Name:_____ Date:_____

Math 8H 2025 Lesson 2 Perfect Squares, Cubes, and Square Roots

1. Indicate which of the following numbers are perfect squares, cubes, both, or neither. If it is a perfect square or cube, write it as a cube or square:

a) 225	b) 1024	c) 243	d) 196	e) 400
f) 128	g) -1	h) 8000	i) 289	j) 125
k) 343	L) -8	M) 10,000	n) 64	o) 189
p) 800	q) 729	r) 0	s) 625	t) 1331

2. Given each of the equations below, indicate whether if it is TRUE or FALSE, explain your work:

   i) $\sqrt{-9} = 3$ TRUE or FALSE ii) $\sqrt[3]{-64} = 4$ TRUE or FALSE

   ii) If the square of "A" is equal to "B", then the square root of "B" is equal to "A" : TRUE or FALSE

   iii) A number can only be a perfect square or a perfect cube, but not both: TRUE or FALSE

   iv) The square root of a negative number does not exist: TRUE or FALSE

   v) The cube root of a negative number does not exist: TRUE or FALSE

   vi) Perfect squares can only be positive: TRUE or FALSE

   vii) Perfect cubes can only be positive: TRUE or FALSE

   viii) Suppose "a" is an integer and not a perfect square, TRUE or FALSE
   then a^2 must be a perfect square

   ix) If "a" is a negative number then it can never be a TRUE or FALSE
   perfect cube

   x) If "a" and "b" are positive integers and are NOT TRUE or FALSE
   perfect squares, then $a \times b$ can be a perfect square

   xi) Suppose "a" and "b" are prime numbers, then TRUE or FALSE
   $a \times b$ can never be a perfect square

   xii) Suppose "a" and "b" are not perfect squares, then TRUE or FALSE
   $a \times b$ can never be a perfect square

3. Use the RULE of "5" to multiply each of the following:

a) 45×45	b) 75×75	c) 95×95	d) 115×115	e) 85×85
f) 55×55	g) 65×65	h) 85×85	i) 105×105	j) 125×125

4. Draw a Number Line and Estimate each of the following

a) $\sqrt{50}$	b) $\sqrt{180}$	c) $\sqrt{77}$
d) $\sqrt{134}$	e) $\sqrt{200}$	f) $\sqrt{63,859,102}$
g) $\sqrt{0.0000485}$	h) $\sqrt{2385029}$	i) $\sqrt{0.0023501}$

5. Suppose "a" is a perfect square, what numbers can the units digit be?

6. Suppose "A",'B", and "C" are single digit positive integers, which of the following can be a Perfect Square?

i) $7ABC4$ ii) $8ABC2$ iii) $9ABC6$ iv) $75ABC44$

7. A square has a perimeter of 28cm. What is the area of the square in cm^2?

8. Two squares, each with an area of $30cm^2$, are placed side by side to form a rectangle. What is the perimeter of this rectangle? Give your answer to 3 decimal places:

9. A cube has a volume of $125cm^3$. What is the area of one face of the cube?

10. What is the "RULE of 5's"? What is the trick to squaring a number that ends with 5? Ie: 125 x 125 = ?

11. Suppose "A" is a single digit positive integer, what is the value of $A5 \times A5$ in terms of "A" ?

12. Square root the following without using a calculator:

a) $\sqrt{15625}$	b) $\sqrt{42025}$	c) $\sqrt{93025}$
d) $\sqrt{65025}$	e) $\sqrt{497025}$	f) $\sqrt{46225}$

13. Which is bigger? 100^2 or 50^3 Explain your answer:

13 . In the following equations, the letters a, b and c represent different numbers.

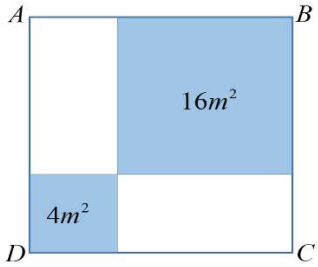
$$1^3 = 1$$
$$a^3 = 1 + 7$$
$$3^3 = 1 + 7 + b$$
$$4^3 = 1 + 7 + c$$

The numerical value of $a + b + c$ is

(A) 58 **(B)** 110 **(C)** 75 **(D)** 77 **(E)** 79

14 $ABCD$ is a square that is made up of two identical rectangles and two squares of area 4 cm^2 and 16 cm^2. What is the area, in cm^2, of the square $ABCD$?

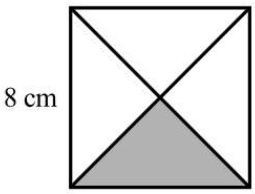
(A) 64 **(B)** 49 **(C)** 25 **(D)** 36 **(E)** 20



15. The diagonals have been drawn in the square shown. The area of the shaded region of the square is

(A) 4 cm^2 **(B)** 8 cm^2 **(C)** 16 cm^2

(D) 56 cm^2 **(E)** 64 cm^2

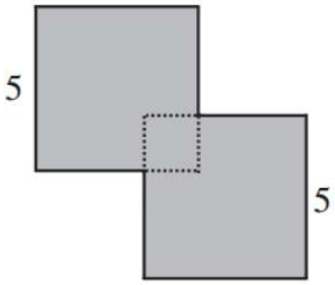


16.

Two squares, each with side length 5 cm, overlap as shown. The shape of their overlap is a square, which has an area of 4 cm^2. What is the perimeter, in centimetres, of the shaded figure?

(A) 24 **(B)** 32 **(C)** 40

(D) 42 **(E)** 50



17. Given that $a^2-b^2=(a+b)(a-b)$, what is the value of 1000^2-999^2 ?

18. If $(k+3)(k-3)=1000$, then what is the value of k^2 ?