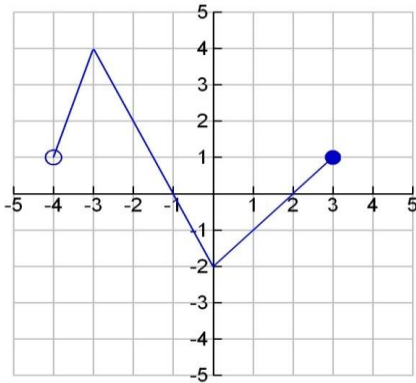


MSLC – Math 1075  
Exam 3 Review

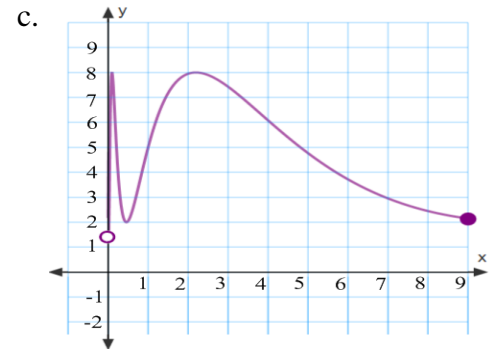
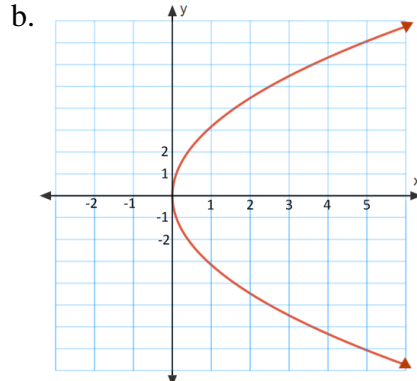
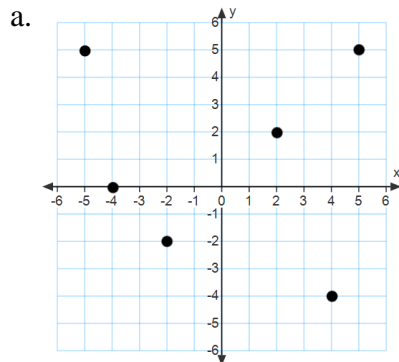
Disclaimer: This should NOT be used as your only guide for what to study.

1. The graph below represents the graph of a function  $f$ .



- Evaluate  $f(2)$ .
- Determine all values of  $x$  that produce  $f(x) = 1$ .
- Determine the domain of  $f$  using interval notation.
- Determine the range of  $f$  using interval notation.

2. Find the domain and range (in interval notation) of each of the following graphs of relations, and determine if that relation is also a function:



3. Use the given functions  $f(x) = x^3$ ,  $g(x) = \sqrt{x-8}$ , and  $h(x) = \frac{1}{3x+7}$  to find each of the following:

- |               |                      |                                   |                     |                      |
|---------------|----------------------|-----------------------------------|---------------------|----------------------|
| a. $f(4)$     | b. $g(33)$           | c. $h(-6)$                        | d. $g(3m)$          | e. $f(-5a^2)$        |
| f. $(f-g)(9)$ | g. $(g \cdot h)(17)$ | h. $\left(\frac{f}{h}\right)(-7)$ | i. $(g \circ f)(x)$ | j. $(h \circ f)(-2)$ |

4. Perform the indicated operations and simplify. Rationalize denominators where appropriate.

a.  $\sqrt[5]{4^3} \cdot \sqrt[5]{4^2}$

b.  $\sqrt{18} + \sqrt{2}$

c.  $\frac{10}{\sqrt{5}}$

d.  $7\sqrt{x^3y} - x\sqrt{49xy}$

e.  $\frac{15}{9 - \sqrt{6}}$

f.  $(\sqrt[3]{-4v})(\sqrt[3]{2v^2})$

5. Simplify the following powers of  $i$ .

a.  $i^{63}$

b.  $i^{114}$

c.  $i^{2680}$

6. Perform the indicated operations. Give your answers in  $a + bi$  form.

a.  $4(3 - 2i) - i(5 + 3i)$

b.  $(11 - 3i)(2 + 5i)$

c.  $\frac{5 - 2i}{4 + 3i}$

7. Find the domain of each of the following functions. *Give your answer in interval notation.*

a.  $f(x) = \sqrt{3(x - 11)}$

b.  $g(x) = \sqrt{3 - 2x}$

c.  $h(x) = \sqrt[3]{x} - 7$

8. Simplify the following using only positive exponents in your answers. Assume all variables represent positive real numbers.

a.  $\left(4^{\frac{1}{5}} \cdot 4^{\frac{2}{5}}\right)^{\frac{5}{2}} \left(4^{\frac{1}{5}} \cdot 4^{\frac{2}{5}}\right)^{\frac{5}{2}}$

b.  $\frac{y^{\frac{1}{4}}}{y^{\frac{1}{5}}}$

c.  $\frac{w^{\frac{3}{4}}}{w^{-\frac{3}{8}}}$

d.  $\left(25v^{-\frac{4}{9}}\right)^{\frac{3}{2}}$

e.  $\left(\frac{27n^{\frac{3}{5}}}{n^{-\frac{3}{5}}}\right)^{-\frac{2}{3}}$

f.  $\frac{\left(5xy^2z^2\right)^{\frac{1}{3}} \left(25x^2y^3z\right)^{\frac{1}{3}}}{3x^2y^{-\frac{1}{3}}z^{-2}}$

9. Use the square root property to find the exact answer to each of the following.

*Make sure to completely simplify your answers.*

a.  $3n^2 - 150 = 0$

b.  $70m^2 - 110 = 0$

c.  $(2x - 3)^2 = 169$

10. Use completing the square to find the exact answer of the following.

*Make sure to completely simplify your answers.*

a.  $5p^2 + 30p + 20 = 0$

b.  $(w - 1)(w + 4) = 7$

## ANSWERS

1. a.  $f(2) = 0$     b.  $x = -1.5$  or  $x = 3$  (The function doesn't include  $x = -4$ )

c. Domain:  $(-4, 3]$     d. Range:  $[-2, 4]$

2. a. Domain:  $\{-5, -4, -2, 2, 4, 5\}$     b. Domain:  $[0, \infty)$     c. Domain:  $(0, 9]$

Range:  $\{-4, -2, 0, 2, 5\}$     Range:  $(-\infty, \infty)$     Range:  $(1.5, 8]$

It's a function    Not a function    It's a function

3.    a. 64    b. 5    c.  $-\frac{1}{11}$     d.  $\sqrt{3m-8}$     e.  $-125a^6$

f. 728    g.  $\frac{3}{58}$     h. 4802    i.  $\sqrt{x^3-8}$     j.  $-\frac{1}{17}$

4.    a. 4    b.  $4\sqrt{2}$     c.  $2\sqrt{5}$     d. 0    e.  $\frac{9+\sqrt{6}}{5}$     f.  $-2v$

5.    a.  $-i$     b.  $-1$     c. 1

6.    a.  $15-13i$     b.  $37+49i$     c.  $\frac{14}{25} - \frac{23}{25}i$

7.    a.  $[11, \infty)$     b.  $(-\infty, \frac{3}{2}]$     c.  $(-\infty, \infty)$

8.    a.  $4^{\frac{3}{2}}$     b.  $y^{\frac{1}{20}}$     c.  $w^{\frac{9}{8}}$     d.  $\frac{125}{v^{\frac{2}{3}}}$     e.  $\frac{1}{9n^{\frac{4}{5}}}$     f.  $\frac{5y^2z^3}{3x}$

9.    a.  $n = \pm 5\sqrt{2}$     b.  $m = \pm \frac{\sqrt{77}}{7}$     c.  $x = -5$  or  $x = 8$

10.    a.  $p = -3 + \sqrt{5}$  or  $p = -3 - \sqrt{5}$     b.  $w = \frac{-3 + \sqrt{53}}{2}$  or  $w = \frac{-3 - \sqrt{53}}{2}$