Worksheets

Continuity and Differentiability

Total questions: 26

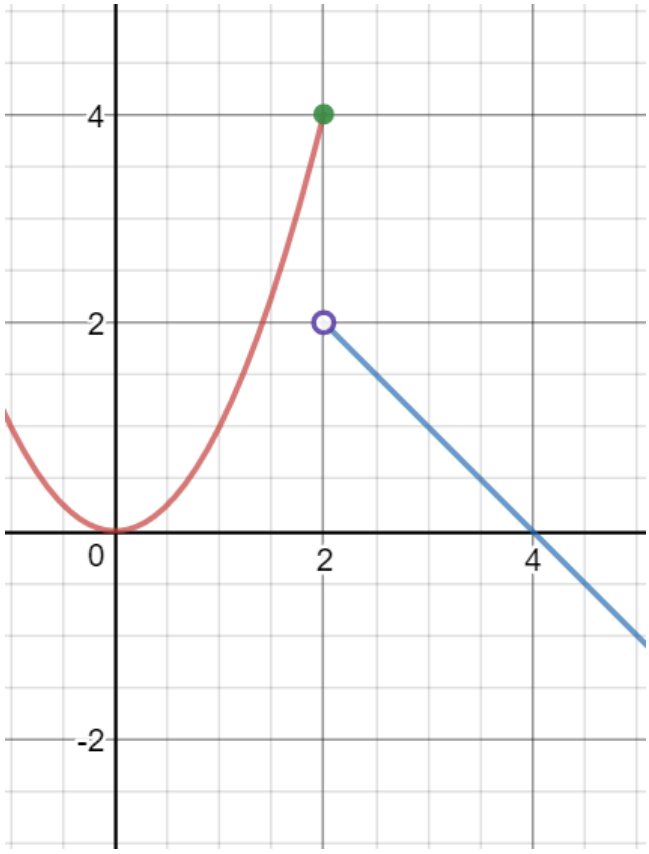
Worksheet time: 30mins

Instructor name: Stanley Walerski

Name

Class

Date

1. 

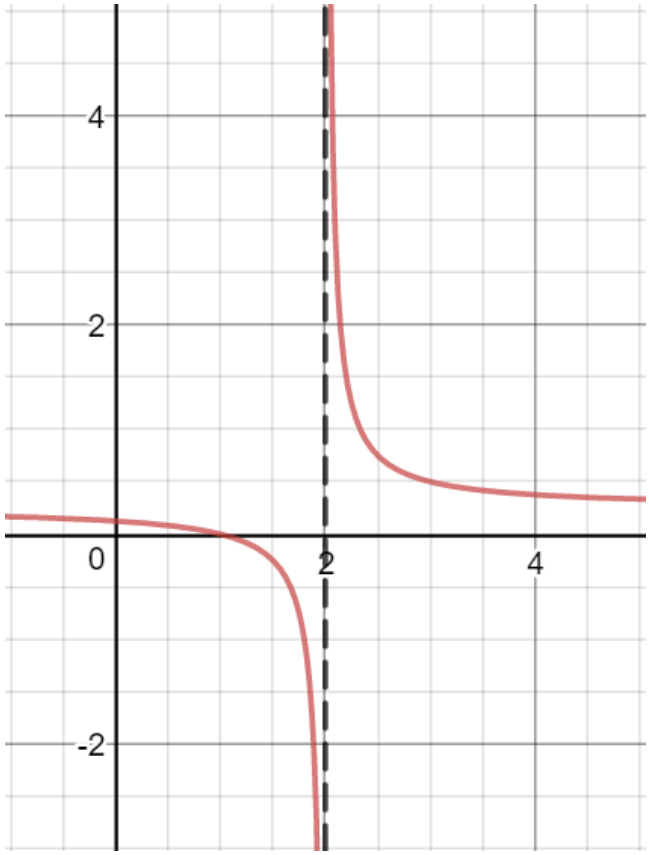
Name the discontinuity at x=2.

a) Continuous at x=2

b) Jump Discontinuity

c) Removable Discontinuity

d) Infinite Discontinuity

2. 

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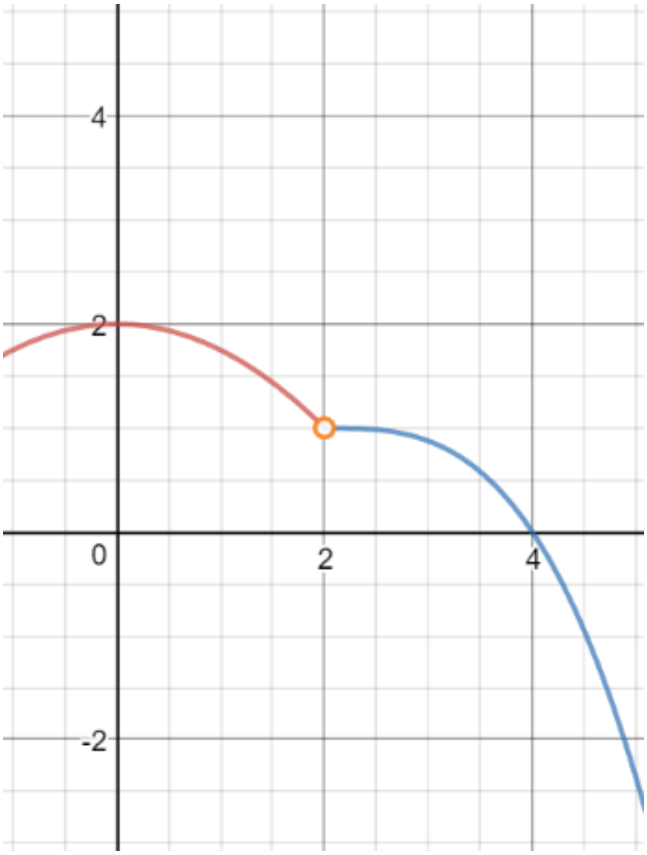
3. 

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c) Continuous at x=2

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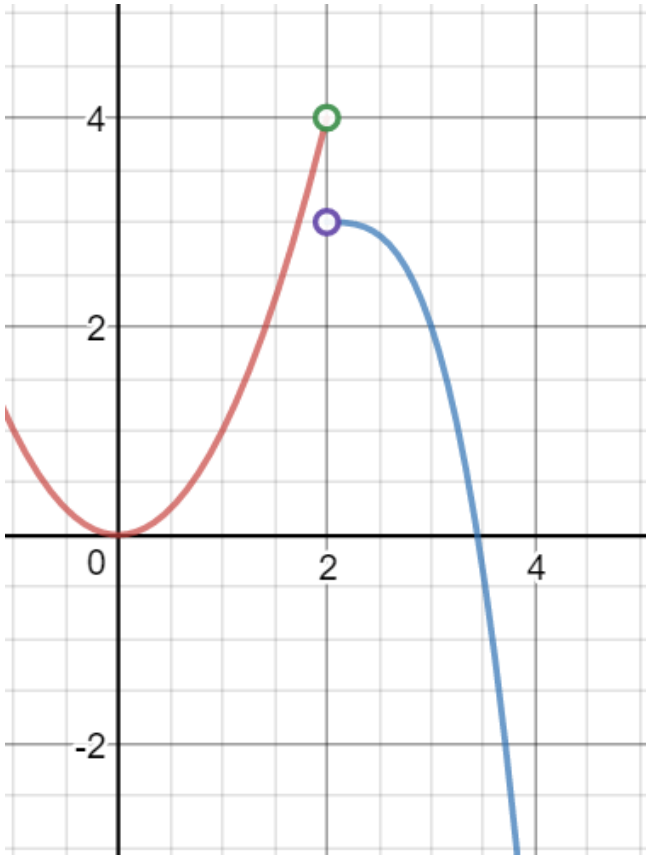
4. 

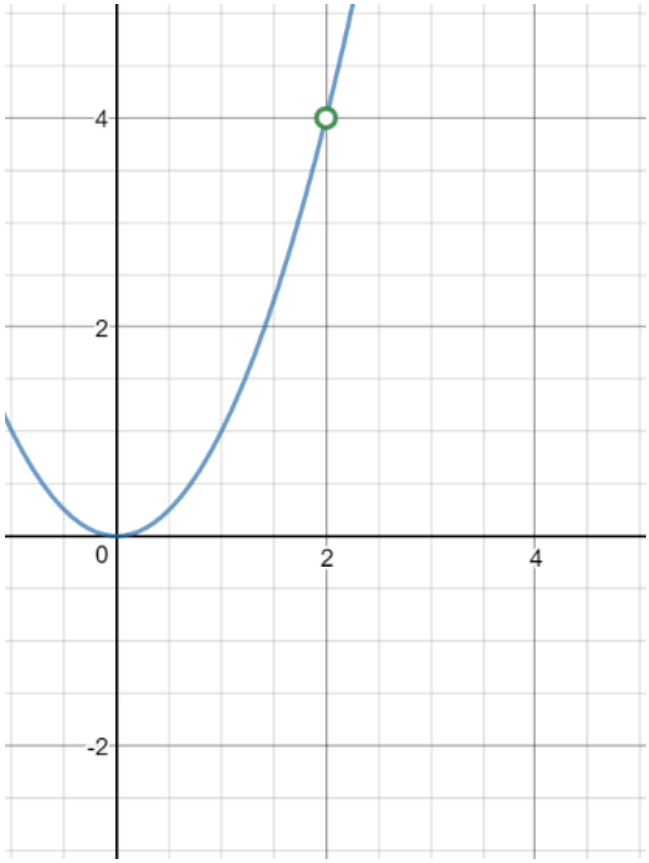
Name the discontinuity at x=2.

a) Infinite Discontinuity

b) Continuous at x=2

c) Jump Discontinuity

d) Removable Discontinuity

5. 

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a) Continuous at x=2

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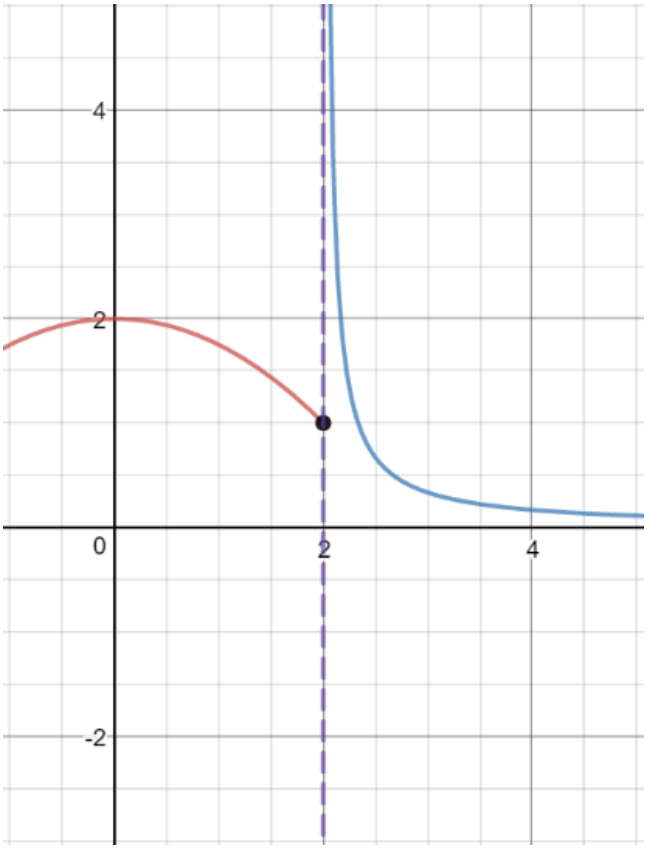
6. 

Name the discontinuity at x=2.

a) Removable Discontinuity

b) Jump Discontinuity

c) Continuous at x=2

d) Infinite Discontinuity

7. Identify the point(s) of discontinuity.

$$f(x) = \frac{4}{x - 6}$$

a) x = 0

b) x = 6

c) x = 4

d) x = -6

8. Identify the point(s) of discontinuity.

$$f(x) = \frac{x - 1}{3x^2 - 3}$$

a) x = -1 and x = 1

b) Only x = 1

c) Only x = -1

d) x = 1 and x = 3

e) Only x = 3

9. Determine any point(s) of discontinuity for the following function.

$$f(x) = \frac{3x - 6}{x^2 - 9x + 14}$$

a) x = 2

b) x = 0

c) x = 2 and x = 7

d) None

e) x = 7

$$f(x) = \frac{x^2+7x+10}{x^2+4x-5}$$

10.

Identify the type of location of the discontinuity/discontinuities.

a) Removable at x = -5 ; Infinite at x = 1

b) Removable at x = 5 ; Infinite at x = -1

c) Removable at x = -5 ; Jump at x = 1

d) Infinite at x = 1 and x = -5

11. $$h(x) = \frac{x+4}{x^2-2x-35}$$

Which of the following best describes the continuity at x = 5?

a) Jump Discontinuity at x = 5

b) Removable Discontinuity at x = 5

c) Continuous at x = 5

d) Infinite Discontinuity at x = 5

12. $$f(x) = \frac{x^2-2x-15}{x-5}$$

Which of the following best describes the continuity at x = 5?

a) Continuous

b) Jump Discontinuity at x = 5

c) Removable Discontinuity at x = 5

d) Infinite Discontinuity at x = 5

13. What is the domain of the function? $\mathrm{v}\,(\mathrm{t}) = \frac{\sqrt{\mathrm{t}+1}}{\mathrm{t}-2}$

a) $\mathrm{t} > -1,\ \mathrm{t} \neq 2$

b) $\mathrm{t} \geq -1,\ \mathrm{t} \neq 2$

c) $\mathrm{t} > 2,\ \mathrm{t} \neq -1$

d) $\mathrm{t} < 1$

14. Determine the domain:

$g(x) = \sqrt{15 + 5x}$

a) $x \geq 3$

b) $x > 3$

c) $x > -3$

d) $x \geq -3$

15. Determine the domain:

$g(x) = \sqrt{x^2 + x - 20}$

a) $x \leq -5 \text{ or } x \geq 4$

b) $x \leq -4 \text{ or } x \geq 5$

c) $-4 \leq x \leq 5$

d) $-5 \leq x \leq 4$

16. For a function,

$f(x)$ to be continuous at a point $x = c$, which of the following

conditions must be met:

i. $\lim_{x \to c} f(x)$ must exist

ii. $f(c)$ must be defined

iii. $\lim_{x \to c} f(x) = f(c)$

a) i and ii only

b) i only

c) iii only

d) i, ii, and iii

17. Can a function be continuous but not differentiable?

a) Yes
b) No

18. If a function is differentiable, it is also continuous.

a) It all depends on the function in question.
b) Yes
c) No

19. If a function is differentiable at x=c, can it be discontinuous at x=c?

a) It all depends on the function in question.
b) Yes
c) No

20. $$f(x) = \begin{cases} x^2 - 11x + 8, & x < 3 \\ -5x - 1, & x \geq 3 \end{cases}$$

Is the function continuous, differentiable, both, or neither at the rule change?

a) continuous
b) differentiable
c) neither
d) both

21. $$f(x) = \begin{cases} \frac{x-5}{2}, x \leq 1 \\ \sqrt{x} - 3, x > 1 \end{cases}$$

Is the function continuous, differentiable, both, or neither at the rule change?

a) both

b) neither

c) differentiable

d) continuous

22. $$f(x) = \begin{cases} x^2 - 13x + 20, & x \leq 2 \\ -9x + 16, & x > 2 \end{cases}$$

Determine if f(x) is continuous or differentiable at the rule change.

a) neither

b) continuous

c) both

d) differentiable

23. $$f(x) = \begin{cases} x^2 + 7x + 3, & x < -11 \\ -5x - 8, & x \geq -11 \end{cases}$$

Determine if f(x) is continuous or differentiable at the rule change.

a) differentiable

b) continuous

c) neither

d) both

24. $$f(x)=\begin{cases} x^2-1, & x\le -1 \\ x+4, & -1<x<2 \\ 5, & x\ge 2 \end{cases}$$

Is f(x) continuous and/or differentiable at x=-1?

a) differentiable

b) both

c) neither

d) continuous

25. $$f(x)=\begin{cases} x^2+1, x\le 0 \\ x, x>0 \end{cases}$$

Is the function continuous, differentiable, both, or neither at the rule change?

a) neither

b) differentiable

c) continuous

d) both

26. $$f(x)=\begin{cases} x^2-12x-25, & x<5 \\ -9x-15, & x\ge 5 \end{cases}$$

Determine if f(x) is continuous or differentiable at the rule change.

a) neither

b) both

c) differentiable

d) continuous

Answer Keys

1. b) Jump Discontinuity
2. d) Infinite Discontinuity
3. b) Removable Discontinuity
4. c) Jump Discontinuity
5. d) Removable Discontinuity
6. d) Infinite Discontinuity
7. b) x = 6
8. a) x = -1 and x = 1
9. a) x = 2
10. a) Removable at x = -5 ; Infinite at x = 1
11. c) Continuous at x = 5
12. c) Removable Discontinuity at x = 5
13. b) $t \geq -1,\ t \neq 2$
14. d) $x \geq -3$
15. d) $-5 \leq x \leq 4$
16. d) i, ii, and iii
17. a) Yes
18. b) Yes
19. c) No
20. d) both
21. a) both
22. c) both
23. b) continuous
24. c) neither
25. a) neither
26. d) continuous