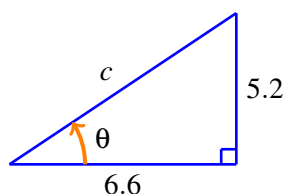


## CAUD Diagnostic Test

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1. Evaluate  $3.4 \times 10^3 \times 4.12 \times 10^{-2}$  giving your answer in scientific notation to the correct number of significant figures.
2. Calculate  $\frac{-3}{2} \times (10 + 2) \div (4 - 10)$  without using a calculator.
3. Calculate  $\frac{2}{3} + \frac{3}{4}$  without a calculator.
4. Solve  $3x + y = 9$  for  $y$ .
5. Simplify  $x - (5 - 2x)$ .
6. Solve  $\frac{1}{u} + \frac{1}{v} = \frac{1}{f}$  for  $f$ .
7. Solve for  $x$  in the equation  $\frac{x-6}{2} + \frac{x+8}{6} = 1$  giving your answer to 2 decimal places.
8. In the expression  $3^{12} \times 3^5 = 3^x$ , what is the value of  $x$ ?
9. Simplify the expression  $\frac{(x^{1/2}y)^2}{x^2}$ .
10. Find the value of  $c$  and  $\theta$  in the diagram given.



11. Find the angle  $\phi$  (in degrees) with  $0 \leq \phi \leq 90^\circ$  such that  $\tan \phi = 1$ .
12. Find all angles  $\theta$  (in radians) with  $0 \leq \theta < 2\pi$  such that  $\cos \theta = \frac{1}{2}$ .

13. A surveyor standing at a distance of 40m from the base of a tower has measured the angle (in degrees) to the top of the tower as  $60^\circ$ . Write an expression for the height of the tower in terms of that angle (in degrees) and find the height of the tower.
14. What is the amplitude and period of the function  $y = 2 \sin\left(\frac{x}{2}\right)$ ?
15. (a) Solve  $\cos\left(x - \frac{\pi}{4}\right) = 0$  for  $x$  (in radians) with  $0 \leq x < \pi$ .  
(b) What is the value of  $x$  in degrees?
16. Given that  $10^x = 136.14$  find the value of  $x$ .
17. True or false?  $\log\left(\frac{a}{b}\right) = \frac{\log a}{\log b}$  for all positive numbers  $a$  and  $b$ .
18. Simplify  $\log_3 9 + \log_4 2$ .
19. If  $\log_2(x) = 5$ , what is  $x$ ?
20. Find all real numbers  $x$  such that  $e^{-x} = \frac{1}{2}$ .