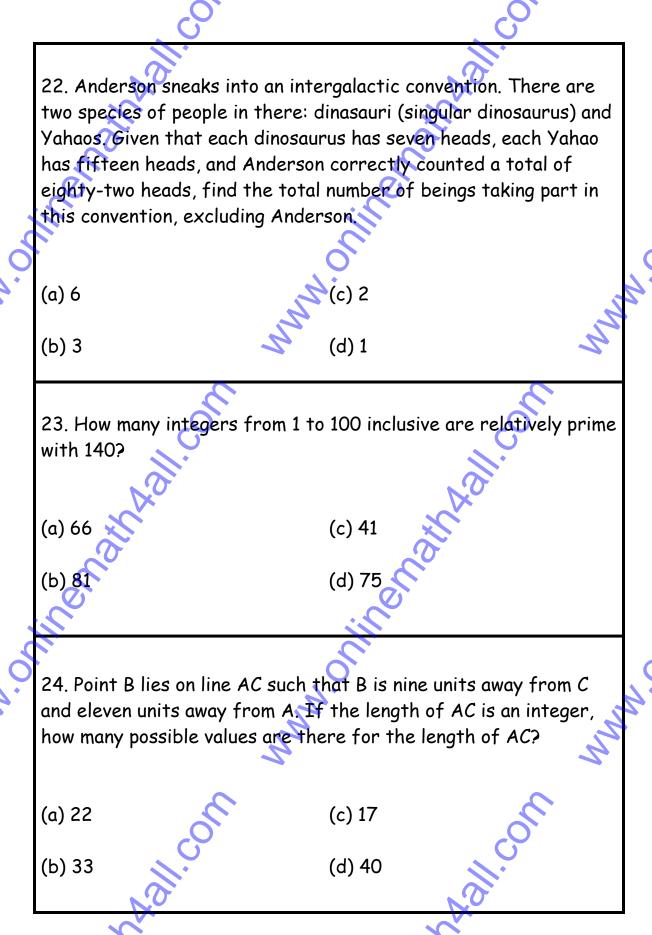
$$20_3 + 2_3 + 0.2_3 + 0.02_3$$
 (c) 80/9

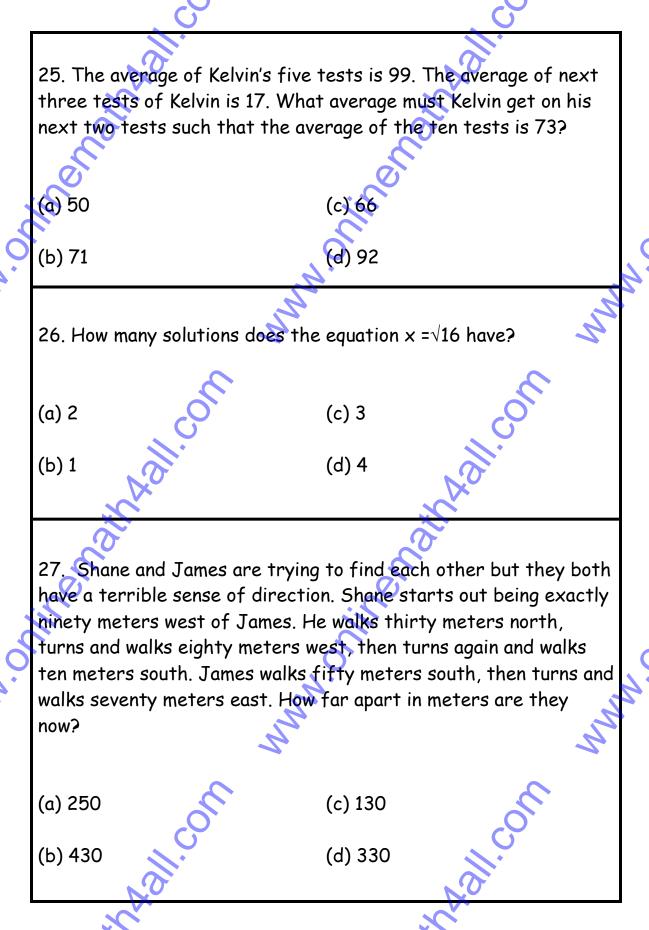
(c)
$$80/9$$

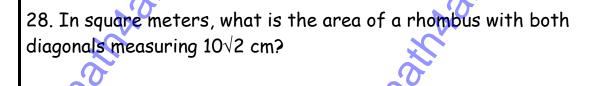
21. Suppose a right triangle has a hypotenuse of length 3. Given that its area is 1. find its perimeter.

(a)
$$-3+\sqrt{13}$$

(c)
$$3-\sqrt{13}$$







(a) 0.0022 sq.m

(c) 1,1 sq.m

(b) 0.01 sq.m

(d) 0.09 sq.m

defined so that

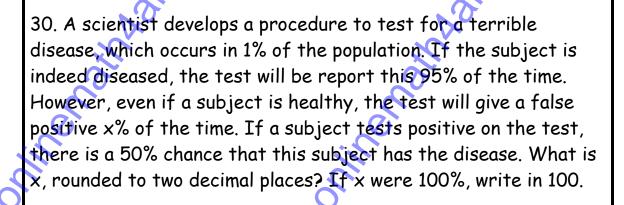
$$2^{a_k} = 2^{2^k} + 1$$

What is the integer nearest to $a_0 + a_1 + a_2 + a_6$?

(a) 184

(b) 128

(d) 112



(a) 0.72

(c) 0.85

(b) 0.65

(d) 0.96

31. Suppose $f(x) = x^2 - 10x + 28$. Find the two integer solutions to the equation f(f(x)) = x.

(a)
$$x = -4$$
, $x = 7$

(c)
$$x=4$$
, $x=7$

(b)
$$x=4$$
, $x=8$

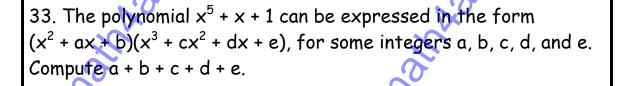
(d)
$$x=3, x=7$$

32. Suppose a triangle ABC has sides AB = $\sqrt{73}$, BC = 10 and CA= 9 such that AD = DE = EC. Point F is the midpoint of BC. Let P be the intersection of lines BE and DF. If BD is perpendicular to AC. What is the sum of these areas of triangle BPF and triangle DPE

(a) 8

(c)7

(b) 6



(b) 1

34. Suppose we have a dartboard with radius 1. Suppose an equilateral triangle is inscribed in the dart-board. Find the probability that when a dart is thrown, it lands inside the triangle. (c) $3\sqrt{3}/4\pi$ (d) $3\sqrt{3}/\pi$

(a) $\sqrt{3/4\pi}$

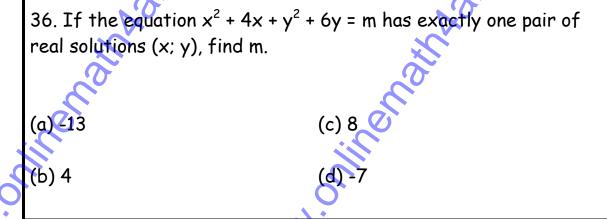
(b) √3/π

35. Yen is playing a computer game when she notices her score is a three-digit palindrome. She notices she is 382 points away from another palindrome score. What is the highest score she could have at that moment?

(a) 729

(c) 888

(b) 654



(b) 4 37. Let $\lfloor x \rfloor$ denote the greatest integer less than or equal to x. If x is a randomly chosen number between 0 and 42, compute the probability that $\lfloor 17x \rfloor = 17 \lfloor x \rfloor$

(a) 28/117

(c) 12/17

(b) 11/117

(d) 1/17

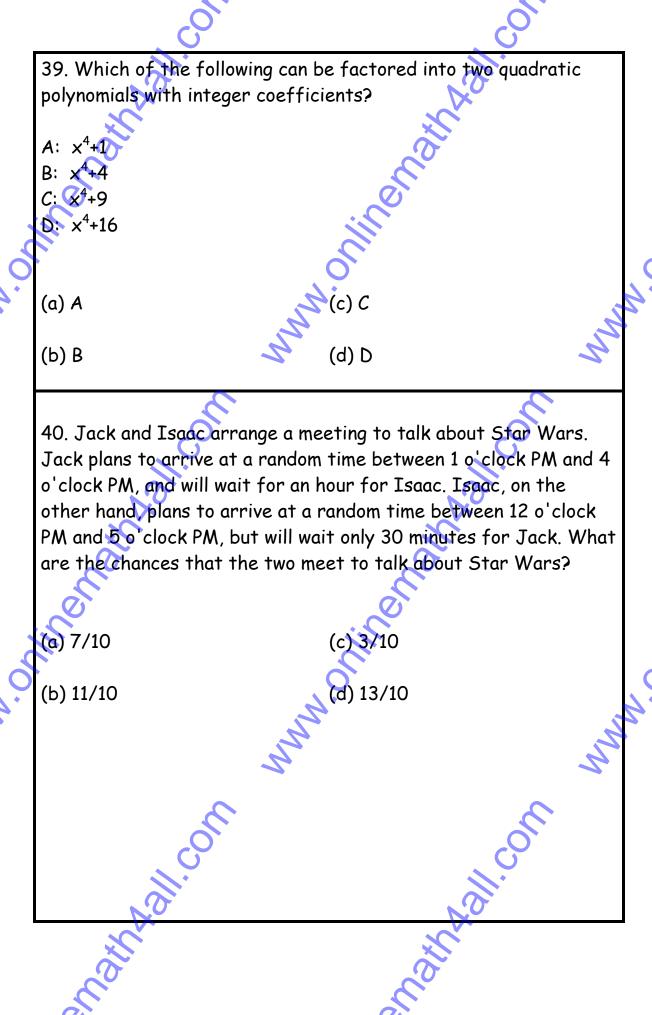
38 Triangle ABC has sides AB = 6, BC = 8, and CA = 10. There is a point P such that it is distance R from A, B, and C. What is πR^2 ?

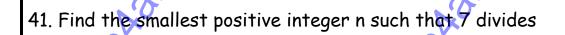
(a) 23π

111 (c) 25π

(b) 16π

(d) 52π





$$\underbrace{11\dots1}_{n}$$

(c) 3

(b) 4

(d) 6

42. Find all values of x for which $3x^2-39x + 126 < 0$.

(a) 6 < x < 7

(c) 7 < x < 8

(b) 6 > x > 7

(d) 7 > x > 8

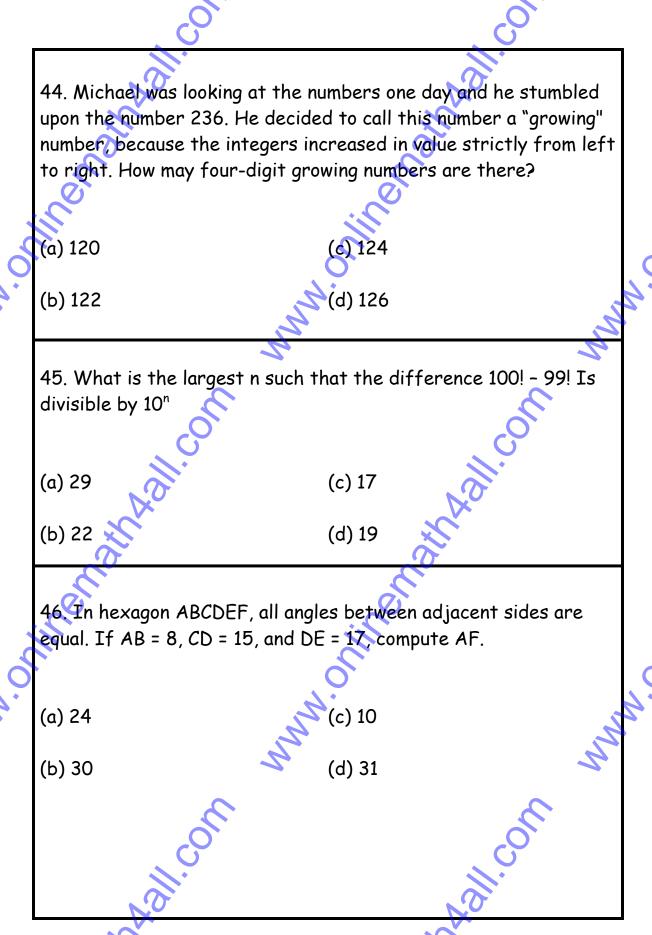
43. Lily and Mary are competing in a hot dog eating contest. Because she fasted for a week, Mary has 4/5 chance of winning a match and Lily has 1/5 chance of winning a match (there are no ties). What is the probability that Lily will win in at least two matches and at most four matches if they compete for five matches?

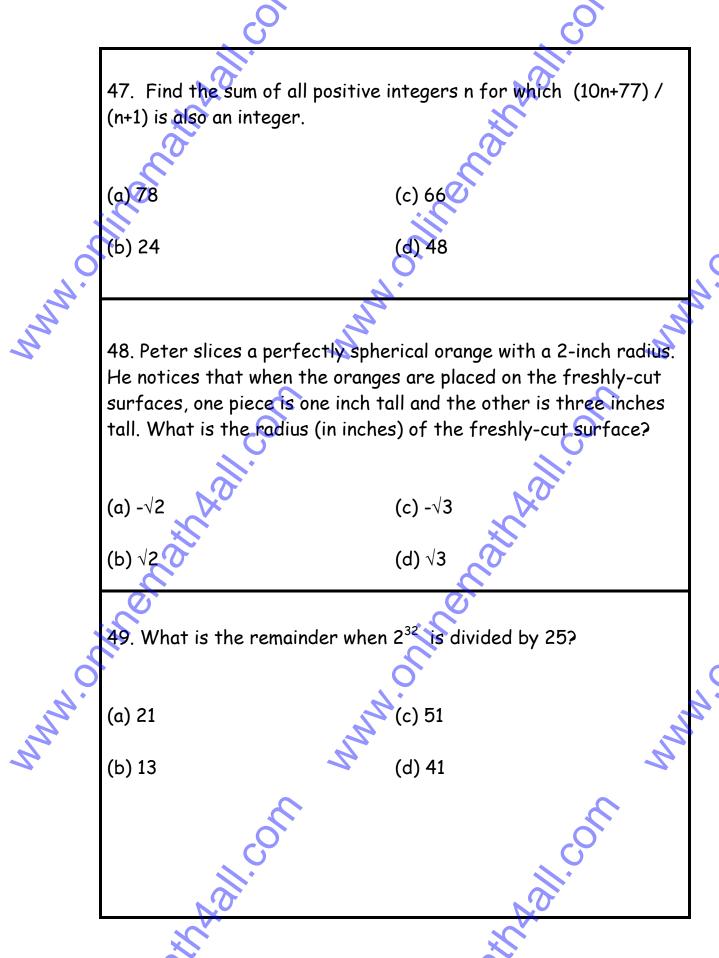
(a) 162/625

(c) 164/625

(b) 163/625

(d) 165/625





50. Charley has twenty-seven unit cubes, which he makes into a 3 by 3 by 3 cube. He paints the exterior red. He throws the cube My Ochingon into the air and it splits into twenty-seven cubes that are all ρες (c) 45 (d) resting on the ground. What is the expected number of red faces that are visible? Mun Mun Solver (a) 30 (b) 25 MANO LINGUARIANI. CORT. Man of the Color o

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	Answers	NO.			XX ASI			
	1. d	2. c	3. c 9. a 15. d	4. a	5. c	6. d		Orinor
MANAN.	7. b	8. a	9. a	10. d	11. a	12. b		
MA	13. b	14. d	15. d	16. a	17. d	18. a		
		20. c	21. d	22. α	23. a	24. c		
	25. d	20. c	27. a	28. b	29. b	30. d		
	31. c	32. a	33. c	34. c	3 5. d	36. a		
Muly Sold Sold Sold Sold Sold Sold Sold Sold	37 . d	38. c	33. c 39. b 45. b	40. c	41. d	42. a		
My.	43. c	44. d	45. b	46. a	47. c	48. d	Nun	•
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