MATH 161 EXAM III NAME: _____

[Run: 04/17/2013 at 14:5 Seed: 1876. Order of Checkable Items: Random.]

Response Grid (Check the appropriate boxes thus: ☒)

Question	a	b	c	d	e
1					
2					
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III-1. Let the function f be specified by the global input-output rule

$$x \xrightarrow{f} f(x) = \frac{-x^2 - 9}{(x-1)^2}$$

find the approximate local input-output rule of f that gives the concavity-sign near ∞.

a. $x \xrightarrow{f_\infty} f_\infty(x) = -1 + x^{-1} + [...]$
b. $x \xrightarrow{f_\infty} f_\infty(x) = -1 - 2x^{-1} + [...]$
c. $x \xrightarrow{f_\infty} f_\infty(x) = -x^2 + [...]$
d. $x \xrightarrow{f_\infty} f_\infty(x) = -1 + x^2 + [...]$
e. None of the preceding

III-2. Given the function f specified by the global input-output rule

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

how many Height-sign change inputs does f have?

a. None **b.** One **c.** Two **d.** Three
e. None of the preceding

III-3. Given the function f specified by the global input-output rule

$$x \xrightarrow{f} f(x) = \frac{(x-1)^2}{x^3 - 8}$$

how many Concavity-sign change inputs does f have?

a. None **b.** One **c.** Two **d.** Three
e. None of the preceding

III-4. Given the function f specified by the global input-output rule

$$x \xrightarrow{f} f(x) = \frac{x-1}{x^3 - 8}$$

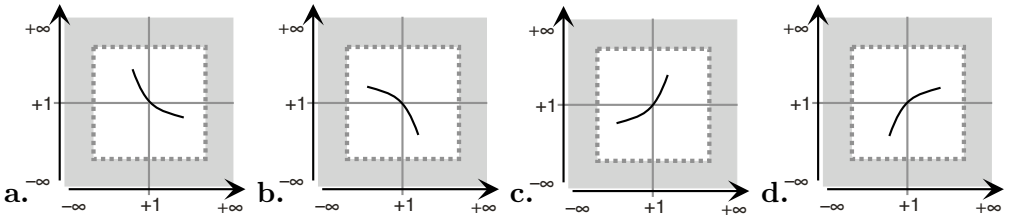
find the approximate input-output local rule for graph near $+2$

a. $h \xrightarrow{f_{+2}} f_{+2}(h) = +12h^{-1} + [...]$
b. $h \xrightarrow{f_{+2}} f_{+2}(h) = +12h + [...]$
c. $h \xrightarrow{f_{+2}} f_{+2}(h) = +\frac{1}{12}h^{-1} + [...]$
d. $h \xrightarrow{f_{+2}} f_{+2}(h) = -12h + [...]$
e. None of the preceding

III-5. Given the function f specified by the global input-output rule

$$x \xrightarrow{f} f(x) = \frac{x^3 - 4}{x^2 - 4}$$

find the local graph of f near $+1$.



e. None of the preceding

III-6. Given the function f specified by the global input-output rule

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

find the Slope sign of f near $+2$.

a. $(\nearrow, \nearrow)$ **b.** $(\nearrow, \searrow)$ **c.** $(\searrow, \nearrow)$ **d.** $(\searrow, \searrow)$

e. None of the preceding

III-7. Given the function f specified by the global input-output rule

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

find the approximate local input-output rule that gives the local graph near 0.

a. $h \xrightarrow{f_0} f_0(h) = +1 + h + h^2 + [...]$

b. $h \xrightarrow{f_0} f_0(h) = +1 - h + h^2 + [...]$

c. $h \xrightarrow{f_0} f_0(h) = +1 - h + h^3 + [...]$

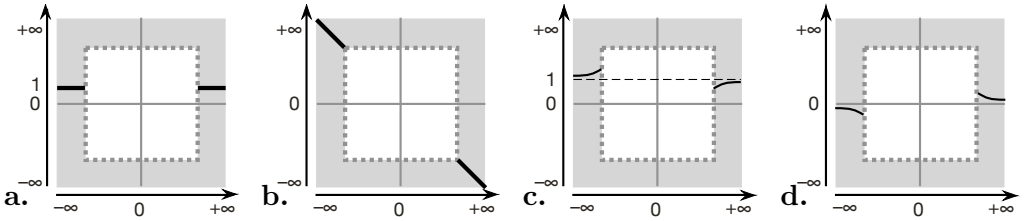
d. $h \xrightarrow{f_0} f_0(h) = +1 + h + h^3 + [...]$

e. None of the preceding

III-8. Given the function f specified by the global input-output rule

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

find the local graph of f near ∞.



e. None of the preceding

III-9. Given the function f specified by the global input-output rule

$$x \xrightarrow{f} f(x) = \frac{x^2 - 9}{(x-3)^2}$$

find the 0-height inputs of f.

a. $-3, +1$ **b.** -3 **c.** $+3$ **d.** $-3, +1, +3$

e. None of the preceding

III-10. Let f be the function specified by the global input-output rule

$$x \xrightarrow{f} f(x) = \frac{+3x^2 + 4x - 4}{-12x^5 + 4x^2 + 1}$$

find the Height sign of f near ∞.

a. $(+, +)$ **b.** $(+, -)$ **c.** $(-, +)$ **d.** $(-, -)$

e. None of the preceding

III-11. Given the function f specified by the global input-output rule

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

find the Concavity-sign of f near $+3$.

a. $(\cup, \cup)$ **b.** $(\cup, \cap)$ **c.** $(\cap, \cup)$ **d.** $(\cap, \cap)$

e. None of the preceding

III-12. Let f be the function specified by the global input-output rule

$$x \xrightarrow{f} f(x) = \frac{(x^2 - 3)^2}{x^8 - 16}$$

find Slope sign of f near ∞.

a. $(\nearrow, \nearrow)$ **b.** $(\nearrow, \searrow)$ **c.** $(\searrow, \nearrow)$ **d.** $(\searrow, \searrow)$

e. None of the preceding

III-13. Let f be the function f specified by the global input-output rule

$$x \xrightarrow{f} f(x) = \frac{x^4 - 16}{x^2 - 9}$$

what is the answer to the Essential Question?

a. No ∞-height bounded input.
b. Two ∞-height bounded inputs: -2 and $+2$.
c. Two ∞-height bounded inputs: -3 and $+3$.
d. Four ∞-height bounded inputs: -2, $+2$ and -3, $+3$.
e. None of the preceding

III-14. Given the function f specified by the global input-output rule

$$x \xrightarrow{f} f(x) = \frac{x^2 - 9}{(x-3)^2}$$

find the ∞-height inputs of f.

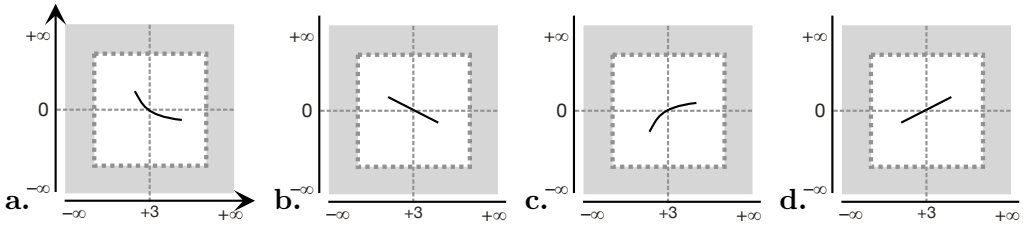
a. $-3, +1$ **b.** -3 **c.** $+3$ **d.** $-3, +1, +3$

e. None of the preceding

III-15. Given the function f specified by the global input-output rule

$$x \xrightarrow{f} f(x) = \frac{x^2 - 9}{x^2 + 9}$$

find the local graph of f near $+3$.

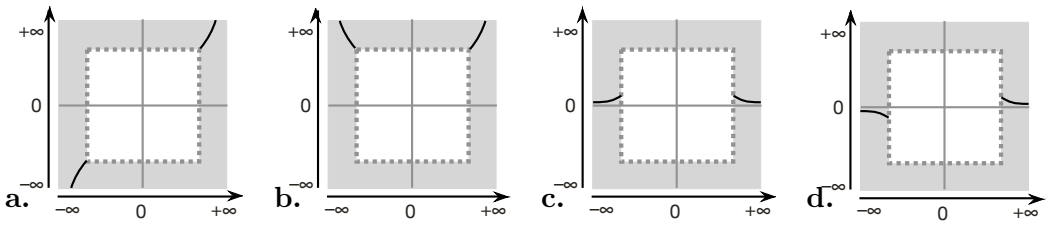


e. None of the preceding

III-16. Let the function f be specified by the global input-output rule

$$x \xrightarrow{f} f(x) = \frac{x - 3}{x^4 - 1}$$

Ffind the local graph of f near ∞.



e. None of the preceding

III-17. Given the function f specified by the global input-output rule

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

find the Height sign of f near $+3$.

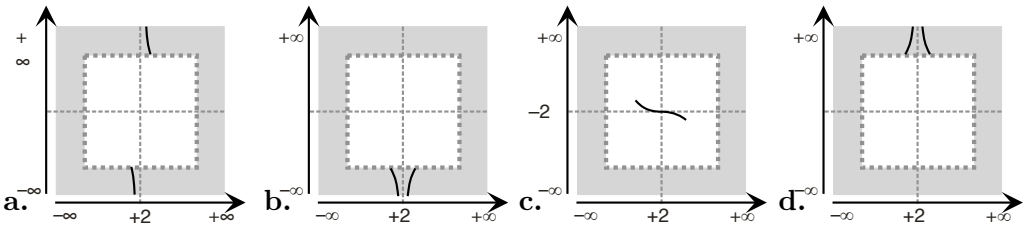
a. $(+, +)$ **b.** $(+, -)$ **c.** $(-, +)$ **d.** $(-, -)$

e. None of the preceding

III-18. Given the function f specified by the global input-output rule

$$x \xrightarrow{f} f(x) = \frac{(x-2)(x+3)}{x^2-4x+4}$$

find the local graph of f near $+2$.

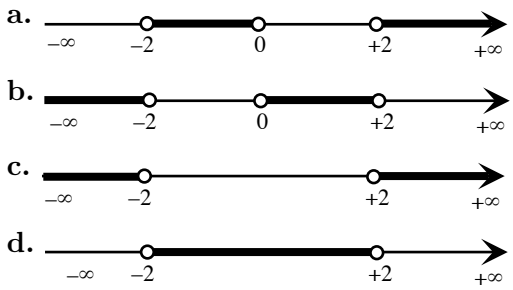


e. None of the preceding

III-19. Given the function f specified by the global input-output rule

$$x \xrightarrow{f} f(x) = \frac{x^2-4}{x^2}$$

for which input(s), if any, is the output of f *positive*?



e. None of the preceding

III-20. Given the function f specified by the global input-output rule

$$x \xrightarrow{f} f(x) = \frac{x^2-1}{x^3-8}$$

find the approximate local input-output rule that gives the local graph near $+1$.

a. $h \xrightarrow{f_{+1}} f_{+1}(h) = -\frac{2}{8}h^{-1} + [...]$

b. $h \xrightarrow{f_{+1}} f_{+1}(h) = -8 + 19h - 27h^2 + [...]$

c. $h \xrightarrow{f_{+1}} f_{+1}(h) = +\frac{1}{4}h^{-1} + [...]$

d. $h \xrightarrow{f_{+1}} f_{+1}(h) = -\frac{2}{8}h^{+1} - \frac{14}{8^2}h^{+2} + [...]$

e. None of the preceding