

Exam #1

September 25, 2017

Name _____

- You will be told when to begin the work and when to terminate work on the examination. You must stop when instructed. Points may be deducted in case of violations.
- Please show your work to support your answers that require calculations. Correct but unsupported answers may not be given full credit.
- The use of a cell phone or other electronic communication devices during the examination is not allowed. The exam will be canceled and a grade of “0” will be assigned to anyone who uses a cell phone during the examination or if one is found within hands reach.
- Calculators are not allowed on this exam.
- The exam consist of two parts. Part I contains four multiple choice questions worth 5 points each. Part II contains 8 open ended questions worth 10 points each if not stated otherwise.

Part I

Choose your answer from five available choices. No partial credit will be given for wrong answers.

1. What is $(f \circ g)(x) = f(g(x))$ if $f(x) = \sqrt{3x - 2}$ and $g(x) = \frac{2}{x + 4}$

(a) $\frac{2}{\sqrt{3x - 2} + 4}$

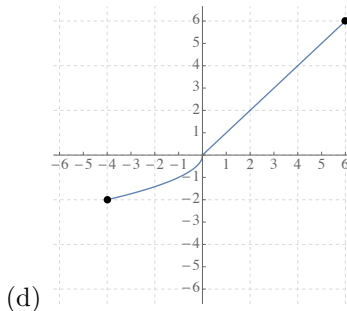
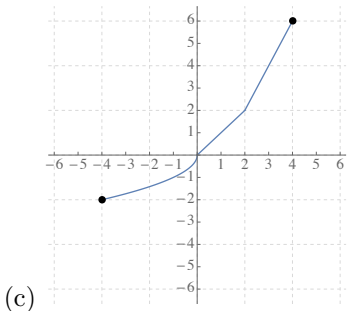
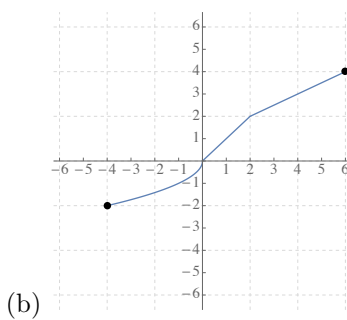
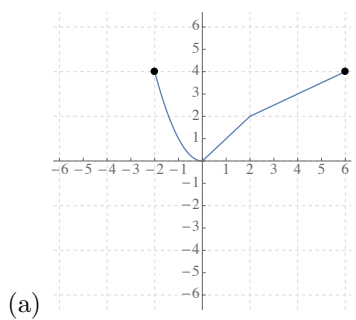
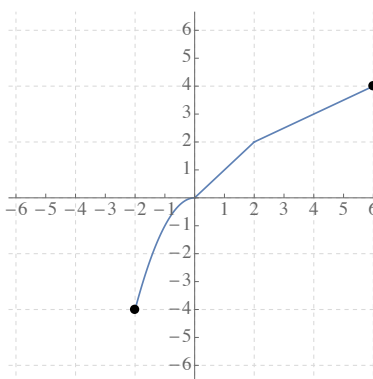
(b) $\frac{2\sqrt{3x - 2}}{x + 4}$

(c) $\frac{2}{\sqrt{3x - 2} + 4}$

(d) $\sqrt{3\frac{2}{x + 4} - 2}$

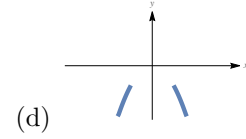
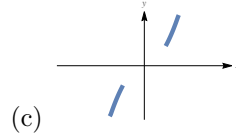
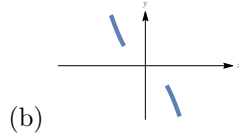
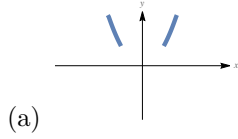
(e) None of the above

2. The graph of a one-to-one function f is given below. Which of the following is the graph of its inverse?



(e) None of the above.

3. Which of the following illustrates the end behavior of $f(x) = -2x^4 + 3x^2 - x + 7$

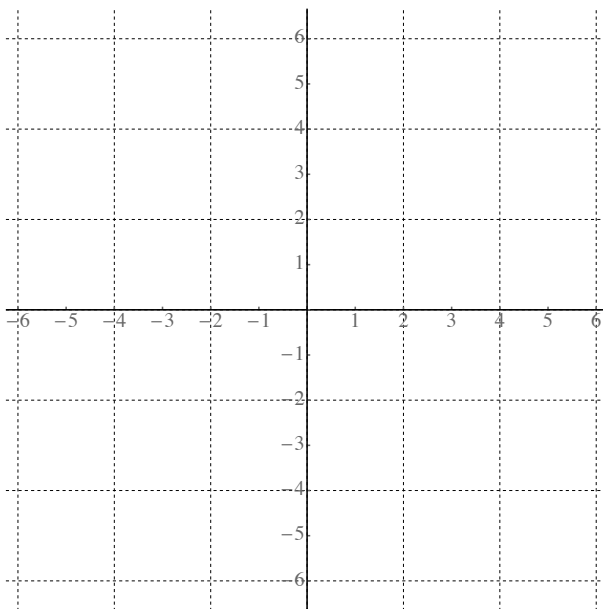


4. Find the domain of $f(x) = \frac{3-x}{\sqrt{x+2}}$

- (a) $(-\infty, -2)$
- (b) $(-2, 3) \cup (3, \infty)$
- (c) $[-2, \infty)$
- (d) $(-2, \infty)$
- (e) None of the above.

Part II

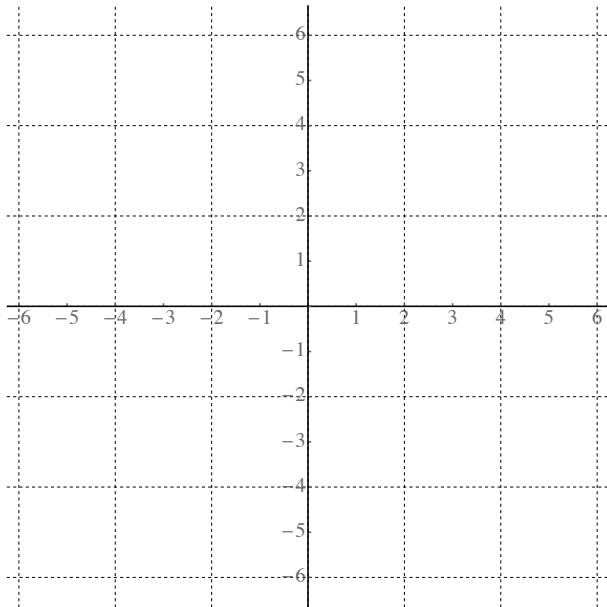
5. Graph the function $f(x) = \begin{cases} x-2 & , x < 2 \\ 1 & , 2 \leq x \leq 3 \\ (x-2)^2 & x > 3 \end{cases}$



6. Graph $y = 2\sqrt{-x + 1}$ using transformations. Start with the graph of a basic function – **plot accurately as least three points** and use them to perform transformations. Do one transformation at a time. Name the transformation and write the equation of the resulting function.

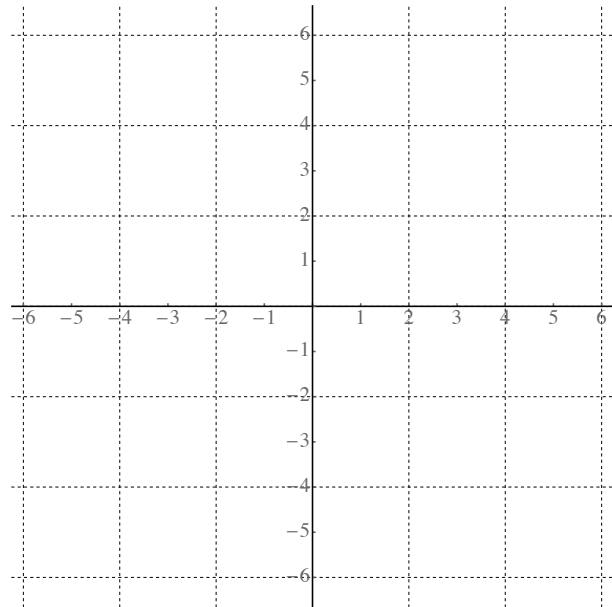
(i) Basic function:

y=



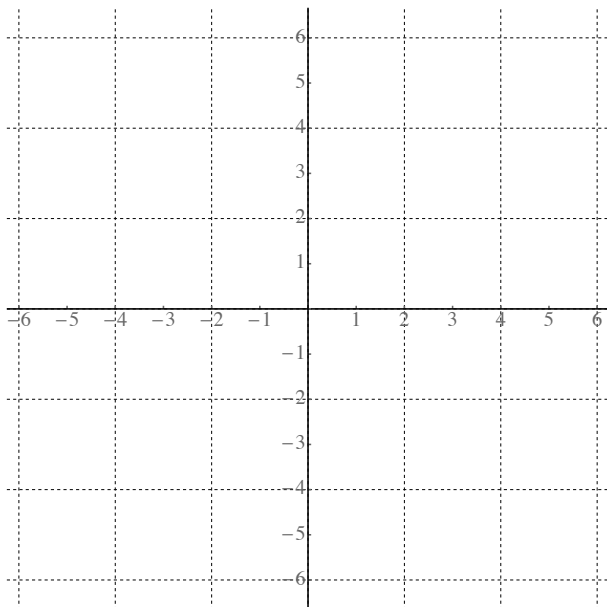
(ii) transformation:

y=



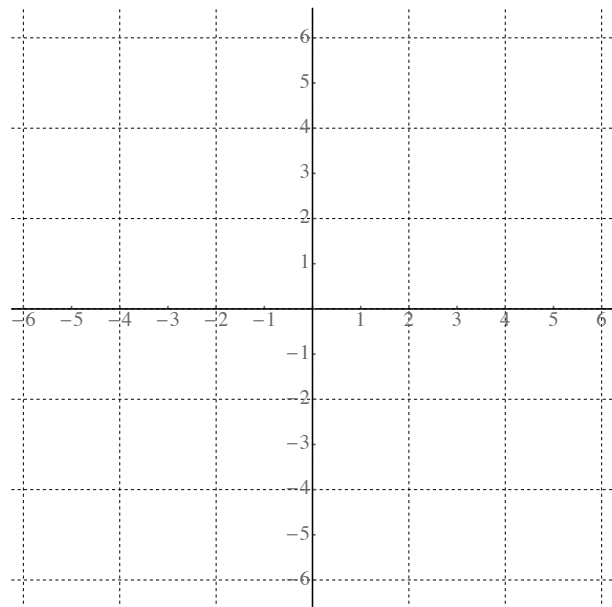
(iii) transformation:

y=



(iv) transformation:

y=



7. Find the difference quotient for $f(x) = -5x^2 + 3$.

8. (20 points) Let $f(x) = 2 + 3\sqrt{1-x}$

(a) Find the domain of f .

(b) Find the inverse of f .

9. Find the zeros and their multiplicities and sketch the graph of the following polynomial.

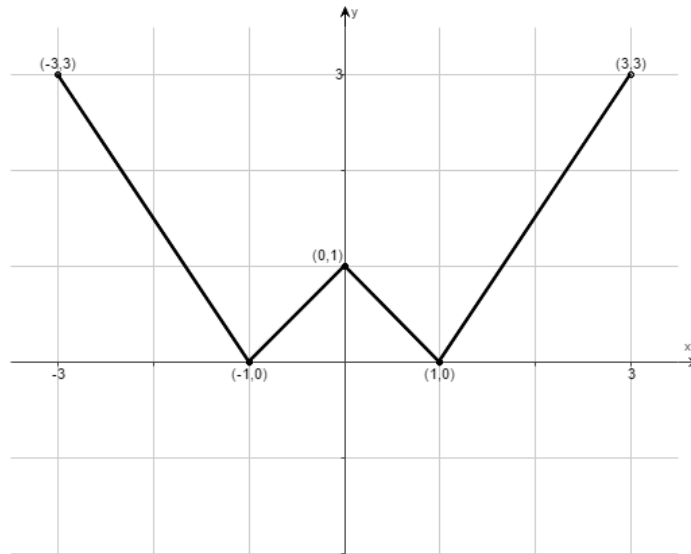
$$y = -3(x^2 + 2)(x - 3)^2(x + 6)^3$$

10. Find $\left(\frac{f}{g}\right)(x) = \frac{f(x)}{g(x)}$ and its domain if $f(x) = \frac{2}{x}$ and $g(x) = \frac{x+2}{1-x}$

11. Find two functions $f(x)$ and $g(x)$ (neither of them identity) so that $h(x) = f(g(x))$, where

$$h(x) = \frac{3}{2\sqrt{x+1}}$$

12. Using the given graph of the function f , answer the parts (a)-(f) below.



(a) Find the domain of f . Express it in interval notation.

(b) Find the range of f . Express it in interval notation.

(c) Find the x -intercepts.

(d) Find the y -intercepts.

(e) Find the intervals on which f is increasing.

(f) Find the intervals on which f is decreasing.