HA2PC S.Hogan

Chapter 8 (A2) Review

The exam will be identical in format to this review. Only the actual numerical values of the questions will vary.

#1-30: See multiple-choice packet.

#31-34: Write as a single, fully simplified rational expression.

31. $\dfrac{4}{x^2-4}+\dfrac{x+3}{x+2}$

32. $\dfrac{x-37}{x^2-2x-15}-\dfrac{5}{x+3}$

33. $\dfrac{\dfrac{2}{\dfrac{4}{x}-5}}{3+\dfrac{1}{x}}+\dfrac{x}{}$

34. $\dfrac{x-y}{x^{-1}-y^{-1}}$

#35: List all vertical asymptotes, horizontal asymptotes, slant asymptotes, holes, intercepts, and the domain of the following function then sketch a graph of the function.

35. $h(x)=\dfrac{x^2+2x-15}{2x^2-18}$

#36-39: Solve for x. For inequalities, write your answer in PARENTHETICAL NOTATION.

36. $3\sqrt{x+2}-5=1$

37. $\sqrt{x}=\sqrt{-x+3}$

38. $\sqrt{x}-2=\sqrt{x-2}$

39. $-2\sqrt{x-1}<-1$

Name_____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

State the domain of the rational function.

1) $f(x) = \frac{17}{12 - x}$ 1) _____

A) $(-\infty, -17) \cup (-17, 17) \cup (17, \infty)$ B) $(-\infty, 17) \cup (17, \infty)$
C) $(-\infty, -12) \cup (-12, 12) \cup (12, \infty)$ D) $(-\infty, 12) \cup (12, \infty)$

2) $f(x) = \frac{x - 9}{x^2 + 5}$ 2) _____

A) $(-\infty, -3) \cup (-3, 3) \cup (3, \infty)$ B) $(-\infty, 5) \cup (5, \infty)$
C) $(-\infty, -5) \cup (-5, \infty)$ D) $(-\infty, \infty)$

3) $f(x) = \frac{(x - 5)(x + 2)}{x^2 - 9}$ 3) _____

A) $(-\infty, -2) \cup (-2, 5) \cup (5, \infty)$ B) $(-\infty, -5) \cup (-5, 2) \cup (2, \infty)$
C) $(-\infty, \infty)$ D) $(-\infty, -3) \cup (-3, 3) \cup (3, \infty)$

For the given function, find all asymptotes of the type indicated (if there are any)

4) $f(x) = \frac{(x - 6)(x + 6)}{x^2 - 9}$, vertical 4) _____

A) $x = 6, x = -6$ B) None C) $x = -6, x = 6$ D) $x = 3, x = -3$

5) $f(x) = \frac{x - 4}{x^2 + 4}$, vertical 5) _____

A) $x = 4$ B) $x = -4$ C) None D) $x = 2, x = -2$

6) $f(x) = \frac{x^2 + 7x - 7}{x - 9}$, slant 6) _____

A) $y = x - 2$ B) $x = y + 16$ C) $y = x + 16$ D) None

7) $f(x) = \frac{x + 9}{x^2 + 9x + 2}$, horizontal 7) _____

A) $y = 9$ B) $y = 0$ C) $y = x$ D) None

8) $f(x) = \frac{4x^2 - 9x - 2}{7x^2 - 7x + 4}$, horizontal 8) _____

A) $y = 0$ B) None C) $y = 9/7$ D) $y = 4/7$

Solve the inequality.

9) $(2x - 5)\sqrt{x + 1} < 0$ 9) _____

A) $(-1, 5/2)$ B) $(5/2, \infty)$ C) $(-\infty, 5/2)$ D) $[5/2, 1]$

10) $\frac{x^2(x - 7)^3}{\sqrt{x + 4}} < 0$ 10) _____

A) $(-4, 0) \cup (7, \infty)$
B) $(-4, 0) \cup (0, 7)$
C) $(-4, 0) \cup (0, \infty)$
D) $(-4, \infty)$

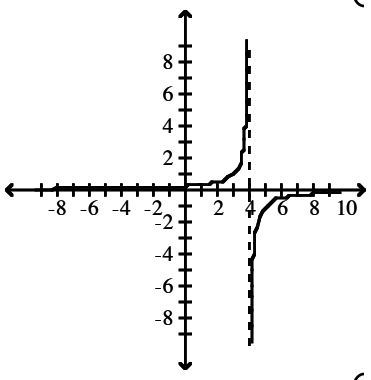
11) $\frac{x^2 - 2x - 3}{x^2 + 11x + 30} < 0$ 11) _____

A) $(-1, 3)$
B) $(-\infty, -6) \cup (-5, -1) \cup (3, \infty)$
C) $(-6, -5) \cup (-1, 3)$
D) $(-\infty, -3) \cup (1, 3) \cup (4, \infty)$

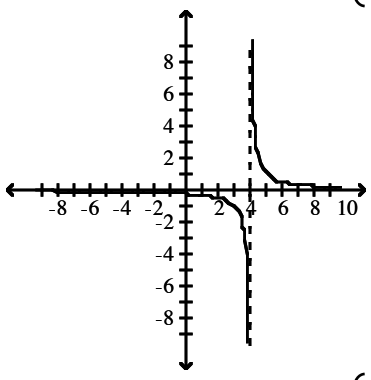
List the x– and y–intercepts, and graph the function.

12) $f(x) = \frac{1}{x - 4}$ 12) _____

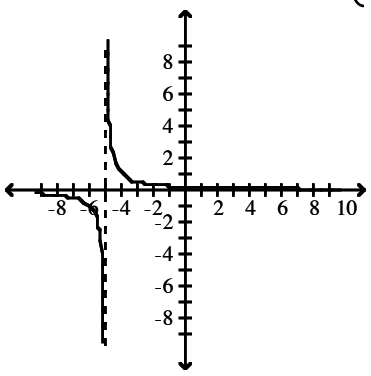
A) No x–intercepts, y–intercept: $\left(0, \frac{1}{4}\right)$;



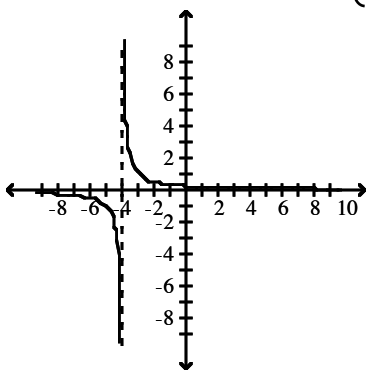
B) No x–intercepts, y–intercept: $\left(0, -\frac{1}{4}\right)$;



C) No x–intercepts, y–intercept: $\left(0, \frac{1}{5}\right)$;

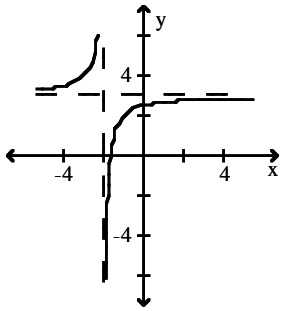


D) No x–intercepts, y–intercept: $\left(0, \frac{1}{4}\right)$;

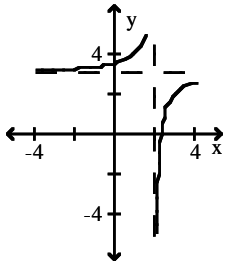


13) $f(x) = \frac{3x - 5}{x - 2}$ 13) _____

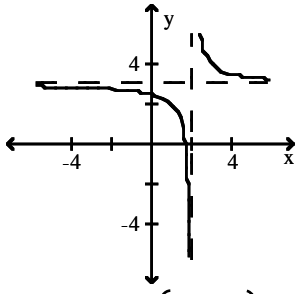
A) x–intercept: $\left(-\frac{5}{3}, 0\right)$, y–intercept: $\left(0, \frac{5}{2}\right)$



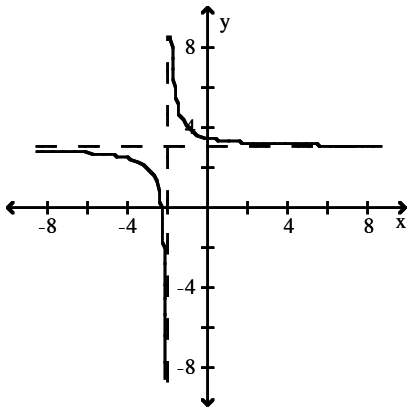
B) x–intercept: $\left(\frac{5}{2}, 0\right)$, y–intercept: $\left(0, \frac{7}{2}\right)$



C) x–intercept: $\left(\frac{5}{3}, 0\right)$, y–intercept: $\left(0, \frac{5}{2}\right)$

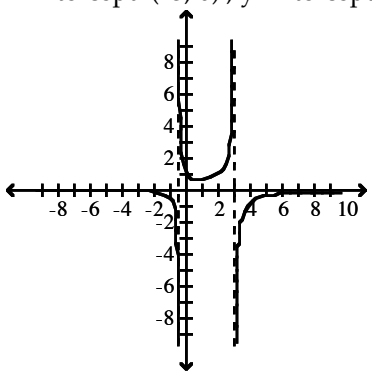


D) x–intercept: $\left(-\frac{5}{2}, 0\right)$, y–intercept: $\left(0, \frac{7}{2}\right)$

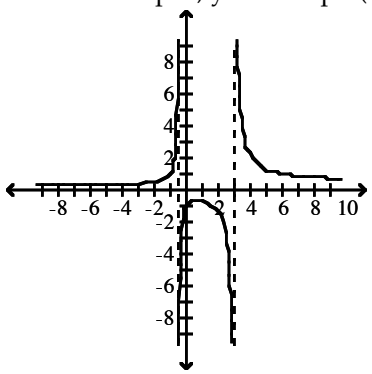


14) $f(x) = \dfrac{x + 3}{2x^2 - 5x - 3}$ 14) _____

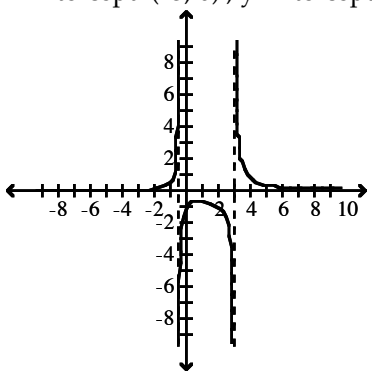
A) x–intercept: (–3, 0) , y–intercept: (0, 1) ;



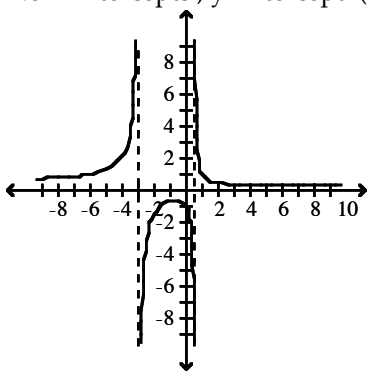
B) No x–intercepts , y–intercept: (0, –1) ;



C) x–intercept: (–3, 0) , y–intercept: (0, –1) ;



D) No x–intercepts , y–intercept: (0, –1) ;



Solve the equation.

15) $x + 2 = \frac{35}{x}$ 15) _____

A) $x = \pm\sqrt{35}$ B) $x = -5$ or $x = 7$

C) $x = -2$ D) $x = -7$ or $x = 5$

16) $\frac{x + 4}{4} - \frac{x - 5}{6} = 2$ 16) _____

A) $x = 2$ B) $x = 52$ C) $x = 92$ D) $x = 44$

17) $\frac{5x}{x - 5} - \frac{4}{x} = \frac{20}{x2 - 5x}$ 17) _____

A) $x = \frac{2}{5}$ or $-\frac{2}{5}$ B) $x = \frac{4}{5}$ C) $x = \frac{4}{5}$ or $-\frac{4}{5}$ D) $x = \frac{5}{4}$

18) $\frac{x}{2x + 2} = \frac{-2x}{4x + 4} + \frac{2x - 3}{x + 1}$ 18) _____

A) $x = \frac{3}{2}$ B) $x = 3$ C) $x = -\frac{12}{5}$ D) $x = -3$

19) $\frac{2x}{x + 2} + \frac{5}{x - 5} = \frac{8}{x2 - 3x - 10}$ 19) _____

A) $x = -\frac{1}{2}$ or $x = 2$ B) $x = \frac{1}{4}$ or $x = 4$

C) $x = 2$ D) $x = \frac{1}{2}$ or $x = 2$

Solve the problem.

20) Suppose a cost–benefit model is given by $y = \frac{5.1x}{100 - x}$, where y is the cost in thousands of dollars for removing x percent of a given pollutant. Find the cost of removing 25% to the nearest dollar. 20) _____

A) \$5100 B) \$1699 C) \$333 D) \$1275

21) An open–top rectangular box has a square base and it will hold 256 cubic centimeters (cc). Each side has length x cm and height y cm. The box's surface area is given by 21) _____

$$S(x) = \frac{1024}{x} + x2.$$

Estimate the minimum surface area and the value of x that will yield it.

A) 256 cm^2 when $x = 6$ cm B) 256 cm^2 when $x = 8$ cm

C) 108 cm^2 when $x = 8$ cm D) 192 cm^2 when $x = 8$ cm

22) Consider all rectangles with an area of 256 cm^2. Let x be the length of one side of such a rectangle. Express the perimeter as a function of x and determine the dimensions of the rectangle that has the least perimeter. 22) _____

A) $P(x) = 256x$; 8 cm × 32 cm

B) $P(x) = x + \frac{256}{x}$; 16 cm × 16 cm

C) $P(x) = 2x + \frac{512}{x}$; 16 cm × 16 cm

D) $P(x) = 2x + \frac{512}{x}$; 4 cm × 64 cm

Solve the polynomial inequality.

23) $(x + 7)(x + 3)(x - 7) > 0$ 23) _____

A) $(-7, -3) \cup (7, \infty)$

B) $(-\infty, -7) \cup (-3, 7)$

C) $(-\infty, -3)$

D) $(7, \infty)$

24) $(x + 4)(x^2 - 9) > 0$ 24) _____

A) $(-4, -3) \cup (3, \infty)$

B) $(-\infty, 3) \cup (3, 4)$

C) $(-\infty, -3) \cup (3, \infty)$

D) $(-4, 3)$

25) $(2x + 1)(x - 6)(3x - 7) \le 0$ 25) _____

A) $(-\infty, -1/2) \cup (7/3, 6)$

B) $(-\infty, -1/2] \cup [7/3, 6]$

C) $[-1/2, 7/3] \cup [6, \infty)$

D) $(-1/2, 7/3) \cup (6, \infty)$

26) $x^4 - 117x^2 + 2916 < 0$ 26) _____

A) $(-\infty, -6) \cup (6, \infty)$

B) $(-9, -6) \cup (6, 9)$

C) $(-9, -6) \cap (6, 9)$

D) $(-9, 9)$

Solve the problem.

27) The profit made when t units are sold, $t > 0$, is given by $P = t^2 - 25t + 154$. Determine the number of units to be sold in order for $P > 0$ (a profit is made). 27) _____

A) $t = 14$ or $t = 11$

B) $t = 25$

C) $t > 14$ or $t < 11$

D) $14 < t < 11$

28) A rectangular enclosure must have an area of at least 400 yd^2. If 100 yd of fencing is to be used, and the width cannot exceed the length, within what limits must the width of the enclosure lie? 28) _____

A) $25 \le w \le 40$ B) $10 \le w \le 40$ C) $0 \le w \le 10$ D) $10 \le w \le 25$

Provide an appropriate response.

29) Fill in the blanks to complete the statement. A polynomial function of degree 9 has at least _ x–intercept(s) and at most _ x–intercept(s). 29) _____

A) 9; 9 B) 0; 8 C) 1; 9 D) 8; 9

30) Suppose that f is a polynomial function of degree 4. If –4 and 11 are zeros of f and the graph of f is symmetric with respect to the y–axis, write f(x) in factored form. 30) _____

A) $f(x) = (x + 4)(x - 11)(x - 4)(x + 11)$

B) $f(x) = (x - 4)^2(x + 11)^2$

C) $f(x) = (x + 4)^2(x - 11)^2$

D) $f(x) = (x + 4)(x - 11)$

Answer Key
Testname: HA2PC_CH8(A2)REVIEW

1) D
2) D
3) D
4) D
5) C
6) C
7) B
8) D
9) A
10) B
11) C
12) B
13) C
14) C
15) D
16) A
17) B
18) B
19) D
20) B
21) D
22) C
23) A
24) A
25) B
26) B
27) C
28) D
29) C
30) A