Pre- Calculus
Practice Test

Ch 2

Name Key

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

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

1) $f(x) = 5x^2 - 10x$ 1) D

$x = \frac{-b}{2a} = \frac{-(-10)}{2(5)} = 1$

A) maximum; $(1, -5)$ B) maximum; $(-1, -5)$
C) minimum; $(-1, -5)$ D) minimum; $(1, -5)$

Find the coordinates of the vertex for the parabola defined by the given quadratic function.

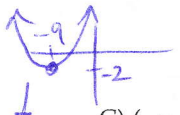
2) $f(x) = -x^2 + 10x - 2$ 2) A

$x = \frac{-b}{2a} = \frac{-(10)}{2(-1)} = 5$

A) (5, 23) B) (−5, −27) C) (−5, −77) D) (10, −2)

Find the range of the quadratic function.

3) $f(x) = (x + 9)^2 - 2$ 3) D



A) $[-9, \infty)$ B) $(-\infty, -2]$ C) $(-\infty, -9]$ D) $[-2, \infty)$

$a(x-h)^2+k \quad V:(h,k) \rightarrow (-9,-2)$

4) $f(x) = 11(x - 3)^2 + 5$ 4) A

A) $[5, \infty)$ $V(h,k) \rightarrow (3,5)$ B) $[-5, \infty)$ C) $(-\infty, 5]$ D) $[3, \infty)$

Find the x-intercepts (if any) for the graph of the quadratic function.

5) $f(x) = 2x^2 + 10x - 48$ 5) A

$2(x^2+5x-24)$
$2(x+8)(x-3)$
$x = -8, 3$

A) (3, 0) and (−8, 0) B) (−3, 0) and (8, 0)
C) (−3, 0) and (−8, 0) D) (3, 0) and (8, 0)

6) $f(x) = x^2 + 14x + 35$ Give your answers in exact form. 6) A

$x = \frac{-14 \pm \sqrt{14^2 - 4(1)(35)}}{2(1)}$

A) $(-7 \pm \sqrt{14}, 0)$ B) $(7 + \sqrt{14}, 0)$ C) $(7 \pm \sqrt{35}, 0)$ D) $(-14 \pm \sqrt{35}, 0)$

$= \frac{-14 \pm \sqrt{196 - 140}}{2} = \frac{-14 \pm \sqrt{56}}{2} = \frac{-14 \pm 2\sqrt{14}}{2} = -7 \pm \sqrt{14}$

Find the y-intercept for the graph of the quadratic function.

7) $f(x) = x^2 + 5x - 6$ 7) C

A) (0, 6) B) (0, 5) C) (0, −6) D) (0, 3)

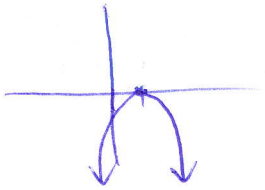
8) $f(x) = -x^2 + 2x + 3$ 8) D

A) (0, −3) B) (3, 0) C) (0, −1) D) (0, 3)

Find the domain and range of the quadratic function whose graph is described.

9) The vertex is (1, 0) and the graph opens down. 9) D

A) Domain: $(-\infty, \infty)$
Range: $[0, \infty)$
B) Domain: $(-\infty, 1]$
Range: $(-\infty, 0]$
C) Domain: $(-\infty, \infty)$
Range: $(-\infty, 1]$
D) Domain: $(-\infty, \infty)$
Range: $(-\infty, 0]$



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

10) $f(x) = 2x^4 - 3x^3 + 3x^2 + 5x - 2$ 10) C

A) falls to the left and falls to the right
B) falls to the left and rises to the right
C) rises to the left and rises to the right
D) rises to the left and falls to the right

11) $f(x) = x^3 + 2x^2 - 4x - 2$ 11) C

A) rises to the left and falls to the right
B) rises to the left and rises to the right
C) falls to the left and rises to the right
D) falls to the left and falls to the right

Find the zeros of the polynomial function.

12) $f(x) = x^3 + x^2 - 6x$ 12) C

$x(x^2+x-6)$

A) $x = -3, x = 2$
B) $x = 0, x = 1, x = 2$
C) $x = 0, x = -3, x = 2$
D) $x = 1, x = 2$

$x(x+3)(x-2)=0$

$x=0,-3,2$

13) $f(x) = x^3 - 5x^2 - 4x + 20$ 13) A

$x^2(x-5)-4(x-5)$

A) $x = 5, x = -2, x = 2$
B) $x = -2, x = 2$
C) $x = -5, x = -2, x = 2$
D) $x = 5, x = 4$

$(x^2-4)(x-5)$

$x=2,-2,5$

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.

14) $f(x) = 5(x + 1)(x + 4)^3$ 14) A

$x=-1,-4$

A) -1, multiplicity 1, crosses x-axis; -4, multiplicity 3, crosses x-axis
B) -1, multiplicity 1, crosses x-axis; -4, multiplicity 3, touches x-axis and turns around
C) 1, multiplicity 1, touches x-axis; 4, multiplicity 3, touches x-axis and turns around
D) 1, multiplicity 1, crosses x-axis; 4, multiplicity 3, crosses x-axis

15) $f(x) = 3(x^2 + 1)(x - 2)^2$ 15) C

$x=2$

A) 2, multiplicity 2, crosses the x-axis
B) -1, multiplicity 1, crosses the x-axis; 2, multiplicity 2, touches the x-axis and turns around.
C) 2, multiplicity 2, touches the x-axis and turns around
D) -1, multiplicity 1, crosses the x-axis; 2, multiplicity 2, crosses the x-axis

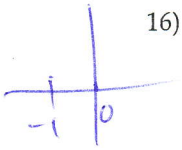
Use the Intermediate Value Theorem to determine whether the polynomial function has a real zero between the given integers.

16) $f(x) = -4x^4 - 2x^2 + 4$; between -1 and 0 16) D

$f(-1) = -4(-1)^4 - 2(-1)^2 + 4 = -4 - 2 + 4 = -2$

A) $f(-1) = 2$ and $f(0) = -4$; yes
B) $f(-1) = 2$ and $f(0) = 5$; no
C) $f(-1) = -2$ and $f(0) = -4$; no
D) $f(-1) = -2$ and $f(0) = 4$; yes

$f(0) = 4$



Determine the maximum possible number of turning points for the graph of the function.

17) $f(x) = 9x^8 - 4x^7 - 5x - 18$ 17) D

turns = n - 1 (n = degree)

A) 9
B) 8
C) 0
D) 7

Solve the problem.

18) Solve the equation $3x^3 - 32x^2 + 73x + 28 = 0$ given that 4 is a zero of $f(x) = 3x^3 - 32x^2 + 73x + 28$. 18) B

A) $\left\{4, 1, -\frac{7}{3}\right\}$
B) $\left\{4, 7, -\frac{1}{3}\right\}$
C) $\left\{4, -7, \frac{1}{3}\right\}$
D) $\left\{4, -1, \frac{7}{3}\right\}$

4	3	-32	73	28
		12	-80	-28
	3	-20	-7	0

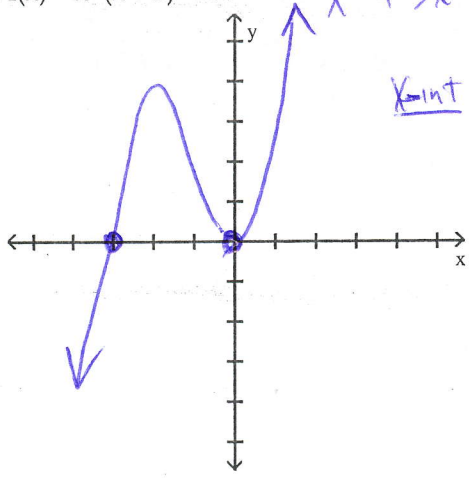
$3x^2 - 20x - 7 = 0$

$(3x + 1)(x - 7) = 0$ $\quad x = -\frac{1}{3}, 7$

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Complete the following:
(a) Use the Leading Coefficient Test to determine the graph's end behavior.
(b) Find the x-intercepts. State whether the graph crosses the x-axis or touches the x-axis and turns around at each intercept.
(c) Find the y-intercept.
(d) Graph the function.

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



$x^3 + 3x^2$

x-int $x^2(x+3) = 0$
$x = 0, -3$

y-int
$f(0) = 0^2(0+3) = 0$

19) _____

a) falls left, rises right
b) (0,0) touches
(-3,0) crosses
c) (0,0)
d) see left

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

Divide using long division.

20) $\dfrac{x^4 + 3x^3 + 6x^2 + 5x + 9}{x^2 + 2x + 3}$

$x^2 + 2x + 3 \overline{)\, x^4 + 3x^3 + 6x^2 + 5x + 9}$
$(-)\ x^4 + 2x^3 + 3x^2$
$x^3 + 3x^2 + 5x$
$(-)\ x^3 + 2x^2 + 3x$
$x^2 + 2x + 9$
$(-)\ x^2 + 2x + 3$
6

A) $x^2 + x + 1 + \dfrac{6}{x^2 + 2x + 3}$

B) $x^2 + 4x + 17$

C) $x^2 + x + 1$

D) $x^2 + 4x + 17 + \dfrac{49x + 48}{x^2 + 2x + 3}$

20) A

21) $\dfrac{8m^4 + 12m^3 - 2m}{2m^2 + m}$

$2m^2 + m \overline{)\, 8m^4 + 12m^3 + 0m^2 - 2m}$
$(-)\ 8m^4 + 4m^3$
$8m^3 + 0m^2$
$(-)\ 8m^3 + 4m^2$
$-4m^2 - 2m$
$(-)\ -4m^2 - 2m$
0

A) $4m^2 + 8m + 4 + \dfrac{2m}{2m^2 + m}$

B) $4m^2 + 6m - \dfrac{2m}{2m^2 + m}$

C) $4m^2 + 4m - \dfrac{6m}{2m^2 + m}$

D) $4m^2 + 4m - 2$

21) D

Divide using synthetic division.

22) $\dfrac{-4x^3 - 16x^2 + 18x - 10}{x + 5}$

$-5 \mid -4 \quad -16 \quad 18 \quad -10$
$\qquad\quad 20 \quad -20 \quad 10$
$\qquad -4 \quad 4 \quad -2 \quad \mid 0$

A) $4x^2 - 5x - 2$

B) $-4x^2 + 4x - 2$

C) $-\frac{4}{5}x^2 - \frac{16}{5}x + \frac{18}{5}$

D) $-4x^2 x - \frac{16}{5} - 2$

22) B

Use synthetic division and the Remainder Theorem to find the indicated function value.

23) $f(x) = 3x^3 - 5x^2 - 4x + 2$; $f(-2)$ 23) D

A) −50 B) −14 C) −4 D) −34

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

24) n = 3; −2 and −3 + 2i are zeros; leading coefficient is 1 24) D

A) $f(x) = x^3 - 4x^2 + 25x + 26$ B) $f(x) = x^3 + 5x^2 + 25x - 14$

C) $f(x) = x^3 + 8x^2 + 15x + 26$ D) $f(x) = x^3 + 8x^2 + 25x + 26$

Use Descartes's Rule of Signs to determine the possible number of positive and negative real zeros for the given function.

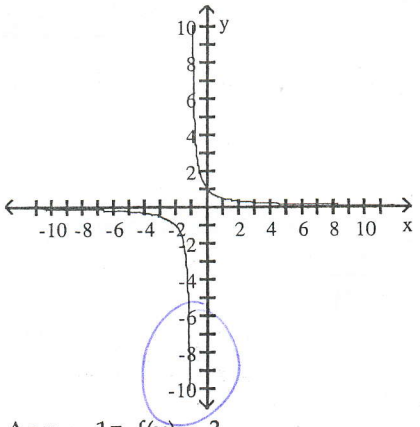
25) $f(x) = x^7 + x^6 + x^2 + x + 2$ 25) C

A) 0 positive zeros, 0 negative zeros B) 0 positive zeros, 1 negative zero

C) 0 positive zeros, 3 or 1 negative zeros D) 0 positive zeros, 2 or 0 negative zeros

Use the graph of the rational function shown to complete the statement.

26) 26) B



As $x \to -1^-$, $f(x) \to$?

A) $+\infty$ B) $-\infty$ C) 1 D) 0

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

27) $g(x) = \dfrac{x}{x^2 - 25}$ 27) B

A) x = 5 B) x = 5, x = −5

C) x = 5, x = −5, x = 0 D) no vertical asymptote

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

28) $g(x) = \dfrac{4x^2 - 2x - 8}{6x^2 - 7x + 5}$ 28) C

A) $y = \dfrac{2}{7}$ B) y = 0

C) $y = \dfrac{2}{3}$ D) no horizontal asymptote

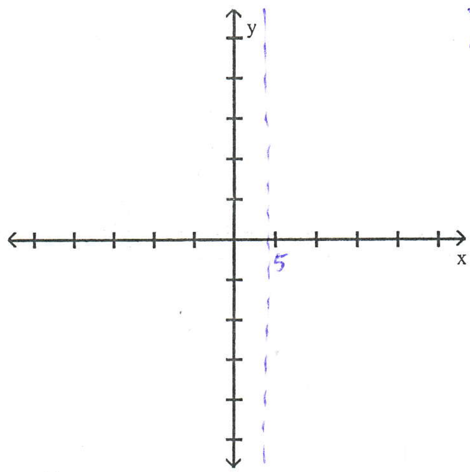
Find the slant asymptote, if any, of the graph of the rational function.

29) $f(x) = \dfrac{x^2 + 9x - 3}{x - 5}$ 29) C

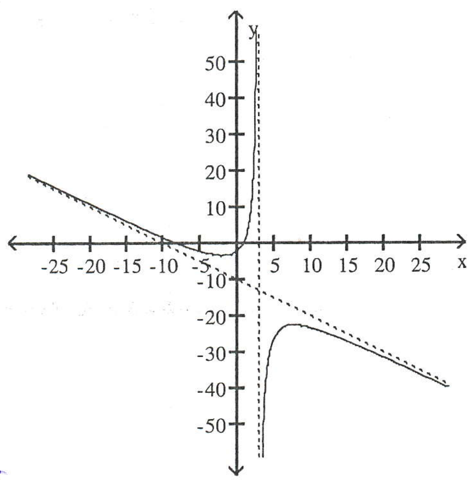
A) $y = x$
B) $y = x + 9$
C) $y = x + 14$
D) no slant asymptote

Graph the function.

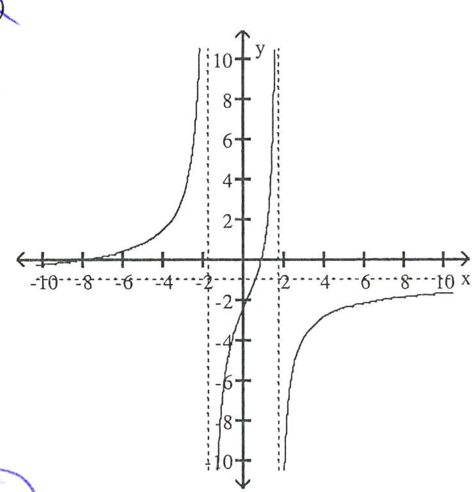
30) $f(x) = \dfrac{x^2 + 7x - 7}{x - 3}$ 30) D



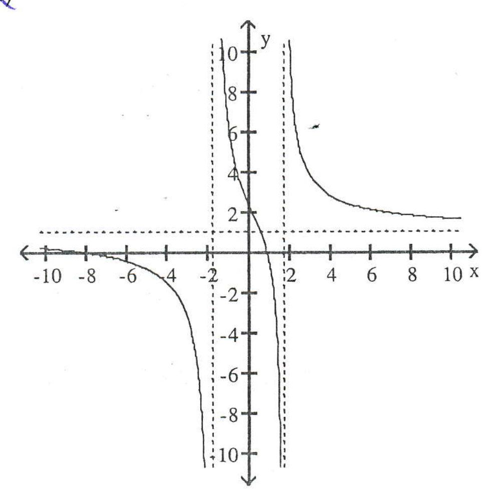
A)



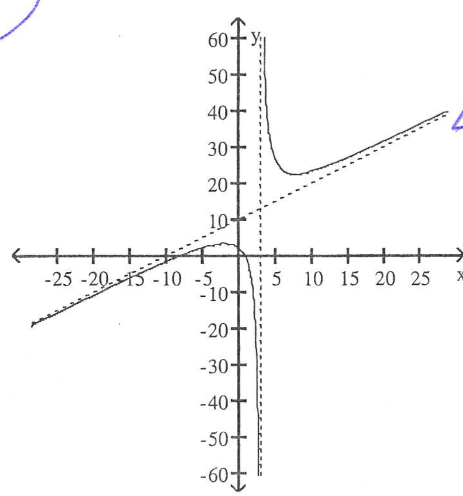
B)



C)



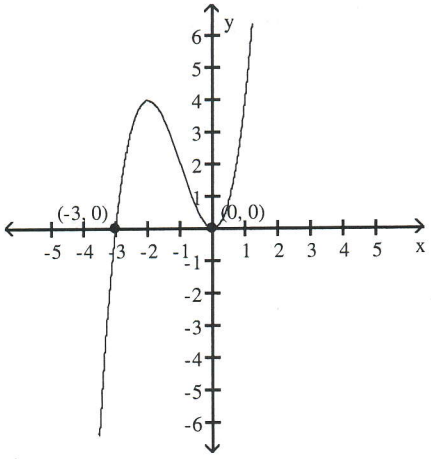
D)



Answer Key
Testname: CH 2 TEST

Pre-Calculus
Practice Test

1) D
2) A
3) D
4) A
5) A
6) A
7) C
8) D
9) D
10) C
11) C
12) C
13) A
14) A
15) C
16) D
17) D
18) B
19) (a) falls to the left and rises to the right
(b) x-intercepts: (0, 0), touches x-axis and turns; (-3, 0), crosses x-axis
(c) y-intercept: (0, 0)
(d)



20) A
21) D
22) B
23) D
24) D
25) C
26) B
27) B
28) C
29) C
30) D