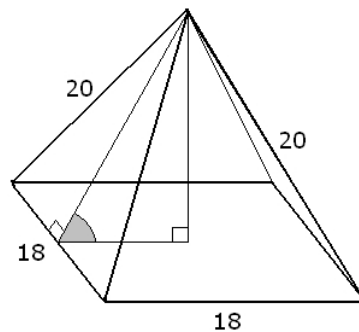


## Review Problems

- Solve each of the following equations.
  - $\sqrt{2x-1} = 2 + \sqrt{x-4}$
  - $\sqrt{x+1} + \sqrt{5x+1} = 6$
- Find the domain of each of the following.
  - $f(x) = \sqrt{25-x^2}$
  - $g(x) = \frac{x+2}{-5+\sqrt{x-2}}$
  - $h(x) = \sqrt{x-5} + \sqrt{8-x} - \frac{1}{x^2-36}$
- Simplify each of the following.
  - $-16^{-3/4}$
  - $(-8)^{-1/3}$
  - $(-16)^{-1/4}$
  - $(-5)^0$
- One number  $a$  is five more than twice another number  $b$ . Find the smallest value of
  - $a^2 + b^2$
  - $ab$
- Compute the exact value of each of the following.
  - $\sin 30^\circ \cos 45^\circ - \tan 60^\circ$
  - $\sec 45^\circ - \tan 45^\circ + \sin^2 60^\circ$
  - $2 \sin 30^\circ \cos 30^\circ$
  - $\sin^2 18^\circ + \cos^2 18^\circ$
  - $\sin 28^\circ - \cos 62^\circ$
- Prove the identity  $\tan^2 x + 1 = \sec^2 x$ .
- Consider a circle with radius 10 m. Let  $P$  be a point 35 m away from the center of the circle. Compute the angle formed between the two tangent lines drawn from  $P$  to the circle.
- Compute the area of a triangle with sides 15 m, 15 m, and 22 m.
- Find the exact value of  $\tan \alpha$  if  $\cos \alpha = \frac{1}{3}$ .
  - Find the exact value of  $\cos \beta$  if  $\tan \beta = 2$ .
- Compute the first element and common difference in the arithmetic sequence if  $s_{25} = 225$  and  $s_{35} = -210$ .
- Compute the first element and common difference in the arithmetic sequence if the sum of the first five elements is 50 and the sum of the next five elements is 225.
- Find the equation of the circle that passes through  $A(1, -3)$ ,  $B(3, 3)$ , and  $C(7, -5)$ .
- A straight pyramid has a square base with sides 18 units long. All other sides are 20 units long. Compute the angle formed by the base and a triangular face.



## Answers

1. a) 13,5      b) 3 (24 doesn't work)
2. a)  $[-5, 5]$       b)  $[2, \infty) \setminus \{27\}$       c)  $[5, 8] \setminus \{6\}$
3. a)  $-\frac{1}{8}$       b)  $-\frac{1}{2}$       c) undefined      d) 1
4. a) 5      b)  $-\frac{25}{8}$
5. a)  $\frac{\sqrt{2}}{4} - \sqrt{3}$       b)  $\sqrt{2} - \frac{1}{4}$       c)  $\frac{\sqrt{3}}{2}$       d) 1      e) 0
6.  $\tan^2 x + 1 = \sec^2 x$ .

$$\begin{aligned} \text{LHS} &= \tan^2 x + 1 = \left(\frac{\sin x}{\cos x}\right)^2 + 1 = \frac{\sin^2 x}{\cos^2 x} + 1 = \frac{\sin^2 x}{\cos^2 x} + \frac{\cos^2 x}{\cos^2 x} = \frac{\sin^2 x + \cos^2 x}{\cos^2 x} \\ &= \frac{1}{\cos^2 x} = \text{RHS} \end{aligned}$$

7.  $2 \arcsin\left(\frac{10}{35}\right) \approx 33.2031^\circ$
8.  $A = 22\sqrt{26} \text{ m}^2 \approx 112.17843 \text{ m}^2$
9. a)  $2\sqrt{2}$       b)  $\frac{1}{\sqrt{5}}$
10.  $a = 45$        $d = -3$
11.  $a = -4$        $d = 7$
12.  $(x - 5)^2 + (y + 1)^2 = 20$
13.  $\arctan\left(\frac{\sqrt{238}}{9}\right) \approx 59.7414247^\circ$