```
years =
    16

months =
    5
```

the end of any of the commands that calculate the values).

1.10 PROBLEMS

The following problems can be solved by writing commands in the Command Window or by writing a program in a script file and then executing the file.

1. Calculate:

(a) $\left(5-\frac{19}{7}+2.5^{3}\right)^{2}$ (b) $7\times3.1+\frac{\sqrt{120}}{5}-15^{5/3}$

2. Calculate:

(a) $\sqrt[3]{8+\frac{80}{2.6}}+e^{3.5}$ (b) $\left(\frac{1}{\sqrt{75}}+\frac{73}{3.1^{3}}\right)^{1/4}+55\times0.41$

(a) $0.4z^4 + 3.1z^2 - 162.32$

7. Define the variable t as $t = 3.2$; then evaluate:

(a) $\frac{1}{2}e^{2t} - 3.81t^3$

(b) $\frac{6t^2+6t-2}{t^2-1}$

8. Define the variables x and y as $x = 6.5$ and $y = 3.8$; then evaluate:

(a) $(x^2+y^2)^{2/3} + \frac{xy}{y-x}$

(b) $\frac{\sqrt{x+y}}{(x-y)^2} + 2x^2 - xy^2$

9. Define the variables a, b, c, and d as:

$c = 4.6$, $d = 1.7$, $a = cd^2$, and $b = \frac{c+a}{c-d}$; then evaluate:

(a) $e^{d-b} + \sqrt[3]{c+a} - (ca)^d$

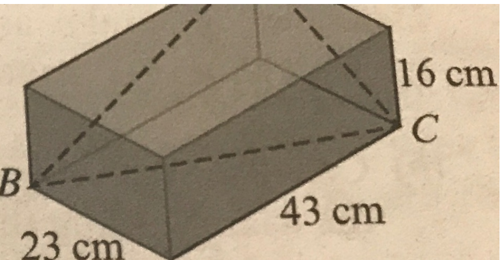
(b) $\frac{d}{c} + \left(\frac{ct}{b}\right)^2 - c^d - \frac{a}{b}$

10. Two trigonometric identities are given by:

(a) $\cos^2 x - \sin^2 x = 1 - 2\sin^2 x$

degree.

(*b*) Determine the area of the triangle *ABC* to the nearest tenth of a centimeter.

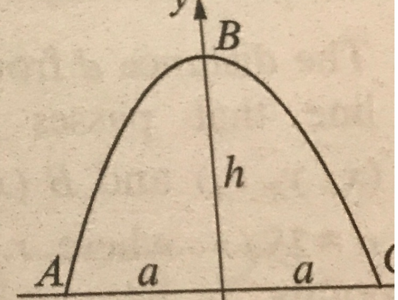


Law of cosines: $c^2 = a^2 + b^2 - 2ab\cos\gamma$

Heron's formula for triangular area:

$A = \sqrt{p(p-a)(p-b)(p-c)}$, where $p = (a+b+c)/2$.

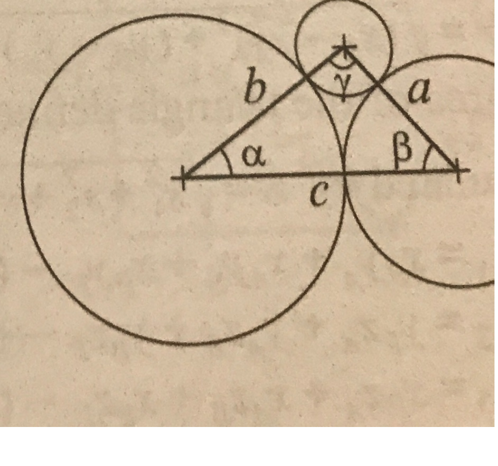
15. The arc length of a segment of a parabola *ABC* is given by:



$$L_{ABC} = \sqrt{a^2 + 4h^2} + \frac{a^2}{2h}\ln\left(\frac{2h}{a} + \sqrt{\left(\frac{2h}{a}\right)^2 + 1}\right)$$

Determine L_{ABC} if a=8 in. and h=13 in.

16. The three shown circles, with radius 15 in., 10.5 in., and 4.5 in., are tangent to each other.

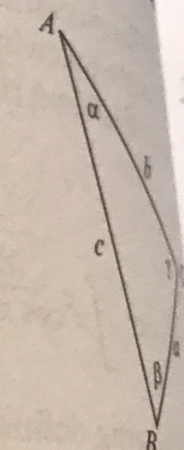


(*a*) Calculate the angle γ (in degrees) by using the law of cosines.

(Law of cosines: $c^2 = a^2 + b^2 - 2ab\cos\gamma$)

(*b*) Calculate the angles γ and α (in degrees) using the law of sines.

18. In the triangle shown $a = 27$ in., $b = 43$ in., and $c = 57$ in. Define a, b, and c as variables, and then:
(*a*) Calculate the angles α, β, and γ by substituting the variables in the law of cosines.
(Law of cosines: $c^2 = a^2 + b^2 - 2\,ab\cos\gamma$)
(*b*) Verify the law of tangents by substituting the results into the right and left sides of:



$$\text{law of tangents: } \frac{b-c}{b+c} = \frac{\tan\left[\frac{1}{2}(\beta-\gamma)\right]}{\tan\left[\frac{1}{2}(\beta+\gamma)\right]}$$

19. For the triangle shown, $\alpha = 72°$, $\beta = 43°$, and its perimeter is $p = 114$ mm. Define α, β, and p, as variables, and then:
(*a*) Calculate the triangle sides (Use the law of sines).
(*b*) Calculate the radius r of th
the triangl