Math 110 Exam 2 All Sections Fall 2009
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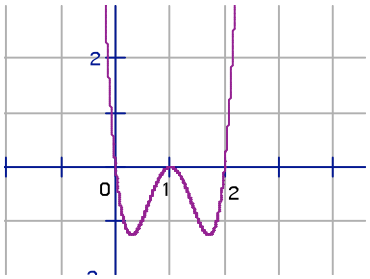
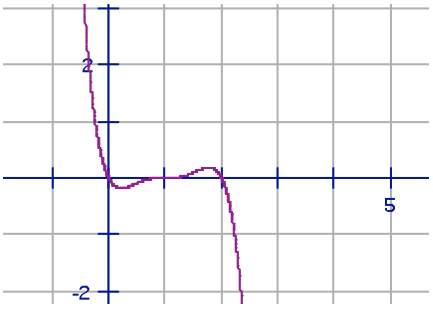
1. Select the function that represents the given graph:



a. $y = 5x(x-1)(x-2)$
b. $y = 5x(x-1)^2(x-2)$
c. $y = 5x^2(x-1)(x-2)$
d. $y = -5x(x-1)^2(x-2)$
e. $y = 5x(x-1)^2(x-2)^2$
f. $y = 5x(x-1)(x-2)^2$

2. Select the function that represents the given graph:



a. $y = x^2(x-1)(x-2)$
b. $y = -x(x-1)^3(x-2)$
c. $y = x^2(x-1)^2(x-2)$
d. $y = -x(x+1)(x+2)$
e. $y = -x^2(x-1)(x-2)$
f. $y = x^2(x+1)(x+2)$

3. Let $R(x) = \dfrac{x^3}{x^2-4}$. Find all vertical asymptotes if any.

a. No vertical asymptotes
b. $x = 0$
c. $x = 2$
d. $x = -2$
e. $x = 0,\ x = 2$
f. $x = 2, x = -2$

4. Find the domain of the following rational function: $f(x) = \dfrac{x^2-7x}{3x(x-7)}$

a. $\{x \mid x \neq 7, x \neq 0\}$
b. $\{x \mid x \neq -7\}$
c. $\{x \mid x \neq 0\}$
d. $\{x \mid x \neq -3, x \neq 0\}$
e. $\{x \mid x \in R\}$.

5. Let $R(x) = \dfrac{6x^3 - 2x^2 + 5x + 2}{2x^2 + 1}$. Find all oblique asymptotes if any.

a. No oblique asymptote
b. $y = 3x + 1$
c. $y = 2x + 3$
d. $y = 3x$
e. $y = 3x - 1$

6. Let $R(x) = \dfrac{3x^4}{2x^4 + 1}$. Find all horizontal asymptotes if any.

a. No horizontal asymptote
b. $y = 3$
c. $y = 2$
d. $y = 3/2$
e. $y = 1$
f. $y = 0$

7. Solve the inequality: $\dfrac{(3 + x)(2 - x)}{x} > 0$.

a. $(-\infty,-3) \cup (0,2)$
b. $(-3,0) \cup (2,\infty)$
c. $(-\infty,-3) \cup (2,\infty)$
d. $(-3,0) \cup (0,2)$

8. Solve the following inequality: $(x + 4)^2 (x - 3) \geq 0$.

a. $(-\infty,\infty)$
b. $[-4] \cup [3,\infty)$
c. $(-\infty,-4] \cup [3,\infty)$
d. $(-4,3)$
e. $\{x \mid x \neq -4, x \neq 3\}$

9. Solve the inequality: $\dfrac{5x - 6}{x - 1} \geq 4$.

a. $(1,2]$
b. $[1,2)$
c. $(-\infty,1) \cup [2,\infty)$
d. $(-\infty,1] \cup (2,\infty)$
e. $(-\infty,1] \cup [2,\infty)$

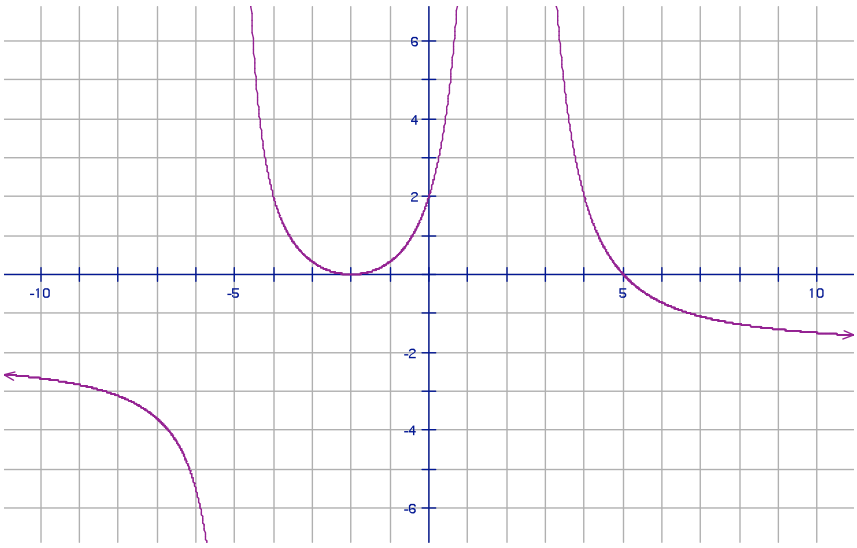
10. Solve the inequality: $x^4 + 8x > 0$.

a $(-2, \infty)$
b. $(-\infty, -2) \cup (0, \infty)$
c. $(-\infty, 0) \cup (2, \infty)$
d. $(0, \infty)$

11. If $x^{50} - 9x^{48} + x - 1$ is divided by x - 3, then the remainder is

a. -1 b. 0 c. 1
d. 2 e. 3

12. Find a rational function that has the following graph.



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

13. The polynomial $4x^4 + 4x^3 - 19x^2 + 14x - 3$ has four rational zeros. Find the zero that has multiplicity two.

a. $\frac{1}{4}$ b. $\frac{3}{4}$ c. $\frac{1}{2}$

d. $-\frac{1}{2}$ e. 1 f. -3

14. Which of the following statements is true about the zeros of $3x^4 - 10x^3 + 10x - 3$?

a. There are no positive zeros.
b. There is exactly one positive zero.
c. There are exactly two positive zeros.
d. There are exactly three positive zeros.
e. There are exactly four positive zeros.

15. Find k so that $f(x) = x^3 + 2kx^2 - kx - 12$ has the factor $x + 2$.

a. $k = 0$ b. $k = 1$ c. $k = 2$ d. $k = 3$ e. $k = 4$

16. Let $f(x)$ be a polynomial so that $f(1) = -1, f(2) = 1, f(3) = 5$, and $f(4) = -1$. Then the Intermediate Value Theorem promises that there must be how many zeros for $f(x)$, for x between 1 and 4?

a. none b. one c. two d. three e. four

17. Form a polynomial with real coefficients of degree two so that $-3 + 2i$ is a zero.

a. $x^2 + 6x + 13$
b. $x^2 - 6x + 13$
c. $x^2 + 6x - 13$
d. $x^2 - 6x - 13$
e. $x^2 + 6x + 5$

18. Form a polynomial of degree 4 with real coefficients with zeros $1 + i$ and i.

a. $x^4 + 2x^3 + 3x^2 + 2x + 2$
b. $x^4 - 2x^3 - 3x^2 - 2x - 2$
c. $x^4 - 2x^3 + 3x^2 - 2x + 2$
d. $x^4 + 2x^3 + 3x^2 - 2x + 2$
e. $x^4 - 2x^3 + 3x^2 + 2x + 2$

19. Find all solutions to $x^4 - 2x^3 + 6x^2 - 2x + 5 = 0$, Given that $x = i$ is a solution.

a. $\pm i, 2 \pm i$ b. $\pm i, -1 \pm 2i$ c. $\pm i, \pm 2i$

d. $\pm i, 2 \pm 3i$ e. $\pm i, 1, 5$ f. $\pm i, 1 \pm 2i$

20. Let $f(x) = x^4 - x^2 - 6$. Find the zeros of $f(x)$ and choose the appropriate response.

a. There are no real zeros of $f(x)$.
b. There is exactly one real zeros of $f(x)$.
c. There are exactly two real zeros of $f(x)$.
d. There are exactly three real zeros of $f(x)$.
e. There are exactly four real zeros of $f(x)$.

Answers

1. B
2. B
3. F
4. A
5. E
6. D
7. A
8. B
9. C
10. B
11. D
12. A
13. C
14. D
15. C
16. C
17. A
18. C
19. F
20. C