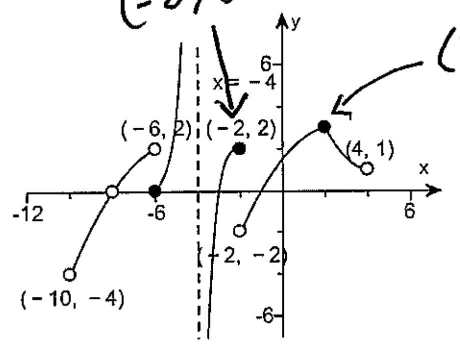
Student: Key
Date:

Instructor: Joe Betters
Course: Pre-Calculus Pre AP (Master Course)
Assignment: 14.3 HW 2020 (Adjusted)

1. Find f(2) and f(− 2).

(-2, 2)

(2, 3)

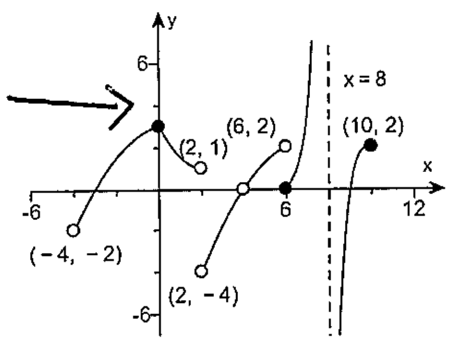


f(2) = $\boxed{3}$ (Type an integer.)

f(− 2) = $\boxed{2}$ (Type an integer.)

ID: 14.3.17

2. Find $\lim\limits_{x \to 0^-} f(x)$.



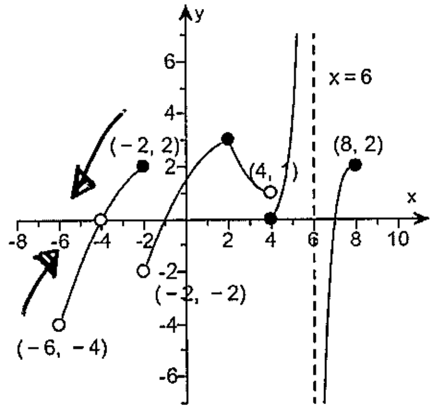
$\lim\limits_{x \to 0^-} f(x) = \boxed{3}$

(Type an integer value.)

limit as x approaches zero from the negative side only is going to 3

ID: 14.3.21

3. Use the accompanying graph of $y = f(x)$. Does $\lim_{x \to -4} f(x)$ exist? If it does, what is it?



Select the correct choice below and fill in any answer boxes in your choice.

○ A. $\lim_{x \to -4} f(x) = \boxed{0}$

○ B. $\lim_{x \to -4} f(x)$ does not exist.

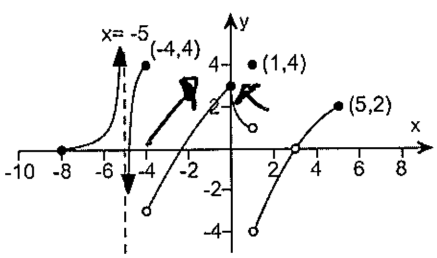
$\lim_{x \to -4^-} = 0$

$\lim_{x \to -4^+} = 0$

has to approach the same number

ID: 14.3.25

4. Is f continuous at 0?



Is f continuous at 0?

○ Yes

○ No

$\lim_{x \to 0^-} f(x) = 3$

$\lim_{x \to 0^+} f(x) = 3$

$f(x) = 3$
$x = 0$

continuous

ID: 14.3.29

5. Find the one-sided limit.

$\lim_{x \to -5^-} (6x + 7)$

$\lim_{x \to -5^-} (6x + 7) = \boxed{-23}$

* Since no gaps in graph, substitute in −5 for x

$6(-5) + 7 = -23$

ID: 14.3.33

6. Find the one-sided limit.

$\lim_{x \to -7\pi/2^+} \cos x$

$\lim_{x \to -7\pi/2^+} \cos x = \boxed{0}$

* Since no gaps in graph, substitute $-7\pi/2$ for x

$\cos(-7\pi/2)$

* $\cos(-7\pi/2) = \cos(7\pi/2) = \cos(2\pi + 3\pi/2)$

$\cos 3\pi/2 = 0$

ID: 14.3.37

7. Determine whether f is continuous at c.

$f(x) = 9x^3 - 3x^2 + 3x - 1, \quad c = 9$

$\lim_{x \to 9^-} = 6344$
(8.9999)

$\lim_{x = 9} = 6344$

Is f continuous at c = 9?

○ No
○ Yes

$\lim_{x \to 9^+} = 6344$
(9.0001)

Continuous at C=9

ID: 14.3.45

8. Determine whether f is continuous at c.

$$f(x) = \begin{cases} \dfrac{x^3+8}{x^2+2} & \text{if } x < -2 \\ -2 & \text{if } x = -2 \\ -\dfrac{6}{x+4} & \text{if } x > -2 \end{cases}, \quad c = -2$$

$\lim_{x \to -2^-} = 12$
(-2.0001)

$\longrightarrow = -2$

$\lim_{x \to -2^+} = -3$
(-1.9999)

Is f continuous at c = −2?

○ Yes
○ No

* different, so not continuous

ID: 14.3.57

9. Find the numbers at which f is continuous. At which numbers is f discontinuous?

$f(x) = \dfrac{-4x-9}{x^2-36}$

* factor *

$\dfrac{-(4x+9)}{(x+6)(x-6)}$

Type the numbers at which f is discontinuous.

[-6, 6] (Use a comma to separate answers as needed.)

$x \neq -6, 6$

Type the numbers at which f is continuous.

([$-\infty$], [-6]) ∪ ([-6], [6]) ∪ ([6], [∞])
(Use ascending order.)

ID: 14.3.69

10. Discuss whether R is continuous at c. Use limits to analyze the graph of R at c. Graph R.

$R(x) = \dfrac{x-5}{x^2-25}$, c = −5 and c = 5

factor

Determine whether R is continuous at 5 and if R is not continuous, determine the type of discontinuity.

$\dfrac{\cancel{(x-5)}}{(x+5)\cancel{(x-5)}}$

- A. R is discontinuous with a vertical asymptote at 5.
- B. R is continuous at 5.
- C. R is discontinuous with a hole at 5.

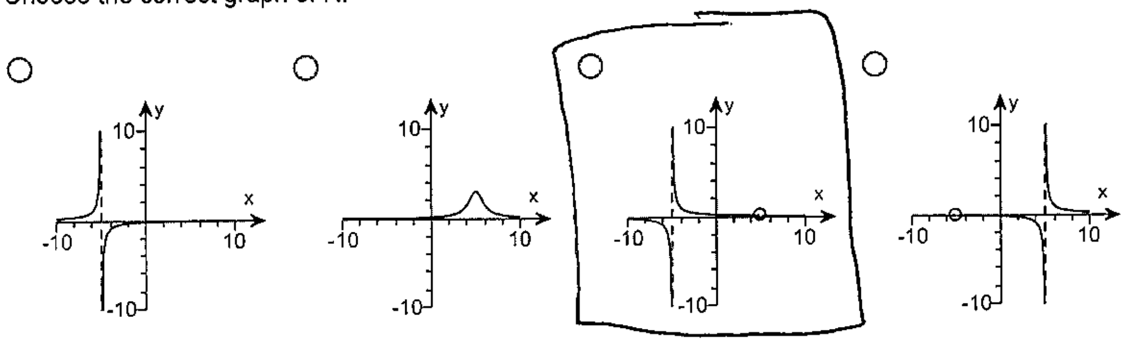
Determine whether R is continuous at −5 and if R is not continuous, determine the type of discontinuity.

- A. R is discontinuous with a vertical asymptote at −5.
- B. R is continuous at −5.
- C. R is discontinuous with a hole at −5.

x = −5, 5

asymptote Hole

Choose the correct graph of R.



ID: 14.3.73

11. Determine where the rational function is not defined. Determine whether an asymptote or a hole appears at such numbers.

$R(x) = \dfrac{x^3+3x^2+x+3}{x^4+3x^3-5x-15}$

factor

$\dfrac{x^2(x+3)+1(x+3)}{x^3(x+3)-5(x+3)}$

~~Type the value or~~ values of x at which R is undefined.

$\boxed{\sqrt[3]{5}, -3}$ (Do not use fractional exponents. Separate answers with commas.)

$\dfrac{(x^2+1)\cancel{(x+3)}}{(x^3-5)\cancel{(x+3)}}$

What type of discontinuity does the graph of R have at $\sqrt[3]{5}$?

- Vertical asymptote
- Hole

What type of discontinuity does the graph of R have at −3?

- Vertical asymptote
- Hole

$x \neq \sqrt[3]{5}, -3$

Asymptote Hole

ID: 14.3.77

12. Determine where the rational function is not defined. Determine whether an asymptote or a hole appears at such numbers.

$$R(x) = \frac{4x^3 + 8x^2 + 4x}{x^4 + x^3 + 6x + 6}$$

R(x) is undefined at ______. $-\sqrt[3]{6}, -1$

(Use a comma to separate answers as needed. Type exact answers, using radicals as needed.)

What type of discontinuity does the graph of R have at $-\sqrt[3]{6}$?

- ○ Vertical asymptote
- ○ Hole

What type of discontinuity does the graph of R have at -1?

- ○ Hole
- ○ Vertical asymptote

ID: 14.3.81

* factor

$$\frac{4x(x^2+2x+1)}{x^3(x+1)+6(x+1)}$$

$$\frac{4x(x+1)\cancel{(x+1)}}{(x^3+6)\cancel{(x+1)}}$$

$x \neq -\sqrt[3]{6}, -1$

Asymptote Hole

1. 3

   2

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2. 3

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3. A. $\lim_{x \to -4} f(x) = \boxed{0}$

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4. Yes

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5. -23

---

6. 0

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7. Yes

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8. No

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9. $-6, 6$

   $-\infty$

   -6

   -6

   6

   6

   ∞

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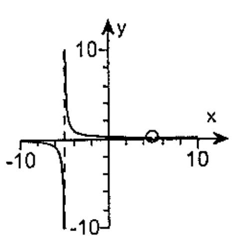
10. C. R is discontinuous with a hole at 5.

    A. R is discontinuous with a vertical asymptote at -5.



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11. $\sqrt[3]{5}$, -3

Vertical asymptote

Hole

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12. $-1, -\sqrt[3]{6}$

Vertical asymptote

Hole
