

Leto 195

PRECALCULUS BOWL

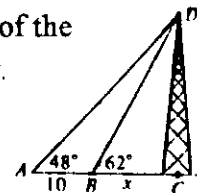
FAMAT REGIONAL

JANUARY

- Find the points of intersection of the graphs $x^2 + y^2 = 4$ and $(x + y)^2 = 4$.
- A 5 inch slice, perpendicular to the base, is cut from one face of a cube. The remaining solid has a volume of 93in^3 . To the nearest tenth of an inch, find the length of an edge of the original cube.
- Write the equation of the sine curve with amplitude F, period G, phase shift H, and displacement I. $F =$ the slope of the line connecting $(-3,7)$ and $(1, -1)$ $G = 2\text{Arctan}(\sqrt{3})$

$$H = 12i^{12} + 6i^6, \text{ where } i = \sqrt{-1} \quad I = \begin{vmatrix} 2 & -1 & 3 \\ 0 & -3 & 2 \\ 4 & 1 & 5 \end{vmatrix}$$

- $(\sin x + \cos x)^2 = \frac{1}{2}$. Give the exact solutions, $0 \leq x \leq 2\pi$.
- Find ab a two digit number having two distinct digits such that the difference between the square of the number and the square of the number with digits reversed is a perfect square.
- From points A and B 10 m apart (see figure below), the angles of elevation of the top of the tower are 48° and 62° respectively. Find the height of the tower to the nearest meter.



$$7. \text{ Let } A = 3 \log_2 4^{x+y} \quad \text{Let } B = \frac{x^3 + y^3}{x^2 - 2x - 24} \bullet \frac{x^2 - 3x - 18}{2x^3 - 2x^2y + 2xy^2}$$

$$\text{Let } C = \frac{(x+3)!}{6(x+2)!} \quad \text{Find } \frac{A \bullet C}{B}$$

- Find all values s such that the distance between the point $(s,3s)$ and the line $3x - 4y - 10 = 0$ is less than 5.
- Find the **sum** of the values of the following statements. If the statement is **true**, its value is given in **parentheses** next to the statement. If the statement is **false**, its value is 0.
 A (3) In polar form the graph of $r = 2 - 2\sin\theta$ is a limaçon. $B(-7) 0^0 = 1$.
 C(-1) The domain of $f(x) = \ln x^2$ is all Reals. $D(22) \sin(x) = -\sin(x+\pi)$
 E(-35) The focus of the parabola $(x-2)^2 = 8(y+3)$ is at $(2,-1)$
 F(50) A wheel turns at 10 revolutions per minute. Its angular velocity is $\frac{\pi}{3}$ rad/sec.
 G(-40) If $\sin\theta = \frac{3}{5}$, then $\cos\theta$ always equals $\frac{4}{5}$.

- A commercial pilot finds it necessary to detour around a group of thundershowers. He turns at angle of 21° to his original path, flies for a while, turns, than intercepts his original path at an angle of 35° , 70 kilometers from where he left it. How much further did he have to go to the nearest kilometer, because of the detour?
- Find the sum of all 3 digit numbers divisible by 6.
- The letters in the word greater are listed at random in a row. What is the probability that three consecutive letters are vowels?
- A discount store owner pays \$15 for an item and wishes to make a 30% profit based on the actual selling price after allowing customers a discount of 10% of the list price. What should be the list price?

$$14. \text{ Simplify. } \frac{\sqrt[3]{2}}{\sqrt[3]{2}-1} + \frac{\sqrt[3]{4}-1}{\sqrt[3]{4}+\sqrt[3]{2}+1} + (\sqrt[3]{3}+1) \bullet (\sqrt[3]{9}-\sqrt[3]{3}+1)$$

- The sum of the first two terms of a seven-term geometric progression is 20 and the sum of the last two terms is $\frac{5}{8}$. Find the sum of all seven terms.

