TEST 2 REVIEW

- You are also responsible for understanding all homework, quizzes, collabs and lectures.
- The following problems will NOT be graded. Do NOT turn in these problems.

1. Apply the following transformations to the function $y = \sqrt{x}$ in the order listed below. **At each step, write down the function and draw the graph**. In each graph, find and plot AT LEAST THREE KEY points. BE SURE TO SHOW THE OVERALL SHAPE OF THE GRAPH.

a) Shift down 4 units
b) Reflect about the x-axis
c) Shift right 2 units.

2. CAREFULLY draw the graph of the function. SHOW AT LEAST THREE KEY points. BE SURE TO SHOW THE OVERALL SHAPE OF THE GRAPH. Find the domain and range.

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

3.

Determine whether the given function is linear or nonlinear. If it is linear, determine the equation of the line.

x	y
−1	5
0	2
1	−1
2	−4
3	−7

4.

Suppose that the quantity supplied S and quantity demanded D of T-shirts at a concert are given by the following functions where p is the price.

$S(p) = -280 + 40p$
$D(p) = 800 - 50p$

(a) Find the equilibrium price (round to the nearest dollar) and the equilibrium quantity (round to the nreaest whole number).
(b) Determine the prices for which the quantity demanded is greater than the quantity supplied.
(c) What will eventually happen to the price in the above situation?

5.

Regrind, Inc. regrinds used typewriter platens. The variable cost per platen is $1.60. The total cost to regrind 110 platens is $300. Find the linear cost function to regrind platens. If reground platens sell for $ 9.50 each, how many must be reground and sold to break even?

6.

Find the zeros of the quadratic function by factoring. What are the x-intercepts of the graph of the function?

$$g(x) = 3x^2 - 10x - 8$$

7.

Find the zeros of each quadratic function by completing the square. What are the x-intercepts of the graph of the function?

$$F(x) = 6x^2 + x - \frac{1}{2}$$

8.

Find the zeros, if any, of the quadratic function using the quadratic formula. What are the x-intercepts, if any, of the graph of the function?

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

9.

What are the points of intersection of the graphs of the two functions?

$$f(x) = -5x^2 + 4$$
$$g(x) = 6x + 5$$

10.

A ball is thrown vertically upward from the top of a building 336 feet tall with an initial velocity of 64 feet per second. The distance s (in feet) of the ball from the ground after t seconds is $s(t) = 336 + 64t - 16t^2$.

(a) After how many seconds does the ball strike the ground?
(b) After how many seconds will the ball pass the top of the building on its way down?

11. Complete the square of the given quadratic expression. Find the vertex and intercepts in exact form and rounded to 2 decimal places. Then use these points to graph the function. Find the domain and range.

$$f(x) = 3x^2 + 6x + 2$$

12.

Suppose that the manufacturer of a gas clothes dryer has found that, when the unit price is p dollars, the revenue R (in dollars) is

$$R(p) = -8p^2 + 24{,}000p$$

What unit price should be established for the dryer to maximize revenue? What is the maximum revenue?

13.

Determine, without graphing, whether the given quadratic function has a maximum value or a minimum value and then find the value.

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

14. Find the complex zeros. Graph the function and label the vertex and intercepts: $f(x) = 2x^2 + 2x + 1$

15. Solve the absolute value inequality $|4t - 7| - 3 \leq 2$

16.

According to a particular test, a normal score is 100. It can be shown that anyone with a score x that satisifies the inequality $\left|\frac{x - 100}{14}\right| > 1.81$ has an unusual score. Determine the scores that would be considered unusual.

17.

Use the remainder theorem to find the remainder when f(x) is divided by x – 2.
Then use the factor theorem to determine whether x – 2 is a factor of f(x).

$f(x) = 3x^4 - 8x^3 + 9x - 2$

If $x - 2$ is a factor, write $f(x)$ in factored form.

18.

Tell the maximum number of zeros that the polynomial function may have. Then use Descartes' Rule of Signs to determine how many positive and how many negative real zeros the polynomial function may have. Do not attempt to find the zeros.

$f(x) = -5x^7 + x^3 - x^2 + 6$

19.

Use the rational zeros theorem to find all the real zeros of the polynomial function. Use the zeros to factor f over the real numbers.

$f(x) = x^3 + 5x^2 - 17x - 21$

20.

Use the rational zeros theorem to find all the real zeros of the polynomial function. Use the zeros to factor f over the real numbers.

$f(x) = x^4 + x^3 - 11x^2 - 9x + 18$

21.

Find the real solutions of the equation.

$$\left|\frac{x}{5}+\frac{3}{4}\right|=5$$

22.

Find the real solutions of the following equation.

$$3x^3+4x^2-7x+2=0$$

Answers.

Reminder: The following are just answers. ON TESTS, YOU ARE REQUIRED TO SHOW WORK.

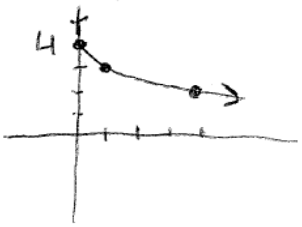
1.

a) $y=\sqrt{x}-4$

x	y
0	-4
1	-3
4	-2

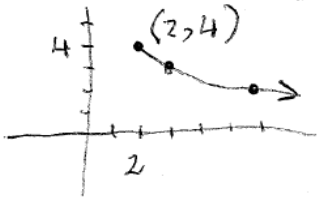
b) $y=-(\sqrt{x}-4)=-\sqrt{x}+4$

x	y
0	4
1	3
4	2



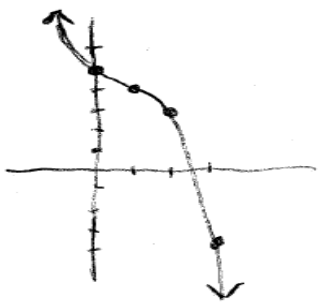
c) $y=-\sqrt{x-2}+4$

x	y
2	4
3	3
6	2



2.

x	y
0	5
1	4
2	3
3	-4



∴ Domain $=(-\infty,\infty)$

Range $=(-\infty,\infty)$

3.

The function is linear. The equation of the line is $y = -3x + 2$.

4. (a) \$12, 200 T-shirts (b) $0 \le p < 12$ (c) Price will increase

5.

$C(x) = 1.60x + 124$; 16 platens

6. $-\frac{2}{3}$, 4

7.

$$\frac{-1 \pm \sqrt{13}}{12}$$

8.

$$\frac{-1+\sqrt{7}}{4}, \frac{-1-\sqrt{7}}{4}$$

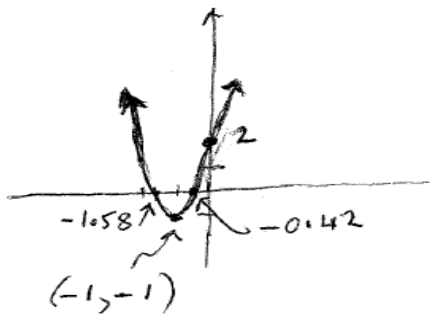
9.

$$\left(-\frac{1}{5}, \frac{19}{5}\right), (-1, -1)$$

10. 7 seconds, 4 seconds

11.

$f(x) = 3(x+1)^2 - 1$
vertex $= (-1, -1)$
y-intercept $= (0, 2)$
x-intercepts $= \left(-1 \pm \frac{\sqrt{3}}{3}\right)$
or $(-1.58, 0), (-0.42, 0)$
$D = (-\infty, \infty)$ $R = [-1, \infty)$

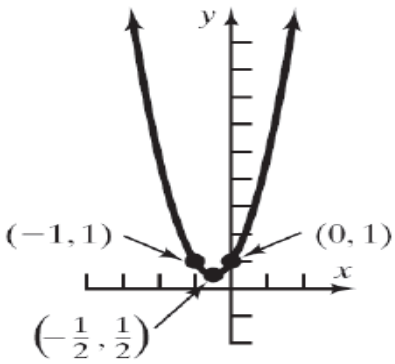


12. \$1,500, \$18,000,000

13. minimum, -7

14.

The zeros are $-\frac{1}{2}-\frac{1}{2}i$ and $-\frac{1}{2}+\frac{1}{2}i$



15.

$\left[\frac{1}{2},3\right]$

16.

Test scores less than 74.66 or greater than 125.34 would be considered unusual.

17. Remainder is 0. Therefore $x-2$ is a factor and $f(x)=(x-2)(3x^3-2x^2-4x+1)$

18 Maximum number of zeros: 7

Number of positive zeros: 3 or 1

Number of negative zeros: 2 or 0

19.

x = −7, −1, 3

f(x) = (x + 1)(x + 7)(x − 3)

20.

x = −2,1,3, −3

f(x) = (x + 2)(x − 1)(x + 3)(x − 3)

21.

$-\frac{115}{4},\frac{85}{4}$

22.

$\frac{2}{3},-1+\sqrt{2},-1-\sqrt{2}$