Exam

Name_____

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

State whether the function is a polynomial function or not. If it is, give its degree. If it is not, tell why not.

1) $f(x) = \dfrac{4}{3} - \dfrac{1}{3}x$

1) _____

    A) Yes; degree 3   B) No; x has a fractional coefficient
    C) Yes; degree 1   D) Yes; degree 0

For the polynomial, list each real zero and its multiplicity. Determine whether the graph crosses or touches the x–axis at each x –intercept.

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

2) _____

    A) 0, multiplicity 2, touches x–axis;   B) 0, multiplicity 2, crosses x–axis;
        3, multiplicity 1, crosses x–axis   3, multiplicity 1, touches x–axis;
                                           $\sqrt{3}$, multiplicity 1, touches x–axis;
                                           $-\sqrt{3}$, multiplicity 1, touches x–axis
    C) 0, multiplicity 2, touches x–axis;   D) 0, multiplicity 2, crosses x–axis;
        3, multiplicity 1, crosses x–axis;   3, multiplicity 1, touches x–axis
        $\sqrt{3}$, multiplicity 1, crosses x–axis;
        $-\sqrt{3}$, multiplicity 1, crosses x–axis

Use the x–intercepts to find the intervals on which the graph of f is above and below the x–axis.

3) $f(x) = (x - 4)^2(x + 5)^2$

3) _____

    A) above the x–axis: no intervals   B) above the x–axis: (–5, 4)
        below the x–axis: (–∞, –5), (–5, 4), (4, ∞)   below the x–axis: (–∞, –5), (4, ∞)
    C) above the x–axis: (–∞, –5), (4, ∞)   D) above the x–axis: (–∞, –5), (–5, 4), (4, ∞)
        below the x–axis: (–5, 4)   below the x–axis: no intervals

Find the domain of the rational function.

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

4) _____

    A) {x|x ≠ –2, x ≠ 2}   B) {x|x ≠ 0, x ≠ 4}
    C) {x|x ≠ –2, x ≠ 2, x ≠ –3}   D) all real numbers

Find the vertical asymptotes of the rational function.

5) $H(x) = \dfrac{2x}{(x - 9)(x - 1)}$

5) _____

    A) x = 9, x = 1, x = –2   B) x = 9, x = 1
    C) x = –9, x = –1   D) x = –2

Give the equation of the horizontal asymptote, if any, of the function.

6) $Q(x) = \dfrac{x + 8}{x^2 - 1}$

6) _____

    A) y = –1, y = 1   B) y = 0   C) y = 1   D) none

Find the indicated intercept(s) of the graph of the function.

7) y–intercept of $f(x) = \dfrac{x - 14}{3x - 5}$

7) _____

    A) (0, 14)   B) $\left(0, -\dfrac{5}{14}\right)$ C) $\left(0, \dfrac{14}{5}\right)$ D) none

8) x–intercepts of $f(x) = \dfrac{2x + 3}{x - 9}$

8) _____

    A) $\left(-\dfrac{3}{2}, 0\right)$ B) (–9, 0)   C) $\left(\dfrac{3}{2}, 0\right)$ D) (9, 0)

Determine the maximum number of turning points of f.

9) $f(x) = (x - 4)^2(x + 5)^2$

9) _____

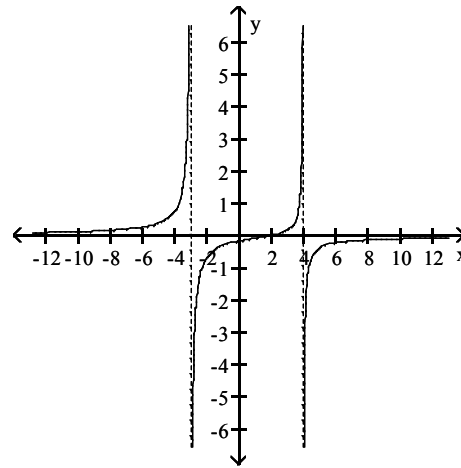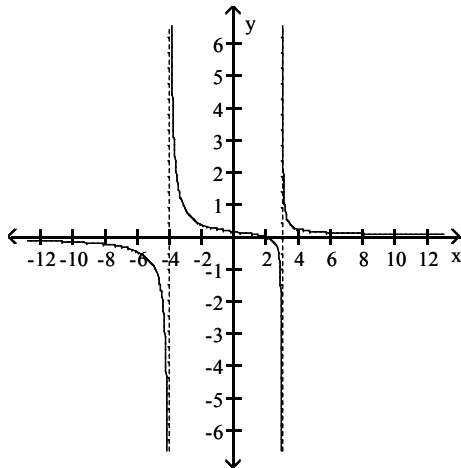   A) 1   B) 2   C) 3   D) 4

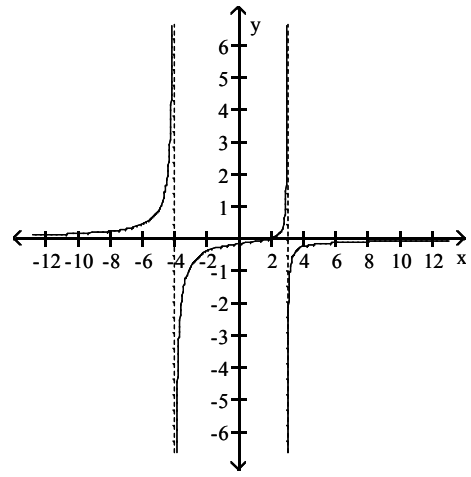**Graph the function.**

10) $f(x) = \dfrac{x - 2}{x^2 - x - 12}$

10) _____

A)

B)

C)

y

6
5
4
3
2
1

-12 -10 -8 -6 -4 -2   2 4 6 8 10 12 x
-1
-2
-3
-4
-5
-6

D)

y

6
5
4
3
2
1

-12 -10 -8 -6 -4 -2   2 4 6 8 10 12 x
-1
-2
-3
-4
-5
-6
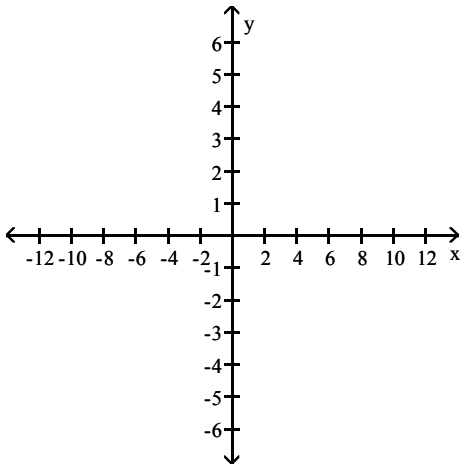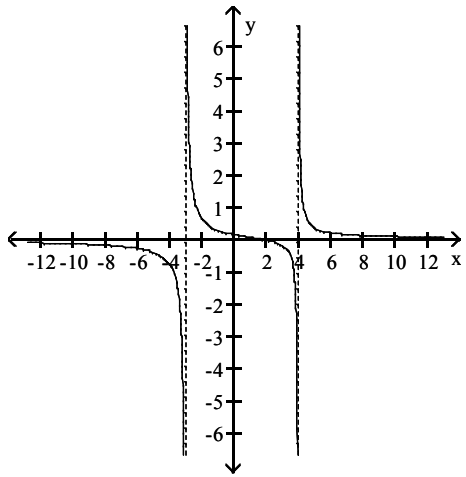
1) C
2) C
3) D
4) A
5) B
6) B
7) C
8) A
9) C
10) C