

CALCULATOR APPLICATIONS TIPS (SEPTEMBER 2019)

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The area of a segment is the area of the sector minus the triangular piece.

Given in degrees

$$\text{Area of a segment} = \left(\frac{\theta}{360} \times \pi - \frac{\sin\theta}{2} \right) \times r^2$$

1. Find the area of a segment whose central angle is 30° and whose radius is 12.

$$A = \left(\frac{30}{360} \times \pi - \frac{\sin 30}{2} \right) \times 12^2 = 1.70$$

Given θ in radians

$$\text{Area of a segment} = \frac{\theta - \sin\theta}{2} \times r^2$$

2. Find the area of a segment whose central angle is 0.527 radians and whose radius is 26.

$$A = \frac{.527 - \sin .527}{2} \times 26^2 = 8.13$$

The determinant of a matrix is a special number that can be calculated from a square matrix. A matrix is an array of numbers.

$$\begin{vmatrix} a & b \\ c & d \end{vmatrix} = ad - bc$$

3. $\begin{vmatrix} 7 & 3 \\ 4 & 5 \end{vmatrix} = \underline{\hspace{2cm}}$.

$$(7)(5) - (4)(3) = 35 - 12 = 23$$

A set is a collection of things. For example you could have a set consisting of things that you drink.

{water, juice, soda}

Water, juice and soda are called the elements of the set. In other words the members of a set are called elements. The elements of a set could be variables or numbers.

{a, b, c} or {0, - 3, 7, 29}

When talking about sets, it is fairly standard to use capital letters to represent the set and lowercase letters to represent an element in that set.

A = {prime numbers} ; B = {a, e, i, o, u}

When we say an element is in Set B, we use the symbol \in to show it. If something is not in a set use \notin . Thus $a \in B$ and $7 \notin B$.

If two sets are equal, you use the equal sign (=). If Set C is equal to set D, this is written $C = D$. The order of the elements of a sets not important.

If $C = \{\text{Alicia, Betty, Carmen}\}$ and $D = \{\text{Betty, Carmen, Alice}\}$, then $C = D$.

SUBSETS

Once a set is defined, if you take pieces of that set, those pieces are called “subsets”. A is a subset of B if and only if every element of A is in B.

The subsets of $\{a, b, c\}$ are $\{a\}$, $\{b\}$, $\{c\}$, $\{a, b\}$, $\{a, c\}$, $\{b, c\}$, $\{\}$, and $\{a, b, c\}$. $\{\}$ is known as the empty (null) set. The empty set has no elements.

$\{a\}$, $\{b\}$, $\{c\}$, $\{a, b\}$, $\{a, c\}$, $\{b, c\}$, and $\{\}$ are considered to be proper subsets. $\{a, b, c\}$ is considered to be an improper subset. Every set has exactly 1 improper subset.

If $\{a\}$ is a subset of Set Z, the symbol use is \subseteq .

$$\{a\} \subseteq Z$$

If a set has n-elements then the number of subsets is 2^n ,

where n is the number of elements of the set.

4. How many subsets does $\{-5, 9, 13, 4\}$ have?

_____.

$$2^4 = 16$$

The number of proper subsets is $2^n - 1$, where n is the number of elements in the set.

5. How many improper subsets does $\{p, r, i, m, e\}$ have? _____.

$$2^5 - 1 = 32 - 1 = 31$$