

Name:

Show all work. Calculators are allowed.

Time:

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

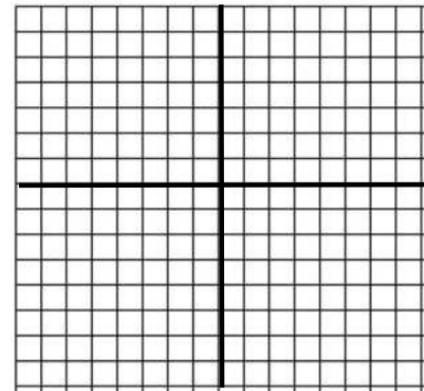
2. What are the exact values of (a)  $\sin \frac{\pi}{6}$  and (b)  $\cos \frac{\pi}{6}$  ?

3. Simplify:

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

4. Graph the function

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

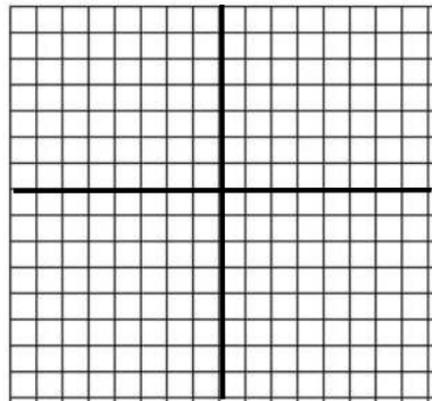


5. Graph the set on a number line:

$$\{x \in \mathbb{R} : |x - 3| < 4\}$$

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.



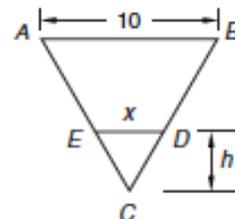
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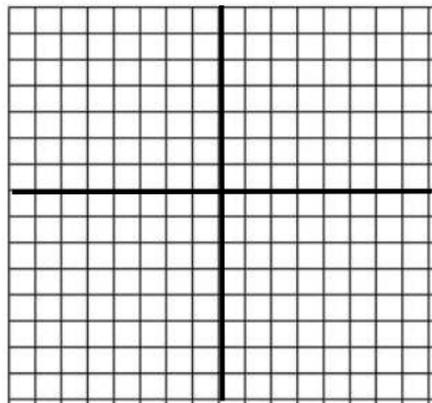
Time:

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:  $x^2 + y^2 = 9$  and  $y - x = 1$ . Graph the two equations, and show the points of intersection of the graphs.



10. Prove the following trigonometric identity:

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

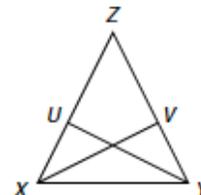
11. Write an algebraic equation that expresses the following statement: the sum of the distance between point  $(x, y)$  and point  $(1, 2)$  and the distance between point  $(x, y)$  and point  $(3, 4)$  is equal to 10.

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

$$\overline{XV} \cong \overline{YU}.$$



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