PLACEMENT TEST FOR CALCULUS 1

Read First: **Instruction for Placement Test Calculus 1**

1. Given $f(x) = x^2$, find $f(x + h)$.

2. What are the exact values of (a) $\sin \frac{\pi}{6}$ and (b) $\cos \frac{\pi}{6}$?

3. Simplify:

$$\frac{\frac{1}{x+h} - \frac{1}{x}}{h}$$

4. Graph the function

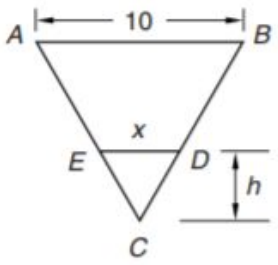
$$y = \sin\left(x - \frac{\pi}{4}\right)$$

5. Graph the set $\{x \in \mathbb{R} : |x - 3| < 4\}$ on a number line. Note that $\mathbb{R}$ denotes the set of real numbers.

6. Graph the circle whose equation is given by $x^2 + y^2 + 6x - 6y + 2 = 0$. Indicate the coordinates of the center of the circle and the length of the radius of the circle.

7. Solve for x: $\log(1 + x) + \log(2 + x) = 2$

8. Triangle ABC is an equilateral triangle and segment ED is parallel to segment AB as shown in the figure below. Express x in terms of h.



9. Find all pairs (x, y) that simultaneously satisfy the following two equations:

$$x^2 + y^2 = 9$$

$$y - x = 1$$

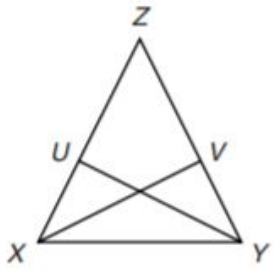
Graph the two equations, and show the points of intersection of the graphs.

10. Prove the following trigonometric identity:

$$\frac{\cos^3(x) + \sin^3(x)}{\cos(x) + \sin(x)} = 1 - \sin(x)\cos(x)$$

11. Write an algebraic equation that expresses the following statement: the sum of the distance between point (x, y) and point $(1, 2)$ and the distance between point (x, y) and point $(3, 4)$ is equal to 10.

12. Given: $\overline{XZ} \cong \overline{YZ}$, $\overline{XV} \perp \overline{YZ}$, $\overline{YU} \perp \overline{XZ}$. Write a two-column proof to show that $\overline{XV} \cong \overline{YU}$.



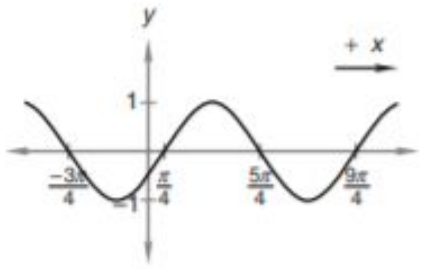
Test Answers

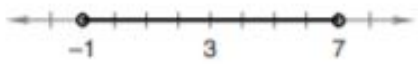
To determine course placement, see this: [Placement Guide Calculus 1]

1. $x^2 + 2xh + h^2$

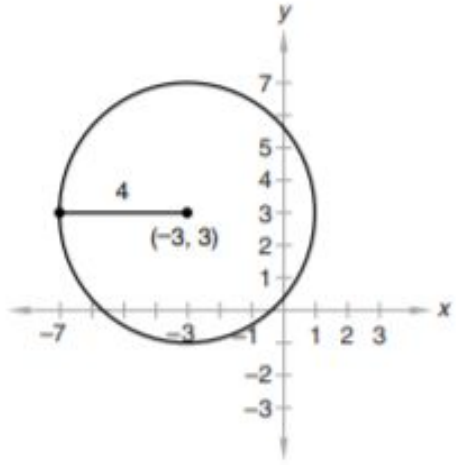
2. $\frac{1}{2}; \frac{\sqrt{3}}{2}$

3. $\frac{-1}{x(x+h)}$

4. 

5. 

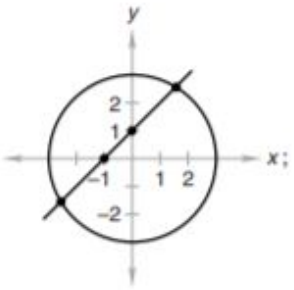
6. radius = 4; center = (−3, 3);



7. $x = \dfrac{-3}{2} + \dfrac{\sqrt{401}}{2}$

8. $x = \dfrac{2\sqrt{3}}{3}h$

9.



$$\left(\frac{-1}{2} + \frac{\sqrt{17}}{2}, \frac{1}{2} + \frac{\sqrt{17}}{2}\right),$$

$$\left(\frac{-1}{2} - \frac{\sqrt{17}}{2}, \frac{-1}{2} - \frac{\sqrt{17}}{2}\right)$$

10. $$\frac{\cos^3 x + \sin^3 x}{\cos x + \sin x}$$

$$= \frac{(\cos x + \sin x)(\cos^2 x - \cos x \sin x + \sin^2 x)}{\cos x + \sin x}$$

$$= \cos^2 x - \cos x \sin x + \sin^2 x$$

$$= 1 - \sin x \cos x$$

11. $$\sqrt{(x-1)^2 + (y-2)^2} + \sqrt{(x-3)^2 + (y-4)^2} = 10$$

12.

STATEMENTS	REASONS
1. $\overline{XZ} \cong \overline{YZ}$	1. Given
2. ΔXYZ is isosceles	2. Definition of isosceles triangle
3. $\angle ZXY \cong \angle ZYX$	3. Base angles of an isosceles triangle are congruent.
4. $\angle XUY$ is a right angle; $\angle YVX$ is a right angle	4. Given
5. $\angle XUY \cong \angle YVX$	5. Right angles are congruent.
6. $\angle UYX \cong \angle VXY$	6. AA $\rightarrow$ AAA
7. $\overline{XY} \cong \overline{XY}$	7. Reflexive axiom
8. $\Delta XUY \cong \Delta YVX$	8. AAAS congruency postulate
9. $\overline{XV} \cong \overline{YU}$	9. CPCTC