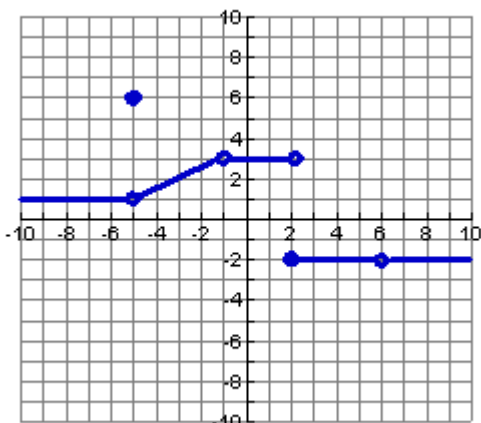| 1. List the three conditions that must be met for a function to be continuous. 1. 2. 3.	2. Let f be a function defined by $f(x) = \begin{cases} \dfrac{1}{2}x & for \ x < 4 \\ x-2 & for \ x \ge 4 \end{cases}$ Show that $f(x)$ is continuous at x=4.	3. What kind of discontinuity is removable? What kind of discontinuity is not removable?

Find the x-values (if any) at which f is discontinuous. What are the discontinuities? Are any of them removable?
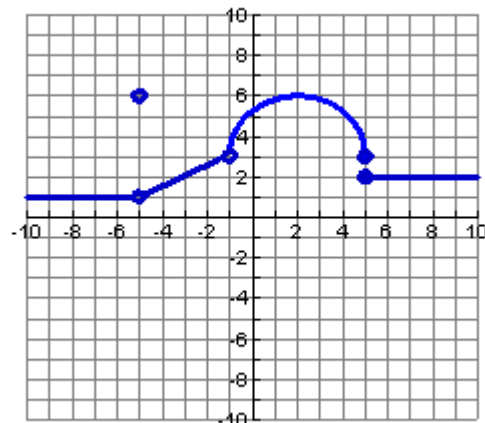
4. $f(x) = x^2 - 2x + 1$	5. $f(x) = \dfrac{1}{x^2+1}$	6. $f(x) = \cos\left(\dfrac{\pi x}{2}\right)$	7. $f(x) = \dfrac{1}{x-1}$
8. $f(x) = \dfrac{x}{x^2-9}$	9. $f(x) = \dfrac{x+2}{x^2-3x-10}$	10. $f(x) = \dfrac{x-1}{x^2+x-2}$	11. $f(x) = \dfrac{|x+2|}{x+2}$

12. $f(x) = \begin{cases} \dfrac{1}{2}x+1 & for \ x \le 2 \\ 3-x & for \ x > 2 \end{cases}$	13. $f(x) = \begin{cases} x & for \ x \le 1 \\ x^2 & for \ x > 1 \end{cases}$

State any discontinuities from the graph and tell why the function is discontinuous at each point.

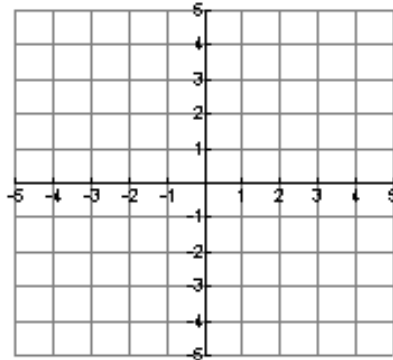| 14. State where the function is discontinuous and why.	15. State where the function is discontinuous and wh

b. $\lim\limits_{x\to a} f(x)$ does not exist
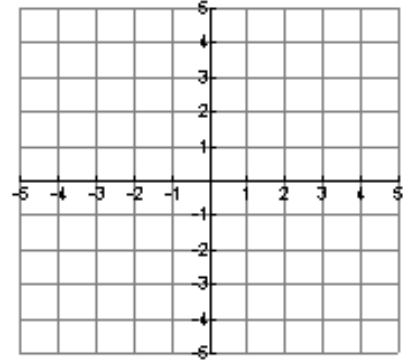
c. $\lim\limits_{x\to a} f(x) \neq f(a)$

label each
 reason:

b. $\lim\limits_{x\to a} f(x)$ does not exist

c. $\lim\limits_{x\to a} f(x) \neq f(a)$

label each reason:

Find the limit of each:

18. $\lim\limits_{x\to 1} \dfrac{x-1}{\sqrt{x}-1}$

19. $\lim\limits_{x\to 0} \dfrac{\cos x - 1}{x}$

20. $\lim\limits_{x\to \frac{3}{2}} \dfrac{8x^3 - 27}{2x - 3}$

21. $\lim\limits_{x\to 0} \dfrac{\sqrt{x+6}-\sqrt{6}}{x}$

22. $\lim\limits_{x\to \frac{7\pi}{6}} \csc x$

23. $\lim\limits_{x\to 0} \dfrac{\frac{1}{x+5} - \frac{1}{5}}{x}$

24. $\lim\limits_{x\to 4} \left(x^2 - 2x + 3\right)$

25. $\lim\limits_{x\to -1} \dfrac{2x^2 - x - 3}{x+1}$

26. $\lim\limits_{x\to 3} \dfrac{\sqrt{x+1}-2}{x-3}$

Answers: 16) Answers will vary. **17)** Answers will vary. **18)** 2 **19)** 0 **20)** 27 **21)** $\dfrac{1}{2\sqrt{6}}$ **22)** -2 **23)** $-\dfrac{1}{25}$ **24)** 11 **25)** -5 **26)** $\dfrac{1}{4}$