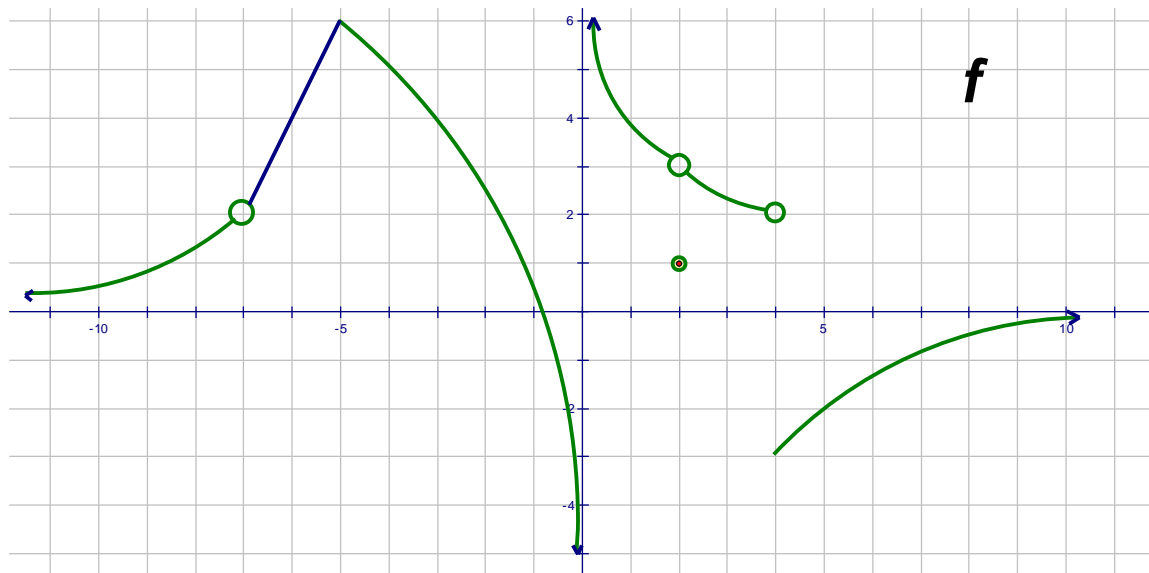


I. The graph of a function  $f$  is shown below.



Answer the following questions about function  $f$ .

- |   |  |                                       |
|---|--|---------------------------------------|
| 1. $f(-5) =$                              | 2. $f(2) =$                              | 3. $f(4) =$                           |
| 4. $\lim_{x \rightarrow -7} f(x) =$       | 5. $\lim_{x \rightarrow -5} f(x) =$      | 6. $\lim_{x \rightarrow 2} f(x) =$    |
| 7. $\lim_{x \rightarrow 4} f(x) =$        | 8. $\lim_{x \rightarrow 0} f(x) =$       | 9. $\lim_{x \rightarrow 0^-} f(x) =$  |
| 10. $\lim_{x \rightarrow 0^+} f(x) =$     | 11. $\lim_{x \rightarrow 4^+} f(x) =$    | 12. $\lim_{x \rightarrow 4^-} f(x) =$ |
| 13. $\lim_{x \rightarrow -\infty} f(x) =$ | 14. $\lim_{x \rightarrow \infty} f(x) =$ |                                       |

15. Use the definition of a continuous function at a number to answer the following.

- a.  $f$  is not continuous at  $x = -7$  because: \_\_\_\_\_
- b.  $f$  is not continuous at  $x = 2$  because: \_\_\_\_\_
- c.  $f$  is not continuous at  $x = 4$  because: \_\_\_\_\_

II. For the following problems, sketch a graph of a function that has the indicated features and write an equation for the function that has these features. The function may be a piecewise.

<p>1. The function is continuous at <math>x = 3</math>, but has a cusp there.</p>	<p>2. The function has a limit as <math>x</math> approaches 3 but fails to be continuous there because <math>f(3)</math> is undefined.</p>
<p>3. The function has a limit as <math>x</math> approaches -1, has a value for <math>f(-1)</math>, but still is not continuous there.</p>	<p>4. The function has no limit as <math>x</math> approaches 0, but <math>f(0)=3</math>.</p>
<p>5. The function has a limit of 2 as <math>x</math> approaches 0 from the right, but has no limit as <math>x</math> approaches 0 from the left.</p>	<p>6. The function has a step (or jump) discontinuity at <math>x = 1</math>, and <math>f(1) = 6</math>.</p>
<p>7. The function has a limit as <math>x</math> approaches 2 of 5 but <math>f(2) = 4</math>.</p>	<p>8. The function has a right-hand limit of -2 and a left-hand limit of 2 as <math>x</math> approaches -1.</p>