

**Exam #1**

October 3, 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 consists of two parts. Part I contains four multiple choice questions worth 5 points each. Part II contains 8 open ended questions.

## Part I

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

1. Simplify  $\frac{\sqrt{12x^2}}{6x^2}$

(a)  $\frac{\sqrt{12}}{6}$

(b)  $\sqrt{3}$

(c)  $\frac{2}{1}$

(d)  $\frac{\sqrt{3}}{3x}$

(e) None of the above

2. Divide the following complex numbers and express the result in standard form,  $a + bi$ .

$$\frac{2i - 3}{2 + i}$$

(a)  $\frac{4 - 7i}{5}$

(b)  $-\frac{4}{5} + \frac{7}{5}i$

(c)  $-\frac{8}{5} + \frac{7}{5}i$

(d)  $-4 + 7i$

(e) None of the above

3. Find the solution set for the equation

$$(x - 1)^2 = -9$$

(a)  $\{1 + 3i\}$

(b)  $\{1 + 3i, 1 - 3i\}$

(c)  $\{3i + 1, 3i - 1\}$

(d) The solution set is empty.

(e) None of the above

4. Determine the number and type of solutions for the following equation

$$x^2 - 3x - 5 = 0$$

- (a) One real solutions.
- (b) Two real solution.
- (c) Two complex solutions.
- (d) Three radical solutions.
- (e) None of the above.

## Part II

5. (10 points) Consider the points  $(1, 6)$  and  $(4, 2)$ . Draw a squid or octopus that has
- (a) The number of arms the same as the y-coordinate of the midpoint.
  - (b) The number of eyes the same as the distance between the points.

6. (10 points each) Solve for  $x$  and include any complex solutions.

(a)  $\sqrt{2x-1} + 2 = x$

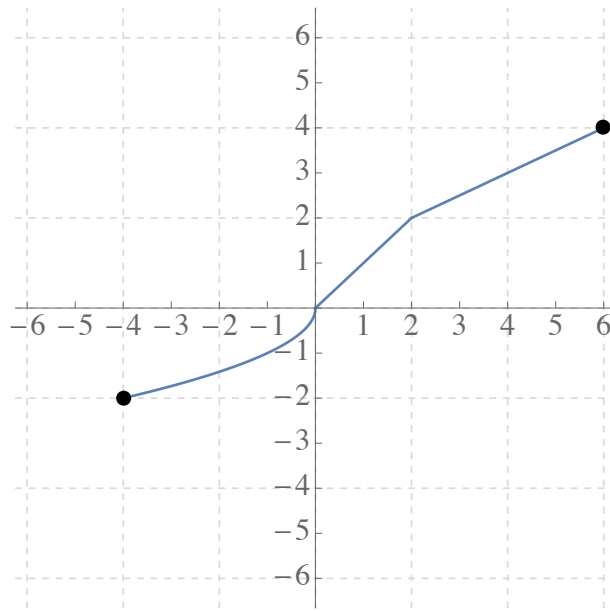
(b)  $2x^2 - x = 1$

7. (5 points) Let  $f(x) = 2 + 3\sqrt{1-x}$  and  $h(x) = \frac{2x}{x-3}$

(a) Find  $f(0)$

(b) Find  $h(4)$

8. (10 points) Consider the following function.



(a) Find the domain and range of the graph of the function.

(b) Find  $f(2)$  and  $f(-4)$ .

9. (15 points) Consider the line  $6x - 3y + 4 = 0$  and

(a) Find the slope of the given line.

(b) Find the equation of the line that is perpendicular to the given line and passes through the point  $(4, 1)$ . Find the y-intercept of this line.

10. (10 points) Consider the circle given by

$$x^2 + y^2 - 4x - 12y - 9 = 0$$

Draw an alien that has:

- (a) The number of hands the same as the circle's radius.
- (b) The number of legs the same as circle's center  $y$ -coordinate.
- (c) The number of eyes the same as circle's center  $x$ -coordinate.

11. (5 points) Simplify

$$\sqrt{40} + 3\sqrt{10}$$

12. (10 points) Simplify

$$\frac{\frac{x}{x-2} - 1}{\frac{3}{x^2-4} + 1}$$