

School _____ Team _____

Team Members 1 _____ 2. _____

3. _____ 4. _____ 5. _____

Instructions: Label answers with appropriate units.
Do not round or approximate answers.
Write answers on lines provided.

1. A runner leaves third base heading toward home base at 22 feet per second. Two seconds later the third baseman throws the ball from third base toward home plate at 88 feet per second. How long after the throw does it take the ball to pass the runner?

Ans: _____

2. Simplify: $\log_2 4 \cdot \log_4 6 \cdot \log_6 8 \cdot \dots \cdot \log_{30} 32$.

Ans: _____

3. Two exterior angles of a regular polygon are $(5x+10)$ degrees and $(4x+17)$ degrees. How many sides does the polygon have?

Ans: _____

4. A fourth degree polynomial equation has real coefficients and two of its solutions are i and $3-i$. What is the equation?

Ans: _____

5. Two years ago Adam was three times as old as Bob, but in 3 years Bob will be only half of Adam's age. How old is Adam now?

Ans: _____

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1. At a meeting a group of polite people greeted each other by shaking hands. If every person shook hands with every other person and a total of 36 handshakes were exchanged, how many people were in the group?

Ans: _____

2. If m men can do a job in d days, how many days will it take $m+1$ men to do the job?

Ans: _____

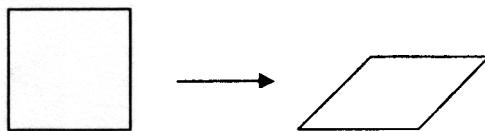
3. Find the fourth power of $\sqrt{2+\sqrt{3+\sqrt{4}}}$ Write your answer in simplest form.

Ans: _____

4. The area of a triangle is 10 square inches. Each side is doubled, forming a new triangle. Find the area of the new triangle.

Ans: _____

5. A square is squashed into a rhombus. If the area of the square is twice the area of the rhombus, what is the size in degrees of the rhombus' acute angle?



Ans: _____

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1. What percent of an amount is 2% of 4% of the amount?

Ans: _____

2. Consider a right triangle the lengths of whose sides are three consecutive integers. Find the surface area of the solid obtained by revolving the triangle about its hypotenuse.

Ans: _____

3. Find the exact value of $\sin^{-1} x + \cos^{-1} x$, where $0 \leq x \leq 1$

Ans: _____

4 Find all solutions to the equation: $3^{2x+1} - 10(3^x) = -3$

Ans: _____

5. *A multiple of eleven I be,
not odd but even, you see.
My digits, a pair,
When multiplied there,
make a cube and a square
out of me. Who am I ?*

Ans: _____

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- 1 Find the exact value of $(87456799)(87456799) - (87456800)(87456798)$.

Ans: _____

- 2 Find all values of m for which the given system of equations has (exactly) one solution:

$$\begin{cases} x^2 + y^2 = 4 \\ x + y = m \end{cases}$$

Ans: _____

- 3 The average age of a group consisting of math teachers and physics teachers is 50. The average age of the math teachers is 45, while the average age of the physics teachers is 65. What is the ratio of the number of math teachers to physics teachers?

Ans: _____

- 4 What is the acute angle in degrees between the hour and minute hands of a clock at 1:10?

Ans: _____

- 5 Solve for x : $2\cos^4 2x - 2\sin^4 2x + 1 = 0$, $0^\circ \leq x \leq 180^\circ$.

Ans: _____

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1. Evaluate: $(2^{-5} - 2^{-6} - 2^{-7})^{-1}$

Ans: _____

2. Find the volume of a cube inscribed in a sphere of radius 3 inches.

Ans: _____

3. Solve for n : $\binom{n+1}{n-1} = 78$

Ans: _____

4. Find the ones digit in 3^{99}

Ans: _____

5. Evaluate: $(1+i)^{12}$

Ans: _____