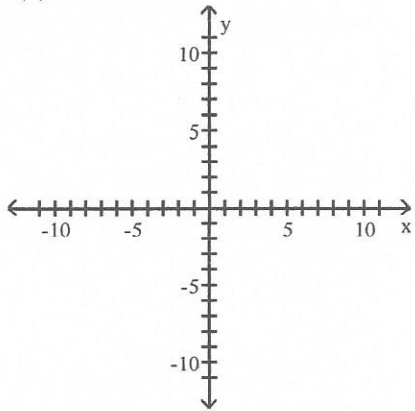


MATH 115
Test 3 Review

Graph the function using its vertex, axis of symmetry, and intercepts. Clearly state each one.

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

1) _____



Vertex: _____ Axis of symmetry: _____ x-intercept(s): _____ y-intercept: _____

Determine the domain and the range of the function in interval notation.

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

2) _____

Domain: _____ Range: _____

Determine where the function is increasing and where it is decreasing using interval notation. Use open intervals.

3) $f(x) = -x^2 - 2x + 8$

3) _____

Increasing: _____ Decreasing: _____

Solve the problem using your calculator.

4) A projectile is thrown upward so that its distance above the ground after t seconds is $h = -10t^2 + 440t$, where h is in feet. After how many seconds does it reach its maximum height? What is the maximum height?

4) _____

Solve the problem algebraically.

5) A projectile is thrown upward so that its distance above the ground after t seconds is $h = -11t^2 + 418t$, where h is in feet. After how many seconds does it reach its maximum height? What is the maximum height?

5) _____

Use synthetic division to find the quotient and the remainder.

6) $x^3 - x^2 + 4$ is divided by $x + 2$

6) _____

7) $x^5 + x^3 + 3$ is divided by $x + 3$

7) _____

8) $x^4 + 256$ is divided by $x - 4$

8) _____

Use synthetic division to determine whether $x - c$ is a factor of the given polynomial.

9) $x^3 + 11x^2 + 24x - 36; x - 2$

9) _____

10) $x^3 - 4x^2 - 31x + 70; x + 5$

10) _____

Use the Remainder Theorem to find the remainder when $f(x)$ is divided by $x - c$.

11) $f(x) = x^4 + 8x^3 + 12x^2; x + 1$

11) _____

Use the Factor Theorem to determine whether $x - c$ is a factor of $f(x)$.

12) $f(x) = x^3 + 2x^2 - 6x + 8; x + 4$

12) _____

Use the given zeros to factor the following polynomials.

13) $P(x) = x^3 - 4x^2 - 36x + 144$; Zero of -6

13) _____

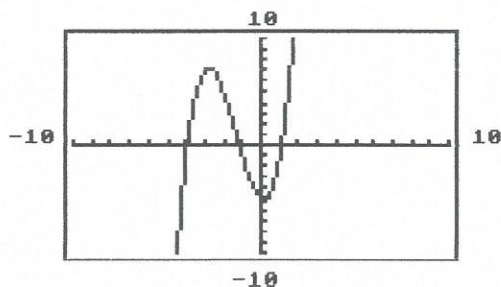
14) $P(x) = x^3 + 7x^2 - 3x - 21$; Zero of -7

14) _____

Find the equation that the given graph represents and give the domain, range, and interval(s) over which the function is increasing and decreasing.

15)

15) _____



A) $P(x) = x^3 + x^2 + x + 5$;
 domain: $(-\infty, \infty)$; range: $(-\infty, \infty)$;
 Increasing over $(-\infty, -4.12]$ and $[1.45, \infty)$;
 Decreasing over $[-4.12, 1.45]$

B) $P(x) = -x^3 + 4x^2 + x - 5$;
 domain: $(-\infty, \infty)$; range: $(-\infty, \infty)$;
 Increasing over $(-\infty, .16]$;
 Decreasing over $[-2.86, \infty)$

C) $P(x) = x^3 + 4x^2 - x - 5$;
 domain: $(-\infty, \infty)$; range: $(-\infty, \infty)$;
 Increasing over $(-\infty, -2.86]$ and $[-.16, \infty)$;
 Decreasing over $[-2.86, -.16]$

D) $P(x) = x^5 + 4x^3 - x^2 + 3x - 5$;
 domain: $(-\infty, \infty)$; range: $(-\infty, \infty)$;
 Increasing over $(-\infty, 2.86]$;
 Decreasing over $[2.86, .16]$ and $[-.16, \infty)$

16) Simple Interest varies jointly as principal and time. If \$1000 invested for 2 yr earned \$70, find the amount of interest earned by \$5000 for 5 yr.

16) _____

Find all intercepts and any asymptotes of the rational function.

17) $f(x) = \frac{x - 14}{3x - 5}$

17) _____

x-intercept (s): _____ y-intercept: _____ Horizontal Asymptote: _____
 Vertical Asymptote(s): _____

18) $f(x) = \frac{x^2 - 36}{3 + x^4}$

18) _____

x-intercept(s): _____ y-intercept: _____ Horizontal Asymptote: _____
 Vertical Asymptote(s): _____

Find the vertical asymptotes and the domain (interval notation) of the rational function.

19) $g(x) = \frac{8x}{x - 6}$

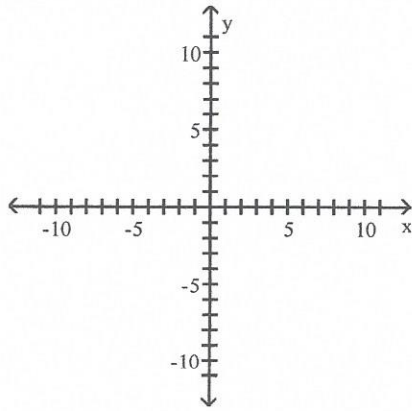
19) _____

Vertical Asymptote(s): _____ Domain: _____

Graph the function.

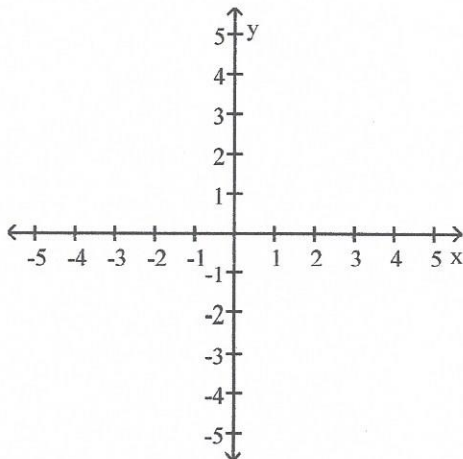
20) $f(x) = x + \frac{1}{x}$

20) _____



21) **Find the polynomial with the least possible degree.**

21) _____



22) **The resistance in ohms of a platinum wire temperature sensor varies directly as the temperature in kelvins (K). If the resistance is 646 ohms at a temperature of 190K, find the resistance at a temperature of 250 K.**

22) _____

23) In a certain manufacturing process, the cost of producing a single item varies inversely as the square of the number of items produced. One hundred items are produced with each item costing \$2. Find the cost per item if 400 items are produced. 23) _____

24) Determine the largest open intervals over the domain where the graph $f(x) = x^3 - 4x^2 + x + 1$ is (a) increasing or (b) decreasing. Round to two decimal places as needed. Give final answers in interval notation. 24) _____

Increasing: _____ Decreasing: _____