Name _____
Period _____ Date _____

Curve Sketching Review Worksheet

I. Sketch the following curves, indicating maximum and minimum points and points of inflection. Show all work and graph on a separate graph paper. *Use graphing calculator only to check your work!*

1. $y = 6 - 2x - x^2$

2. $y = 12 - 12x + x^3$

3. $y = x^3 - 3x^2 + 4$

For #3:

Derivative: _____

Increasing on (_____, _____) , (_____ , _____)

Decreasing on (_____, _____)

Relative maximum at (_____, _____)

Relative minimum at (_____, _____)

Second derivative: _____

Concave Up on (_____, _____)

Concave Down on (_____, _____)

Point of Inflection at (_____, _____)

II. Sketch a smooth curve illustrating the following characteristics or properties:

4. If y is a function of x such that $y' > 0$ for all x and $y'' < 0$ for all x, sketch the curve.

5. Sketch $y = f(x)$, given that

$f(1) = 0$

$f'(x) < 0 \quad for\ x < 1$

$f'(x) > 0 \quad for\ x > 1$

6. Sketch $y = f(x)$, given that

$f(1) = -2$

$f''(x) < 0 \quad for\ x < 1$

$f''(x) > 0 \quad for\ x > 1$

7. Sketch $y = f(x)$, given that

$f(-2) = 8$

$f(0) = 4$

$f(2) = 0$

$f''(x) > 0 \quad for\ x > 0$

$f'(2) = f'(-2) = 0$

$f'(x) < 0 \quad for \quad |x| < 2$

$f''(x) < 0 \quad for \quad x < 0$

$f'(x) > 0 \quad for \quad |x| > 2$

8. Sketch the function which is
   Increasing on $(-\infty,0)$ and $(2,\infty)$
   Decreasing on $(0,2)$
   Concave up on $(1,\infty)$
   Concave down on $(-\infty,1)$
   Relative maximum at $(0,4)$
   Relative minimum at $(2,0)$
   Point of inflection at $(1,1)$

9. Sketch the curve with
   y-axis symmetry
   horizontal asymptote: $y = 0$
   vertical asymptotes: $x = -2$, $x = 2$
   increasing on $(0,2)$ and $(2,\infty)$
   decreasing on $(-\infty,-2)$ and $(-2,0)$
   concave up on $(-2,2)$
   concave down on $(-\infty,-2)$ and $(2,\infty)$
   $f(0) = 2$

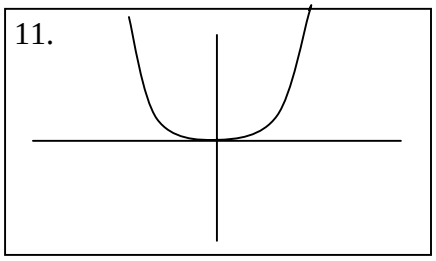
10. Sketch the curve which is
    Increasing on $(-\infty,0)$ and $(1,\infty)$
    Decreasing on $(0,1)$
    Tangent with undefined slope at the origin
    Horizontal tangent at $(1,-1)$
    Concave up for all x except $x = 0$
    No concavity at (0,0)

Use the Graphing Calculator and substitute values for *a*, *b*, *c*, *d*, and *e* in the equation

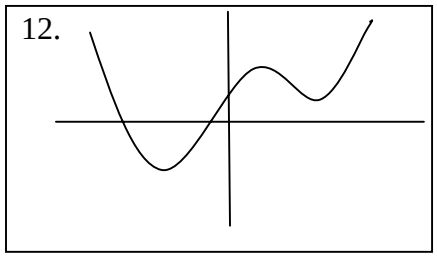
$$y = ax^4 + bx^3 + cx^2 + dx + e$$

to get each of the three types of curves illustrated.

11.



12.



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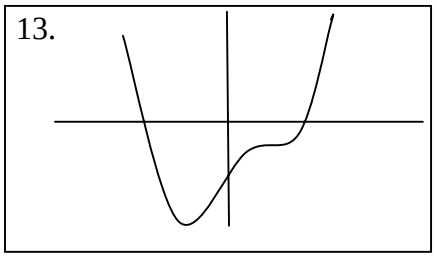

11. *a* = _____ *b* = _____ *c* = _____ *d* = _____ *e* = _____

12. *a* = _____ *b* = _____ *c* = _____ *d* = _____ *e* = _____

13. *a* = _____ *b* = _____ *c* = _____ *d* = _____ *e* = _____