NAME:_____   DATE:_____

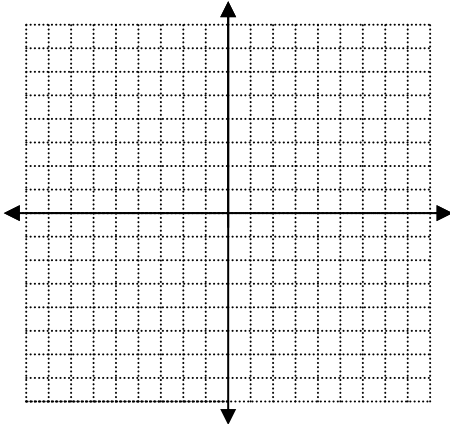# SEMESTER 1   REVIEW

Unit 1: Intro to Pre-Calc

1.   Linear Functions

Slope Intercept Form	Standard Form	Point Slope Form
a. Write the equation of the line in slope intercept form that is perpendicular to $y = 2x - 5$ and contains (-50,10)	b. Graph $3x + 2y = 10$	c. Write the equation of the line in point slope form that contains the points (-50,-49) and (35,53)

2.   Regression (Best Fit Line/Curve)
The following table gives the number of motor vehicle thefts (in thousands) in the U.S. for the years 1983 - 1993. $x = 1$ represents 1983. Use the regression capabilities of your calculator to fit a cubic model to this data.

Year	1	3	4	7	8	9	10	11
Vehicle Thefts	1008	1103	1224	1565	1636	1662	1611	1561

a. Graph the data with a friendly window. Record here ────────────→

TI-84 Plus Silver Edition
TEXAS INSTRUMENTS

```
WINDOW
Xmin=
Xmax=
Xscl=
Ymin=
Ymax=
Yscl=
Xres=1
```
STAT PLOT F1 TBLSET F2 FORMAT F3 CALC F4 TABLE F5
Y=   WINDOW   ZOOM   TRACE   GRAPH

b. Use regression and write the equation of your model.
(Round to three decimal places)
$$V(t) =$$

c. What does $V(5.5)$ mean? Find it.

d.   Find the time(s) in which there will be 1400 thousand auto thefts.

e. What does the y-intercept mean in this situation?

f. Predict the auto thefts in 1995.
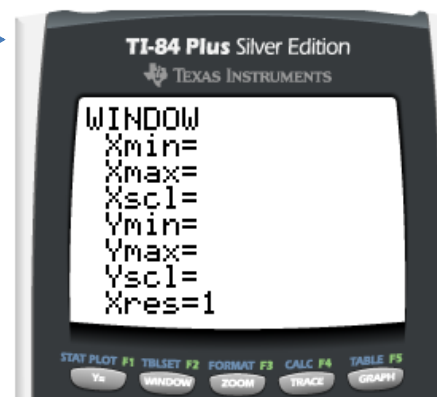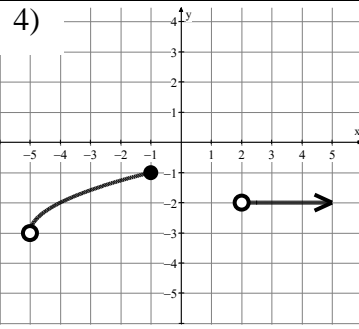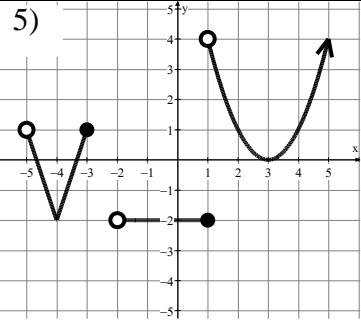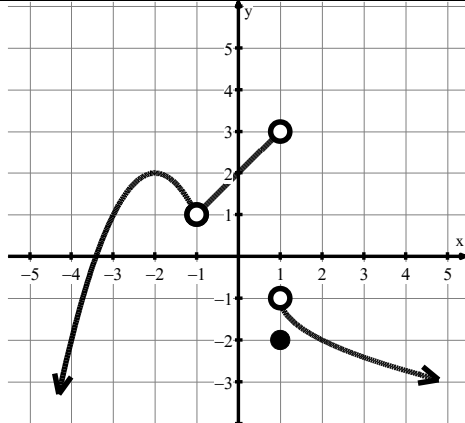
3.   Factoring Basics: Solve the following by factoring.

a. $x^2 - 9x = 0$

b. $x^2 - 9x - 112 = 0$

c. $2x^2 - 17x = -35$

Unit 2: Functions and Limits

For 4-5, identify the domain and range of each function. Use both interval notation and inequality notation.

4)

Domain:
Interval: _____

Inequality: _____

Range:
Interval: _____

Inequality: _____

5)

Domain:
Interval: _____

Inequality: _____

Range:
Interval: _____

Inequality: _____

6) Using the graph on the right, give the value of each statement.

a. $\lim\limits_{x \to 1^-} f(x) =$

b. $f(-1) =$

c. $\lim\limits_{x \to -1} f(x) =$

d. $\lim\limits_{x \to -2} f(x) =$

e. $f(1) =$

f. $\lim\limits_{x \to 1^+} f(x) =$

For questions 7-14, refer to the graph of $f(x)$

7. State the intervals where $f(x)$ is continuous.

8. State the values of x where the function is discontinuous and label them as removable or non-removable discontinuities.

9. $\lim\limits_{x \to 0} f(x) =$

10. $\lim\limits_{x \to 2^+} f(x) =$

11. $\lim\limits_{x \to 2^-} f(x) =$

12. $\lim\limits_{x \to 2} f(x) =$

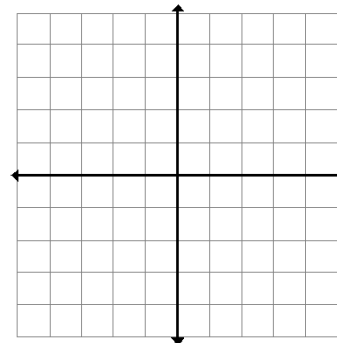13. $f(0) =$

14. $\lim\limits_{x \to -2} f(x) =$
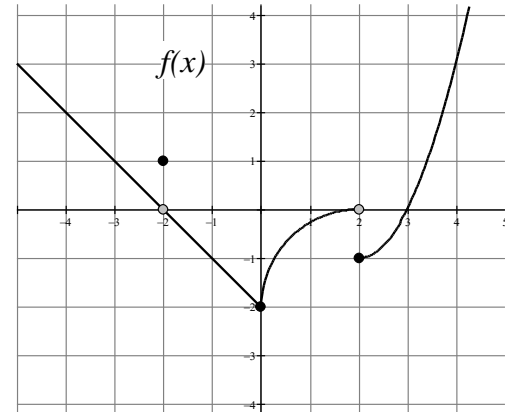
For 15-16, graph the function and determine if it has points of discontinuity. If there is a discontinuity, tell what type of discontinuity it is and its x-value. Clearly mark all asymptotes with a dotted line.

15. $f(x) = \dfrac{2}{x}$
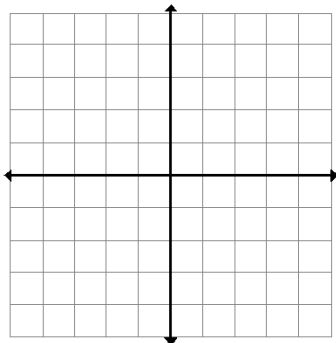
16. $f(x) = \dfrac{x}{x^2 - 4}$

Unit 3: Function Analysis

For 17-19, find the <u>domain</u> of the given function. Use interval notation.

17. $f(x) = \sqrt{10-x}$

18. $f(x) = \dfrac{x}{x-5}$

19. $f(x) = \dfrac{\sqrt{x-2}}{(x+7)(x-8)}$

For 20-21, find the <u>range</u> of the function. Use interval notation.
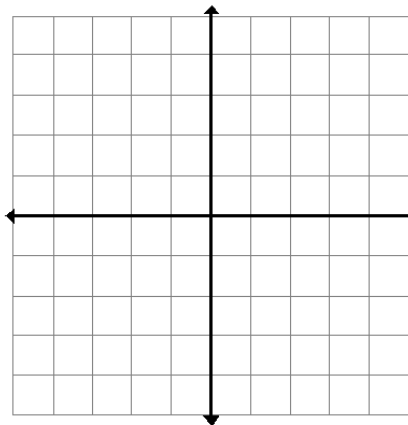
20. $f(x) = (x-4)^2 + 4$

21. $f(x) = \sqrt{9+x}$

22. Sketch the piecewise function $f(x) = \begin{cases} x^3 - 1 & x \le 0 \\ \sqrt{x}+1 & x > 0 \end{cases}$
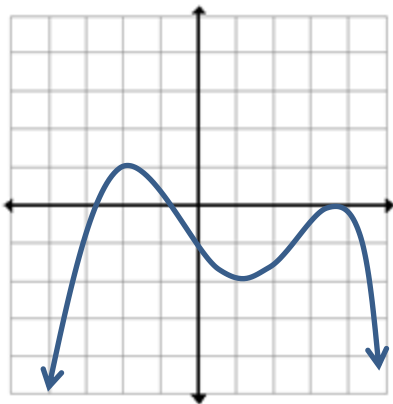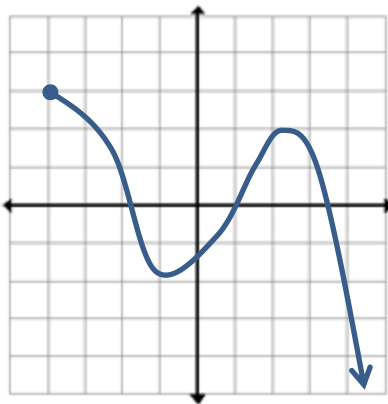

    a. $f(2) =$

    b. $f(-2) =$

    c. $f(0) =$
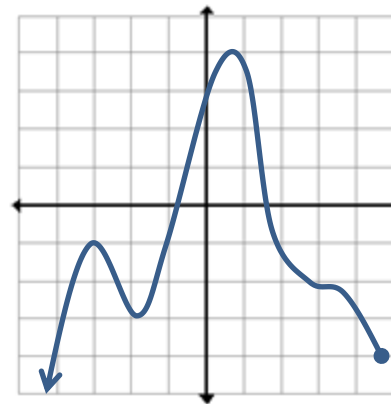
23. Label all local and absolute maximums and minimums.

a.

b.

c.

Unit 4: Function Algebra

24. $f(x) = 3x + 11$ and $g(x) = 5x - 1$

$f \cdot g =$

25. $f(x) = 4x^2 + 2x + 3; \ \ g(x) = 2x - 4$

$f \circ g =$

$\dfrac{f}{g} =$

For 26, confirm that f and g are inverses by showing the $f(g(x)) = x$

26. $f(x) = 2x + 9$ and $g(x) = \dfrac{x-9}{2}$

For 27-32, if $f(x) = 2x - 5$ and the $g(x) = x^2 + 2x - 3$, find the following...

27. $f(2)$	28. $g(-2)$	29. $f(g(0))$
30. $f - g$	31. $f(x + h)$	32. $(f + g)(2)$

33. Is $f(x) = \dfrac{x+1}{x^2-1}$ even, odd, or neither. Justify your answer!
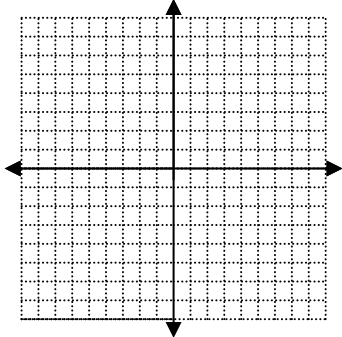
Transformations

| 34. $y = 2(x - 5)^3 - 4$	35. $f(x) = -|3x + 6| + 5$	36. $y = \sqrt{-x} + 3$
Name function:_____	Name function:_____	Name function:_____
Translation:	Translation:	Translation:
Scale:	Scale:	Scale:
Reflection:	Reflection:	Reflection:
SKETCH GRAPH!	SKETCH GRAPH!	SKETCH GRAPH!
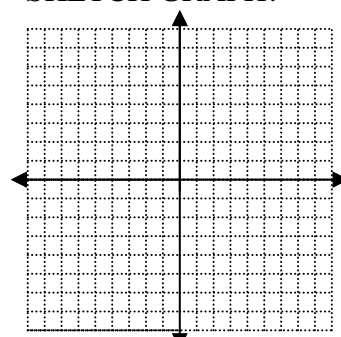
Unit 5: Polynomials

Graph on your calculator to solve the following.

37. $0 = x^4 + 2x^2 - 3x - 1$

38. $3x^6 - 2x^5 = 8 - 3x^2$

39. Use the graph of the function to determine at least one zero, then find the exact values of all the zeros using the Factor Theorem. $f(x) = 7x^4 + 20x^3 - 24x^2 - 60x + 9$
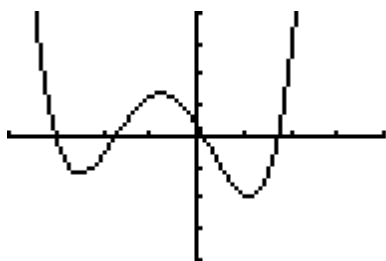

```
WINDOW
 Xmin=-4
 Xmax=4
 Xscl=1
 Ymin=-100
 Ymax=100
 Yscl=25
↓Xres=1
```

40. Factor the following.

a. $6x^2 + 13xy - 5y^2$

b. $5x^3 - 30x^2 - 8x + 48$

c. $216 + x^3$

41. Factor to solve the following.

a. $4x^4 + 64x = 0$

b. $x^3 - 6x^2 + 8x = 0$

c. $x^4 - 11x^2 = -30$