

Answer KEY:

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- 1. D 6. B
- 2. D 7. D
- 3. A 8. B
- 4. C 9. D
- 5. B 10. C

College Algebra Worksheet (8)

Multiple Choice Questions on Rational Functions

1. Find the function f whose graph is given below.

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

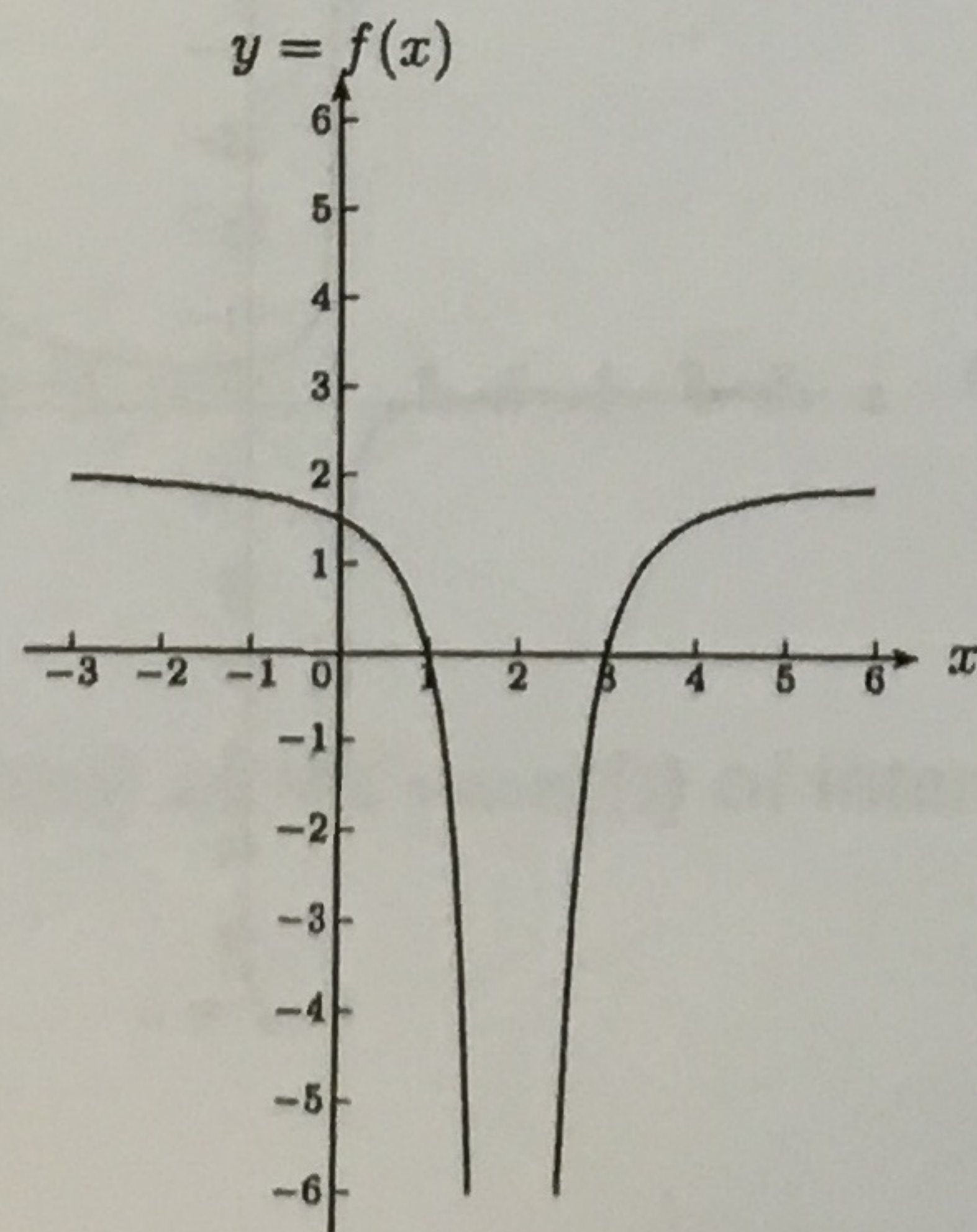
$f(0) = 3/4 \times$

~~b. $f(x) = \frac{2(x-1)(x-3)}{(x-2)}$~~

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

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

$f(0) = 6/4 \checkmark$



bounces, so $(x-2)^2$
mult. must be even.

2. If function f is defined by $f(x) = \frac{4x^2 - 12x}{x^2 - 9}$, then at $x = 3$

- ~~a. the graph of f has a vertical asymptote.~~
- ~~b. the graph of f has a hole on the x axis.~~
- ~~c. $f(x) = 0$~~
- d. the graph of f has a hole at $(3, 2)$.

hole

$$\frac{4x(x-3)}{(x-3)(x+3)}$$

$$f(x) = \frac{4x}{x+3}$$

$$f(3) = \frac{12}{6} = 2$$

3. Which of the following functions has an oblique asymptote?

- a. $f(x) = \frac{x^5 + 1}{x^4 + 3x^2 + 2}$
- b. $f(x) = \frac{x^2 + 1}{x^3 - x^2 - 1}$
- c. $f(x) = \frac{4x^2 + x + 1}{x^2}$
- d. $f(x) = \frac{x^5}{x^2 - 1}$

Bonus: what IS the equation for the asymptote for each?

4. Find the equation of the oblique asymptote of the function $f(x) = \frac{x^2 - 11x + 30}{x - 4}$

- a. $y = x - 4$
- b. $y = x + 4$
- c. $y = x - 7$
- d. $y = x + 7$

$$\begin{array}{r|rrr} 4 & 1 & -11 & 30 \\ & & 4 & -28 \\ \hline & 1 & -7 & \end{array}$$

5. Find the function f whose graph is given below.

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

$f(0) = 1/2$

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

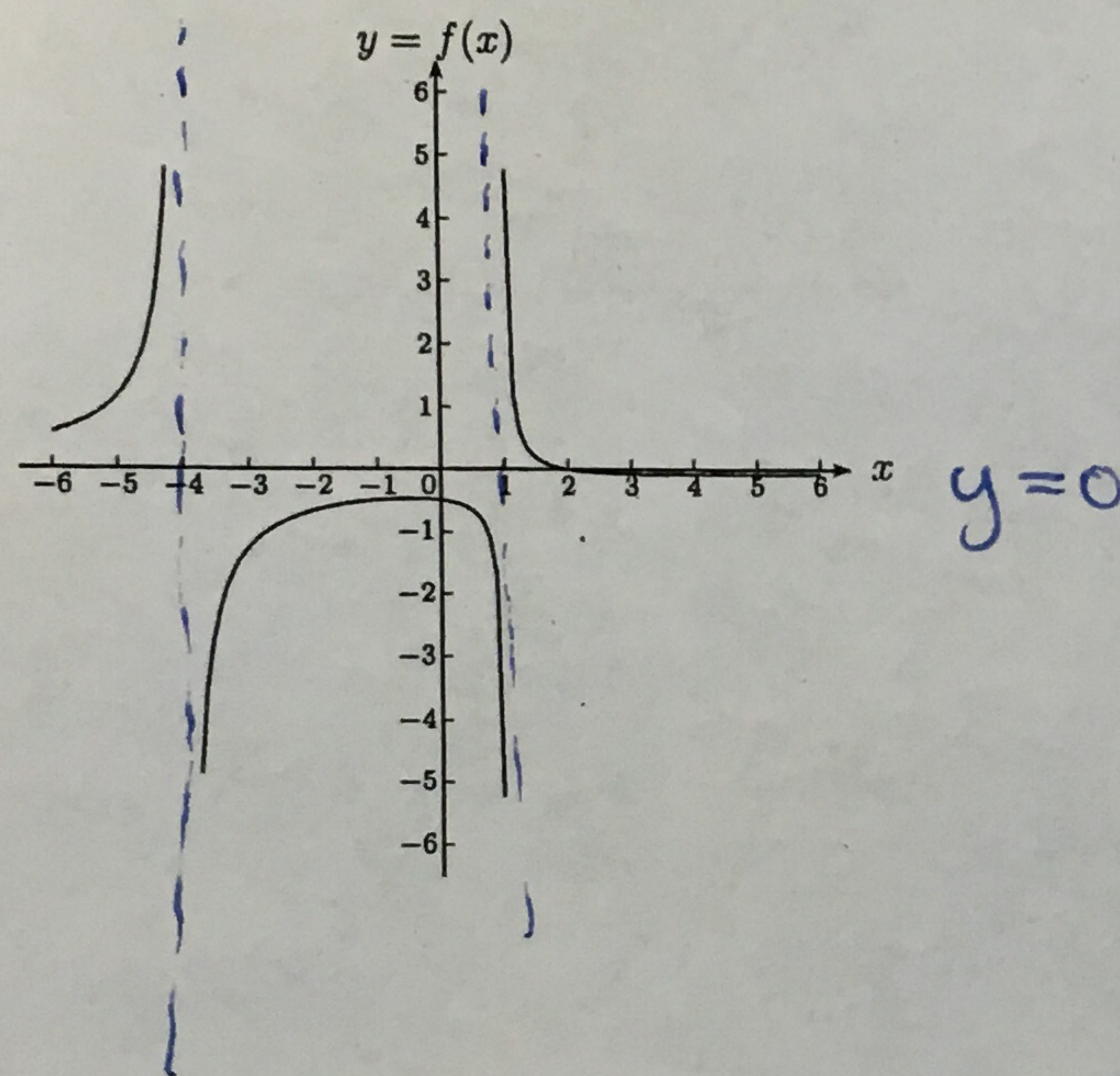
$f(0) = -1/2$

$y =$

$(x+4)(x-1) = x^2+3x-4$

~~c.~~ $f(x) = \frac{x-2}{x^2-3x-4}$

~~d.~~ $f(x) = \frac{2-x}{x^2-3x-4}$



6. Which of the following functions has no horizontal asymptote?

~~a.~~ $f(x) = \frac{x^2-2}{x^3-9x-4}$

$\rightsquigarrow y=0$

b. $f(x) = \frac{5x^4-2^3-x+7}{-x^3+3x^2-4}$

~~c.~~ $f(x) = \frac{9x^2-2x-3}{x^2+8x-2}$

$\rightsquigarrow y=9$

~~d.~~ $f(x) = \frac{1}{x^2-x}$

$\rightsquigarrow y=0$

7. Which of the following functions has a hole at (1,4)?

a. $f(x) = \frac{x-1}{(x-1)(x-5)}$ $f(1) = \frac{1}{-4}$

~~b.~~ $f(x) = \frac{x-1}{(x+1)^2}$ no holes

~~c.~~ $f(x) = \frac{4}{x-1}$

d. $f(x) = \frac{(x+1)(11x+1)}{(x-1)(x+2)}$ $f(1) = \frac{12}{3} = 4$

8. Which of the following functions has a zero, a vertical asymptote and a horizontal asymptote?

~~a.~~ $f(x) = \frac{x-4}{(x-4)(x-5)}$ no zero

b. $f(x) = \frac{(x+2)(x^2+1)}{(x-4)(x^2+7)}$ x^3/x^3 ✓

~~c.~~ $f(x) = \frac{x^2+5}{(x-4)(x-5)}$ no zero

~~d.~~ $f(x) = \frac{(x-5)(x^2+8)}{(x-4)}$ x^3/x

9. Which of these functions has no vertical asymptotes?

~~a.~~ $f(x) = \frac{x-7}{(x-7)(x-5)}$

~~b.~~ $f(x) = \frac{x}{x^2-x-1}$

~~c.~~ $f(x) = \frac{1}{x-2}$

d. $f(x) = \frac{x^2-9x+20}{(x-4)(x-5)}$ $\frac{(x+5)(x-4)}{(x-4)(x-5)}$

10. Which of the following functions has a hole, one zero, an oblique asymptote and no vertical asymptote?

~~a.~~ $f(x) = \frac{(x-7)(x^2+1)}{(x-7)(x-5)}$

~~b.~~ $f(x) = \frac{(x-7)(x^2-1)}{(x-7)(x-2)}$

c. $f(x) = \frac{(x-7)(x^3-4)}{(x-7)(x^2+5)}$

~~d.~~ $f(x) = \frac{x-7}{(x-7)(x-5)}$