MATH 1050-90
PRACTICE EXAM 1
(Sections 1.1-1.9, 2.1-2.5)

The purpose of the practice exam is to give you an idea of the following:
- *length of exam*
- *difficulty level of problems*
- *your instructor's problem writing style*

Your actual exam will have different problems. You should review your homework, quizzes, lecture notes etc., not just perfect taking the practice exam. However, you can use the practice exam to gauge how well you know the material. To do this, take it under the same conditions as a normal exam (no notes, no calculator, time yourself). Then score your problems against the solution key.

The following instructions are on the exam:
- Use a PENCIL, erase or cross out errors.
- **SHOW ALL WORK**. No points will be given for answers without justification.
- Circle your answer so it is easy to locate.
- NO CALCULATORS, NOTES, PHONES, ETC.
- Answers should be simplified (reduced).
- The value of each question is shown.
- Finish in 80 minutes (one hours + 20 minute grace period). You are responsible for keeping track of the time. The proctor does not say "time is up". For each minute you take beyond 80 min, your score will be reduced by 0.5%.

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/28	/15	/20	/19	/16	/100

Parent Functions

Parabola:	Square root	Cubic polynomial
$y = a(x - h)^2 + k$	$y = a\sqrt{x - h} + k$	$y = a(x - h)^3 + k$
Absolute value	Rational	
$y = a|x - h| + k$	$y = \dfrac{ax \pm b}{cx \pm d}$	

1. *(12pts)* **Points and lines.** Given the points

    A (-4,-2)   B (-7,4)   C (-1,9)

    Find the following. Simplify if possible.

a. the midpoint of the segment with
    endpoints A and B:

b. the distance from A to C:

c. the slope of the line containing B and C:

d. The equation of the line passing through A
    and PERPENDICULAR to the line through B
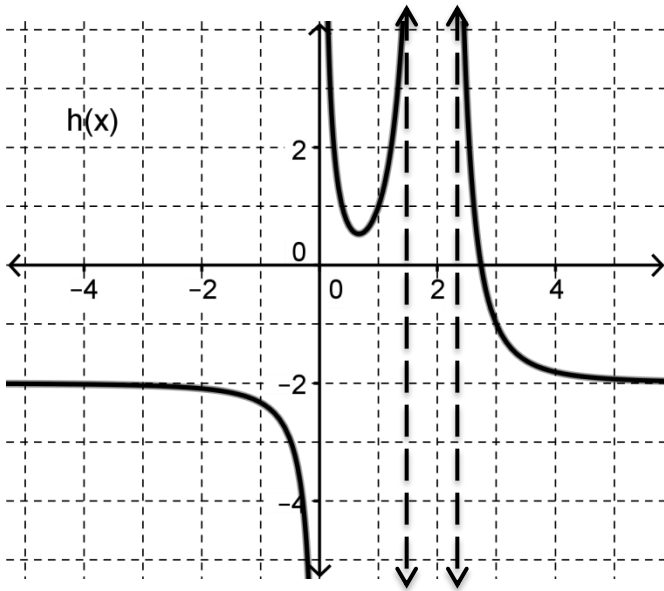   and C.
    (*in slope-intercept form, y=mx+b*):

(16 pts) **Functions**
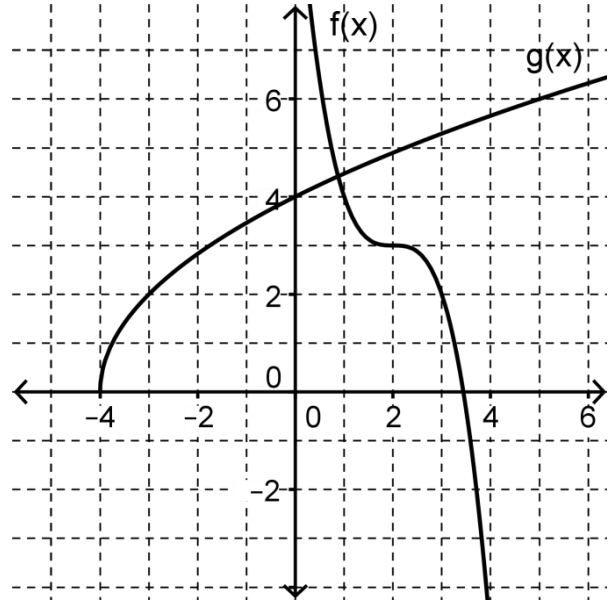$$f(x) = x - 7 \text{ and } g(x) = 2 - x^3.$$

Find the following. Simplify if possible.

a. $(f \circ g)(x)$

b. $(g \circ f)(5)$

c. $g^{-1}(x)$

d. $\left(\frac{g}{f}\right)(x) =$

e.   What is the domain of the function in d?

Graph A

Graph B

2. *(8 pts)* **Analyzing GRAPH A.**

   a. h(3) = _____

   b. For which value(s) of x is h(x) = 2? _____

   c.   Domain *(write as interval)* _____

   d.   Range *(write as interval)* _____

3. *(7 pts)* **Analyzing GRAPH B.**

   a.   For which x does f(x) = g(x)? _____

   b.   f(x) = _____*(Hint, parent functions are shown on the cover page)*

   c. g(x) = _____*(Hint, parent functions are shown on the cover page)*

4. *(6 pts)* **Simplify the expression.**
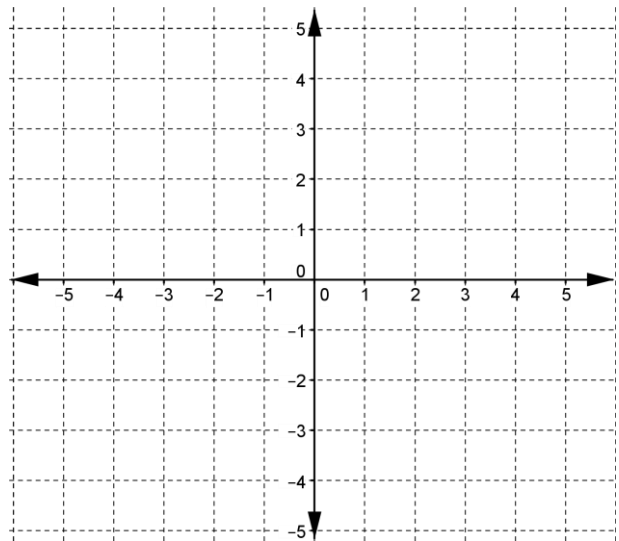
$$(7i + 3)^2 + \sqrt{-100} + i^9$$

Write the answer in the form a+bi

5. *(14 points)* **Quadratic functions.** Given this quadratic function $f(x) = -4x^2 + 24x - 31$

a. Complete the square to rewrite it in the form
   f(x) = a(x-h)² +k.

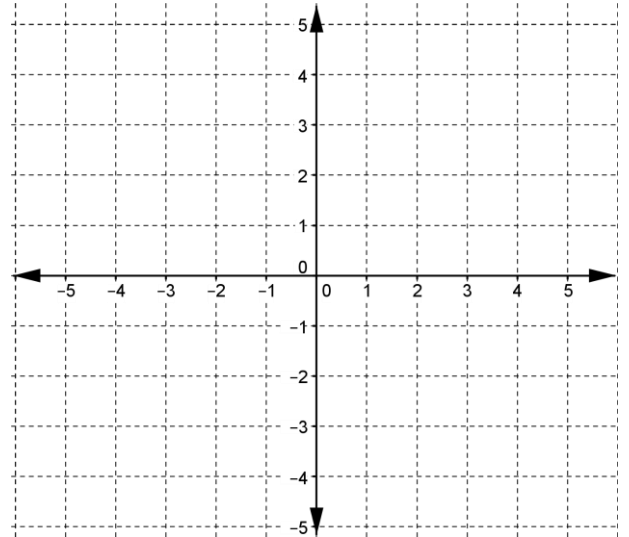c. Graph f(x) showing Be accurate.

b. Use the quadratic formula to find the zeros of f(x).
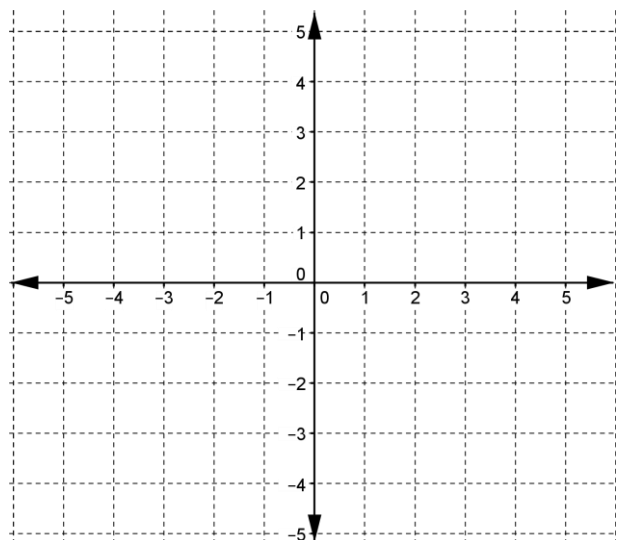   Simplify.

6. *(13pts)* **Functions, inverses and graphs**

Given the function $f(x) = 2 - 3x$

   a. Find $f^{-1}(x)$

   b. Graph $f(x)$ and $f^{-1}(x)$ on the same graph.

   c. How are the graphs of $f(x)$ and $f^{-1}(x)$ related?

7. *(6pts)* **Polynomials.** Draw a (polynomial) function that looks like it meets these
   requirements:
- Degree 4
- Has negative leading coefficient
- Has zeros at x=-2, x=0 and a DOUBLE zero at x=3

8. *(16 pts)* **Polynomials:** Given: $p(x) = 4x^3 - 12x^2 - x + 15$

a. Calculate: p(x)÷(x-5) *(Use synthetic division or long division)*

e. Factor p(x).

   Hint: either x-1 or x+1 is a factor of the polynomial. Decide which one. Factor it out and then factor the remaining polynomial more.

b. p(5) =

c. What is the relationship between a. and b.? (Hint, think of a theorem.)

d. What is the y-intercept of p(x)?