

Name: _____ ID #: _____

NO CALCULATORS

1. [20 points] [Precalculus] Do the following graphs. Label all intercepts.

a. $y = (x - 1)^3$, $x \in [-2, 2]$

b. $y = 3 \sin(2x)$, $x \in [0, 2\pi]$

c. $y = \frac{1}{x + 1}$, $x \in [-3, 3]$ but $x \neq -1$.

d. $y = x^2 - 4x + 4$, $x \in [-3, 3]$

2. [20 points] Find the following derivatives.

a. $(\cos 3x)''$

b. $(\sqrt{2x+1})'$

c. $(x^2 \sin 2x)'$

d. $(e^{x^2})'$

3. [20 points] Find the following integrals.

a. $\int x \sin(x^2) dx$

b. $\int \cos 4x dx$

c. $\int \frac{1}{1-3x} dx$

d. $\int_{-\pi}^{\pi} x^2 \sin x dx$

4. [20 points] If you drop a ball from a height of 1600 feet when will it hit the ground? Ignore air resistance. Use $g = 32 \text{ ft/sec/sec}$.

5. [20 points] Let $f(x) = x^2 e^{-x}$. Find the x and y coordinates of all relative mins and maxs. Find the x and y coordinates of all inflection points.