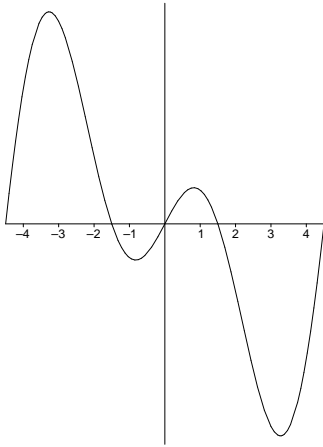
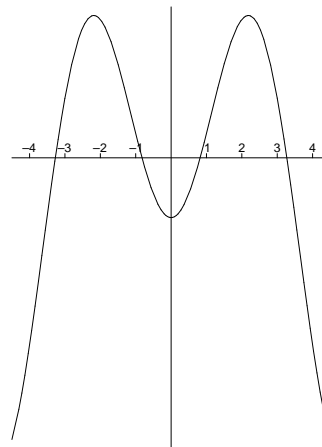
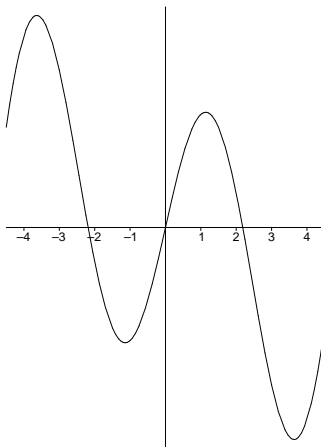
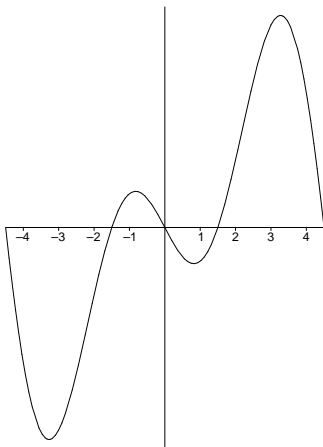
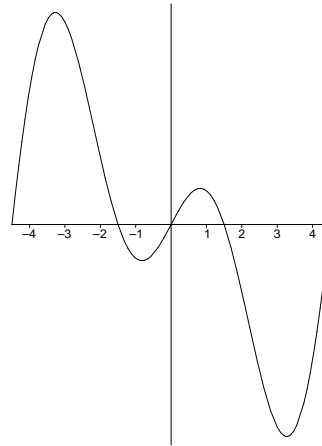
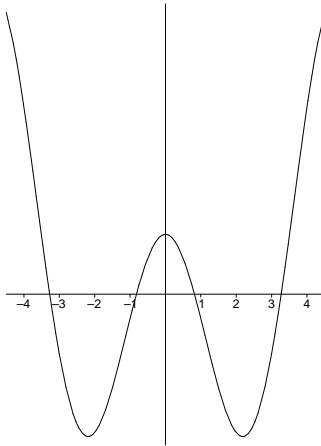
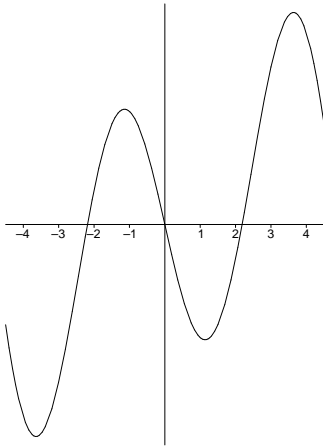


1. (6 points) If the point  $(7, -2)$  is on the graph of an even function  $f$ , then which one of the following points must also be on the graph of  $f$  ?
- (a)  $(2, 7)$
  - (b)  $(2, -7)$
  - (c)  $(-2, 7)$
  - (d)  $(-2, -7)$
  - (e)  $(7, 2)$
  - (f)  $(-7, 2)$
  - (g)  $(-7, -2)$
2. (6 points) If the point  $(7, -2)$  is on the graph of an odd function  $f$ , then which one of the following points must also be on the graph of  $f$  ?
- (a)  $(2, 7)$
  - (b)  $(2, -7)$
  - (c)  $(-2, 7)$
  - (d)  $(-2, -7)$
  - (e)  $(7, 2)$
  - (f)  $(-7, 2)$
  - (g)  $(-7, -2)$
3. (6 points) Given a function  $f(x)$  for which  $\lim_{h \rightarrow 0} \frac{f(4+h) - f(4)}{h}$  exists, which one of the following statements must be true?
- (a)  $f$  is continuous but not differentiable at  $x = 0$ .
  - (b)  $f$  is continuous but not differentiable at  $x = 4$ .
  - (c)  $f$  is differentiable but not continuous at  $x = 0$ .
  - (d)  $f$  is differentiable but not continuous at  $x = 4$ .
  - (e)  $f$  is both differentiable and continuous  $x = 0$ .
  - (f)  $f$  is both differentiable and continuous  $x = 4$ .
  - (g)  $f$  is neither continuous nor differentiable at  $x = 0$ .
  - (h)  $f$  is neither continuous nor differentiable at  $x = 4$ .

4. (6 points) The graph of  $f(x)$  is shown below.



Circle the graph of  $f'(x)$ , given that it is one of the six choices below.



5. (12 points) Given that  $f(x) = 5 + \ln(x - 4)$ , find a formula for  $f^{-1}(x)$ .

6. (10 points) Let  $f(x) = x^2 - 6x$ . Use the definition of a derivative as a limit to show that  $f'(x) = 2x - 6$ . Show each step in your calculation and be sure to use proper terminology.

7. (12 points) Find the domain of the function  $f(x) = \ln(5 - \sqrt{x - 30})$ .

8. (12 points) Find a formula for an exponential function whose graph goes through the following three points.

$$(0, 9), (3, 12), (6, 16)$$

9. (5 points each) Evaluate the following limits. An answer of ‘does not exist’ is not sufficient. If the limit is infinite then you must state if it is  $\infty$  or  $-\infty$ .

(a)  $\lim_{x \rightarrow 0} (18 - 11 \ln(5x^2 + 1))$

(b)  $\lim_{x \rightarrow \infty} (9 + 8 \cos(e^{-3x}))$

(c)  $\lim_{x \rightarrow 5} \frac{x^2 + 2x - 35}{x - 5}$

$$(d) \lim_{x \rightarrow 4^-} \frac{3x^2 + 10}{x^2 - 16}$$

$$(e) \lim_{x \rightarrow \infty} \frac{3x + 5x^2}{7x^2 + 13}$$

10. (5 points) A function  $f$  satisfies the following inequality for all  $x \neq 0$ .

$$\frac{9x + 2 \sin x}{2x} \leq f(x) \leq \frac{13x - 2 \sin x}{2x}$$

Determine  $\lim_{x \rightarrow 0} f(x)$ .