## Algebra II Chapter 5: 5.1-5.4 Test Review

## Test Review is due on the day of the test. Answers should be written on separate paper with graphs on graph paper. * calculator allowed

Evaluate the expression for the given value of the variable(s).

1. $|4 b-4|+\left|3-b^{2}\right|+2 b^{3} ; \quad b=2$
2. $-x^{2}-4 x-4$;
$x=-3$

Find the value of $\boldsymbol{y}$ for a given value of $\boldsymbol{x}$, if $\boldsymbol{y}$ varies directly with $\boldsymbol{x}$.
3. If $y=166$ when $x=83$, what is $y$ when $x=23$ ?
4. What is the vertex of the function $y=|-3 x+2|-4$ ?

Solve the system both the method of substitution and elimination.

$$
5 \cdot\left\{\begin{aligned}
-3 x-3 y+2 z & =-7 \\
z & =1 \\
-2 x-3 y+z & =-6
\end{aligned}\right.
$$

6. $\left\{\begin{array}{l}-4 x+4 y=-8 \\ x-4 y=-7\end{array}\right.$

Determine whether the function is linear or quadratic. Identify the quadratic, linear, and constant terms.
7. $y=(x+1)(6 x-6)-6 x^{2}$
8. $f(x)=(3 x+2)(-6 x-3)$

Find a quadratic model for the set of values.
*9. $(-2,8),(0,-4),(4,68)$
*10. $(-2,15),(0,-3),(4,33)$
Identify the vertex and the axis of symmetry of the parabola. Identify points corresponding to $P$ and $Q$.
11.

12.

13. Find the vertex of $y=-3 x^{2}-24 x-52$, then write in vertex form.
14. Find the vertex of $y=2 x^{2}+16 x+35$, then write in vertex form.
*15. Ralph's Jeans Outlet determines that the number of jeans it can sell each week is given by the formula $D=-3 p^{2}+180 p-285$, where $p$ is the price of the jeans in dollars.
a. At what price will Ralph's sell the maximum number of jeans?
b. What is the maximum number of jeans that can be sold?
16. Use vertex form to write the equation of the parabola

*Factor the expression.
18. $-15 x^{2}-21 x$
19. $8 x^{2}+12 x-16$
22. $3 x^{2}+26 x+35$
23. $5 x^{2}-22 x-15$
20. $x^{2}-6 x+8$
17. Use vertex form to write the equation of the parabola

24. $16 x^{2}+40 x+25$
21. $x^{2}-2 x-63$
$25.9 x^{2}-16$
*26. The table shows the number of copies of a book sold per 100,000 people in the United States for five selected years. The values in the first column are years since 1987, so $X=0$ corresponds to 1987, $x=3$ corresponds to 1990 , and so on.

| Years since <br> $1987(x)$ | Copies sold per 100,000 <br> people $(y)$ |
| :---: | :---: |
| 0 | 8.3 |
| 3 | 9.4 |
| 6 | 9.5 |
| 9 | 7.4 |
| 12 | 5.7 |

a. Use a graphing calculator to model the data with a quadratic function. Round the coefficients and constant term to four decimal places.
b. Graph the data and the quadratic function.

Using graph paper, graph the following equations. Identify the vertex, axis of symmetry, and the minimum or maximum value of the function.
27. $y=x^{2}+3 x+2$.
29. $y=-3 x^{2}+6 x+5$.
28. $y=3 x^{2}-12 x+13$.
31. Use the equation of $y=(x-3)^{2}+5$ write the new equation of the parabola if.....
a. you translate the parabola to the right 2 units and down 7 units, what is the equation of the new parabola in vertex form?
b. you translate the parabola to the left 2 units and up 7 units, what is the equation of the new parabola in vertex form?
*32. The distance $d$ in meters traveled by a skateboard on a ramp is related to the time traveled $t$ in seconds. This is modeled by the function: $d(t)=4.9 t^{2}-2.3 t+5$. What is the maximum distance the skateboard can travel, and at what time would it achieve this distance? Round your answers to the nearest hundredth.
*33. The table shows approximate fuel consumption in miles per gallon, given the tread height of the tire in mm . Find a quadratic model for the fuel consumption given the tread height. Use the model to estimate the fuel consumption for a car with a tread height of 15 mm .

| Fuel Consumption <br> (miles per gallon) | Tread Height <br> $(\mathbf{m m})$ |
| :---: | :---: |
| 37.48 | 2 |
| 40 | 5 |
| 40.28 | 12 |
| 31 | 20 |
| 14.48 | 27 |
| 5 | 30 |

*34. A biologist took a count of the number of migrating waterfowl at a particular lake, and recounted the lake's population of waterfowl on each of the next six weeks.

| Week | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Population | 585 | 582 | 629 | 726 | 873 | 1,070 | 1,317 |

a. Find a quadratic function that models the data as a function of $x$, the number of weeks.
b. Use the model to estimate the number of waterfowl at the lake on week 8 .
*35. Graph of $y=-2(x-2)^{2}-4$ ? Identify the vertex and the $y$-intercept.
Find the value of $\boldsymbol{c}$ for the quadratic equation having the given point:
36.

$$
y=2 x^{2}+c,(-1,5)
$$

37. 

$$
\begin{equation*}
y=x^{2}+c, \tag{4,10}
\end{equation*}
$$

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## Answer Section

1. 21
2. -1
3. 46
4. $\left(\begin{array}{l}2 \\ 3\end{array},-4\right)$
5. $(2,1,1)$
6. $(5,3)$

7 .linear function; 1 inear term: $0 x$; constant term: -6
8.q uadratic function; quadratic term: $-18 x^{2}$; linear term: $-21 x$; constant term: -6
9. $y=4 x^{2}+2 x-4$
10. $y=3 x^{2}-3 x-3$
11. $(-1,-2), x=-1 \quad ; P^{\prime}(0,-1), Q^{\prime}(-3,2)$
12. $(-3,1), x=-3 ; \quad P^{\prime}(-2,0), Q^{\prime}(-5,-3)$
13. $y=-3(x+4)^{2}-4$
14. $y=2(x+4)^{2}+3$
15. $\$ 30 ; 2,415$ jeans
16. $y=-2(x+3)^{2}+3$
17. $y=3(x-2)^{2}-4$
18. $-3 x(5 x+7)$
19. $-4\left(-2 x^{2}-3 x+4\right)$
20. $(x-2)(x-4)$
21. $(x-9)(x+7)$
22. $(3 x+5)(x+7)$
23. $(5 x+3)(x-5)$
24. $(4 x+5)^{2}$
25. $(3 x+4)(3 x-4)$
26.a. $y=-0.0619 x^{2}+0.5029 x+8.3857$
b.

27.

vertex: $\left(-\frac{3}{2},-\frac{1}{4}\right)$, axis of symmetry: $x=-\frac{3}{2}$
28.
 minimum: 1
29.

maximum value; 8
30.


Minimum value; 5
31.
a. $\quad y=(x-5)^{2}-2$
b. $\quad y=(x-1)^{2}+12$
c. left 4 units, up 14 units
32. 4.73 meters at 0.23 seconds The maximum distance is about 4.73 meters at 0.23 seconds.
33. $F=-0.08 t^{2}+1.4 t+35 ; 38$ miles per gallon
34. $P(x)=25 x^{2}-28 x+585 ; 1,961$ waterfowl
35.


Vertex: $(2,-4) ; \quad b=-12$
36. $\mathrm{c}=3$
37. $\mathrm{c}=-6$

