

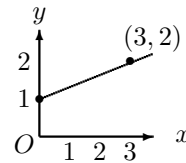
This diagnostic collection of questions is intended to assess your readiness for calculus. **No calculator** is permitted on these questions.

1. If  $a = 2$  and  $b = -3$  then  $\frac{(a-b)^2 + b}{(b-2a)^2 + a} =$

5.  $(27a^{-3}b^6c^3)^{1/3} =$

6. For what value of  $t$  does  $\frac{2t-1}{t+3} = -2$ ?

2. In the system of equations  $\begin{cases} 3x + y = 1 \\ x - 3y = 17 \end{cases}$ ,  $x =$



7. The line segment in the figure is a portion of the line whose equation is:

3. In a room with 35 men, 80% of the occupants are women. How many women are in the room?

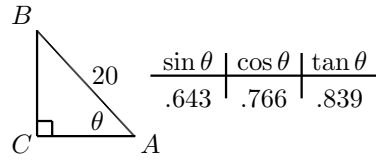
8. If  $8^{2-x} = 4^{3x}$ , then  $x =$

4. For what interval of  $x$  is  $|x-4| > 3$ ?

9.  $\left(\frac{(a+b)^2}{a^2-b^2}\right)\left(\frac{a-b}{a+b}\right) =$

10. The number  $\log_3 13$  is between what two integers?

15. From the information given in the table and in the figure shown, estimate the length of  $BC$  to two decimal places (without a calculator).



11. What is the radian measure of an angle whose measure is  $72^\circ$ ?

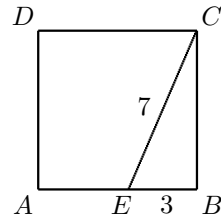
16. On what interval of  $x$  is  $x^2 - 2x < 8$ ?

12. If  $f(x) = x^2 + 2x + 3$ , then  $f(a - 1) =$

17. What number must be added to  $9x^2 + 9x$  to form a perfect square?

13.  $\frac{x+1}{x(x-1)} - \frac{1}{2(x-1)} =$

18. Find the area of square  $ABCD$

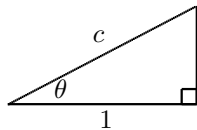


14. If  $f(x) = ax + b$  and  $f(2) = f(4)$ , then  $a =$

19. 
$$\frac{\frac{21 - 7x}{x + 3}}{\frac{x^2 - 3x}{2x + 3}} =$$

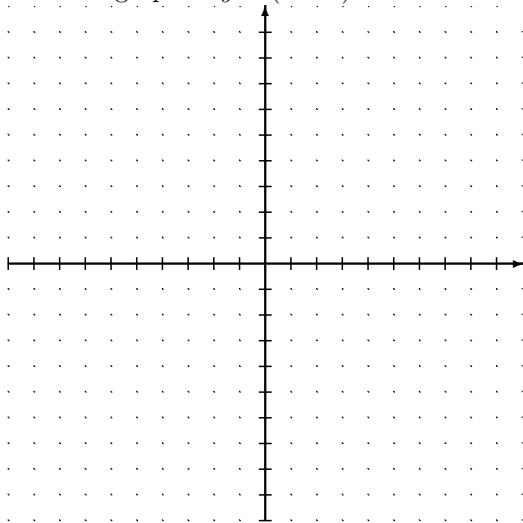
20. Graph  $y = -\sin 2x$

21.  $\tan \theta =$

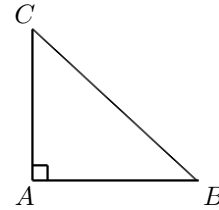


22. 
$$\frac{x^{4b+1}}{x^{2-b}} =$$

23. Sketch a graph of  $y = (x - 2)^2$

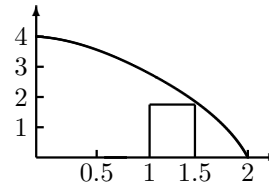


24. In the right triangle  $\triangle ABC$ ,  $AC = 3x$  and  $BC = 5x$ . If the perimeter is 84,  $x =$



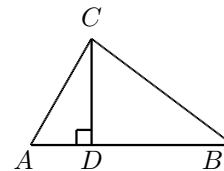
25. The perimeter of a rectangular field is  $P$  feet. The width of the field is 200 feet less than its length. In terms of  $P$ , what is the length of the field in feet?

26. A portion of the graph of  $f(x) = 4 - x^2$  is shown (not to scale). What is the area of the rectangle?



27. Find the roots of  $x^2 - 5x - 2 = 0$

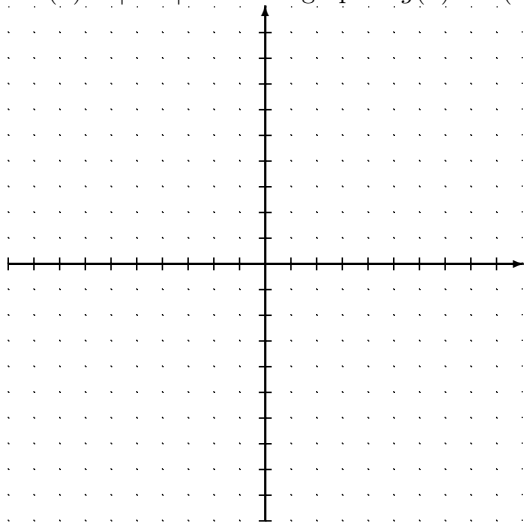
28. In the right triangle  $\triangle ABC$ , if  $AB = 14$  and  $BC = 12$ , then  $BD =$



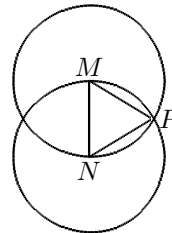
29. If  $x + a = \frac{b}{3}x$  and  $b \neq 3$ , then  $x =$

33. If  $f(x) = 5x + 1$ , then its inverse function  $f^{-1}(x) =$

30. If  $h(x) = |2 - x|$ . Sketch a graph of  $g(x) = h(x + 2)$



34. Two circles with centers at  $M$  and  $N$  each have radius 8 and intersect at  $P$ . What is the area of  $\triangle MPN$ ?



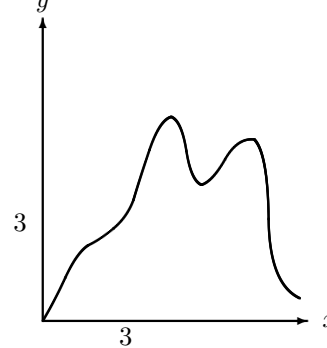
35.  $\sqrt[4]{3}\sqrt[5]{3} =$

31. If  $\log w = \frac{1}{5} \log x - \log y$ , then  $w =$

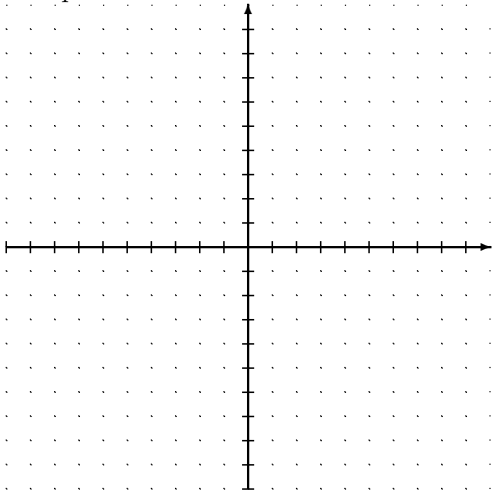
36.  $\sqrt{4x^4 + 36x^2 + 81} =$

32. in  $\triangle ABC$ ,  $m\angle B = \frac{\pi}{2}$  radians,  $m\angle C = \frac{\pi}{6}$  radians, and  $AB = 2$ . Find  $BC$ .

37. The graph of the function  $y = f(x)$  is shown below. For exactly how many values is  $f(x) = 3$ ?



38. Sketch a graph of  $y = |\log_2 x|$ . Label at least four points.



39. What is the area of the region bounded by the graph of  $y = x + 3$ , the  $x$ -axis, and the vertical lines  $x = 3$  and  $x = 5$ ?

40. What is the equation for the horizontal asymptote to the graph of  $y = 3 - \frac{x+b}{x-c}$ ?