Math 1314 - Practice Exam 3 - Fall 2019

MULTIPLE CHOICE SECTION. (5 pts each) Choose the correct answer for each question. Select one choice only. No work will be graded. No partial credit.

Find the vertex of the parabola.

1) $f(x) = 4x^2 + 40x + 96$ 1) _____

A) (–5, –4) B) (5, 4) C) (4, 5) D) (–4, –5)

Determine whether there is a maximum or minimum value for the given function, and find that value.

2) $f(x) = \frac{1}{2}x^2 - 8x - \frac{11}{2}$ 2) _____

A) Maximum: – 112

B) Minimum: $-\frac{75}{2}$

C) Maximum: 0

D) Minimum: $\frac{181}{2}$

Find the range of the given function.

3) $f(x) = -4x^2 + 32x - 69$ 3) _____

A) [–4, ∞) B) (–∞, –5] C) [5, ∞) D) (–∞, –4]

Use the Leading Term Test to determine the end behavior of the polynomial function.

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

A) falls to the left and rises to the right

B) rises to the left and falls to the right

C) falls to the left and falls to the right

D) rises to the left and rises to the right

Find the zeros for the polynomial function and give the multiplicity for each zero. State whether the graph crosses the x–axis or touches the x–axis and turns around, at each zero.

5) $f(x) = \left(x + \frac{1}{2}\right)^2 (x + 8)^3$ 5) _____

A) $-\frac{1}{2}$, multiplicity 2, touches the x–axis and turns around;

–8, multiplicity 3, crosses the x–axis.

B) $\frac{1}{2}$, multiplicity 2, touches the x–axis and turns around;

8, multiplicity 3, crosses the x–axis.

C) $-\frac{1}{2}$, multiplicity 2, crosses the x–axis;

–8, multiplicity 3, touches the x–axis and turns around

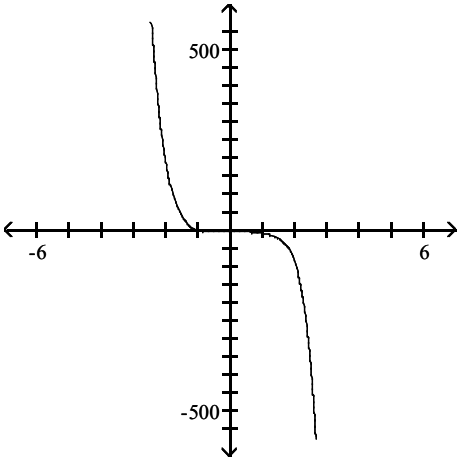
D) $\frac{1}{2}$, multiplicity 2, crosses the x–axis;

8, multiplicity 3, touches the x–axis and turns around

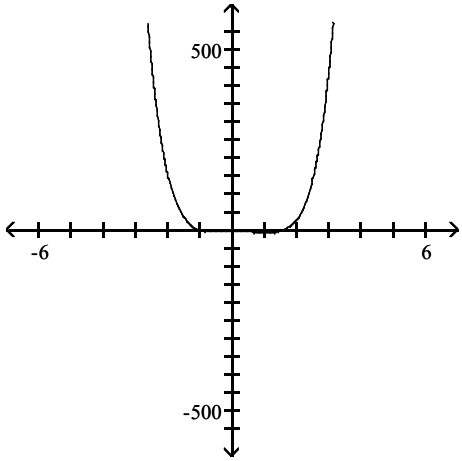
Use the leading–term test to match the function with the correct graph.

6) $f(x) = -0.6x^6 - x^5 + 5x^4 - 4x^3 - 6x^2 + x - 3$ 6) _____

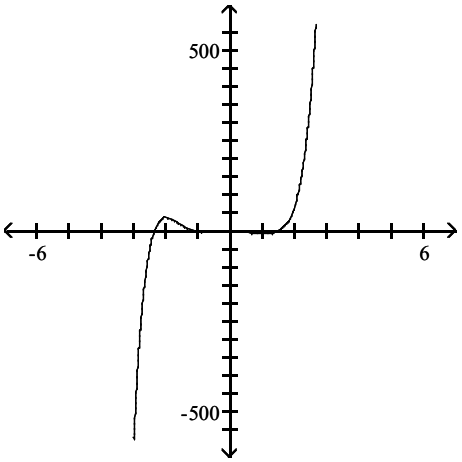
A)



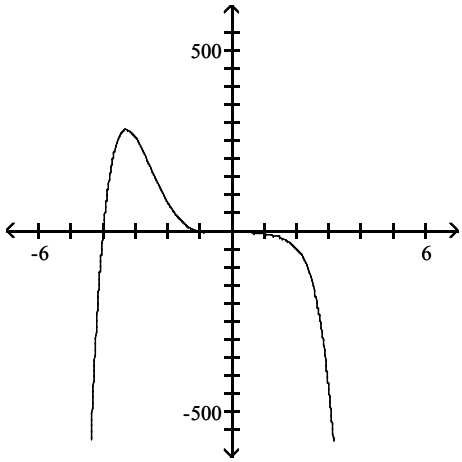
B)



C)



D)



Use synthetic division to find the quotient and the remainder.

7) $(x^5 + 8x^4 + 13x^3 - 8x^2 + 8x - 8) \div (x + 5)$ 7) _____

A) $Q(x) = x^3 + 3x^2 - 2x + 2$; $R(x) = 2$

B) $Q(x) = x^4 + 3x^3 - 2x^2 + 2x + 2$; $R(x) = 4$

C) $Q(x) = x^4 + 3x^3 - 2x^2 + 2x + 2$; $R(x) = 0$

D) $Q(x) = x^4 + 3x^3 - 2x^2 + 2x - 2$; $R(x) = 2$

Find an nth degree polynomial function with real coefficients satisfying the given conditions.

8) n = 3; – 6 and i are zeros; $f(-3) = 60$ 8) _____

A) $f(x) = -2x^3 - 12x^2 + 2x + 12$

B) $f(x) = 2x^3 + 12x^2 - 2x - 12$

C) $f(x) = 2x^3 + 12x^2 + 2x + 12$

D) $f(x) = -2x^3 - 12x^2 - 2x - 12$

Use the Rational Zero Theorem to list all possible rational zeros for the given function.

9) $f(x) = -4x^4 + 2x^2 - 3x + 6$ 9) _____

A) $\pm\frac{1}{6}, \pm\frac{1}{2}, \pm\frac{1}{3}, \pm\frac{2}{3}, \pm\frac{4}{3}, \pm 1, \pm 2, \pm 4$

B) $\pm\frac{1}{4}, \pm\frac{1}{2}, \pm\frac{3}{4}, \pm\frac{3}{2}, \pm 1, \pm 2, \pm 3, \pm 4, \pm 6$

C) $\pm\frac{1}{4}, \pm\frac{1}{2}, \pm\frac{3}{4}, \pm\frac{3}{2}, \pm 1, \pm 2, \pm 3, \pm 6$

D) $\pm\frac{1}{4}, \pm\frac{1}{2}, \pm\frac{2}{3}, \pm\frac{3}{4}, \pm\frac{3}{2}, \pm 1, \pm 2, \pm 3, \pm 6$

State the domain of the rational function.

10) $f(x) = \dfrac{x^2 + 4x - 12}{x^2 - 5x - 14}$ 10) _____

A) $(-\infty, \infty)$
B) $(-\infty, -2) \cup (-2, 7) \cup (7, \infty)$
C) $(-\infty, -7) \cup (-7, 2) \cup (2, \infty)$
D) $(-\infty, 7) \cup (7, \infty)$

Find the vertical asymptotes, if any, of the graph of the rational function.

11) $h(x) = \dfrac{x + 6}{x^2 - 36}$ 11) _____

A) $x = 6$
B) $x = 6, x = -6$
C) $x = -6$
D) no vertical asymptote

Find the horizontal asymptote, if any, of the graph of the rational function.

12) $f(x) = \dfrac{-10x}{2x^3 + x^2 + 1}$ 12) _____

A) $y = -5$
B) $y = -\dfrac{1}{5}$
C) $y = 0$
D) no horizontal asymptote

SHORT ANSWER SECTION. (5 pts each) WRITE THE ANSWER IN THE BOX. Write the FINAL ANSWER ONLY (do NOT write any work). No work will be graded. No partial credit.

Determine whether the given quadratic function has a minimum value or maximum value. Then find the coordinates of the minimum or maximum point.

13) $f(x) = -4x^2 + 4x$ 13) _____

Write either the word MAXMIMUM or MINIMUM. And write the x and y coordinate of the point.

Divide using synthetic division.

14) $\dfrac{x^4 + 3x^3 + x^2 + 4x + 3}{x + 1}$ 14) _____

Write the QUOTIENT and the REMAINDER only:

Find the requested polynomial.

15) Find a polynomial function of degree 3 with $-2, 3, 5$ as zeros. 15) _____

Write the final answer only:

Find the horizontal asymptote, if any, of the rational function.

16) $f(x) = \dfrac{x^2 + 3x + 7}{4 - x^2}$ 16) _____

Write the final answer only:

ESSAY. (10 pts each) Show all work to justify your answer. Answer with no work or insufficient work will receive no credit. Partial credit may be given.

Find the vertical asymptote(s) of the graph of the given function.

17) $f(x) = \dfrac{x^2 + 4x}{x^2 - 2x - 24}$

Write the final answer only:

Solve the problem.

18) Solve the equation $3x^3 - 29x^2 + 78x - 40 = 0$ given that 5 is a zero of $f(x) = 3x^3 - 29x^2 + 78x - 40$.

Show all work:

Answer Key
Testname: 1314-PRACTICETEST3-FALL19-WITHKEY

1) A
2) B
3) B
4) B
5) A
6) D
7) D
8) C
9) C
10) B
11) A
12) C
13) maximum; $\left(\frac{1}{2}, 1\right)$
14) $x^3 + 2x^2 - x + 5 - \frac{2}{x+1}$
15) $f(x) = x^3 - 6x^2 - 1x + 30$
16) $y = -1$
17) $x = 6$
18) $\left\{5, 4, \frac{2}{3}\right\}$