

Math 1021 Review for Test 1 (2.2, 2.3, 2.4, 4.2, 4.7, 5.1-5.5 inclusive and 9.1)

NOTE THIS IS NOT ALL ENCOMPASSING. THERE MIGHT BE TYPES OF PROBLEMS ON THE TEST THAT ARE NOT ON THIS REVIEW. You must know how to do any of the types of homework problems that were assigned. **Any problem similar to a sample problem or a homework problem may appear on the test. You are also responsible for the examples worked out in each assigned section in the textbook even though they are not done in class.**

1. Determine whether each correspondence is a function. Justify your answer.

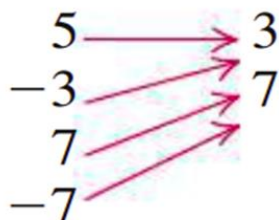
(a)

Domain *Range*



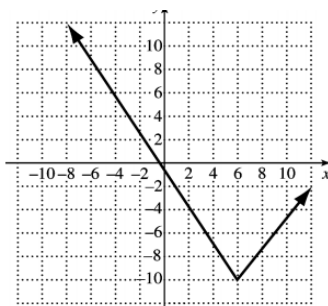
(b)

Domain *Range*

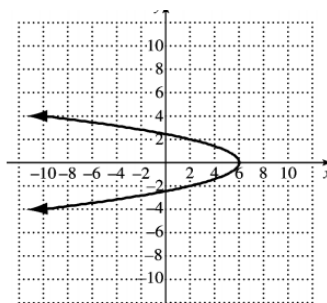


2. Determine whether each of the following is the graph of a function.

(a)



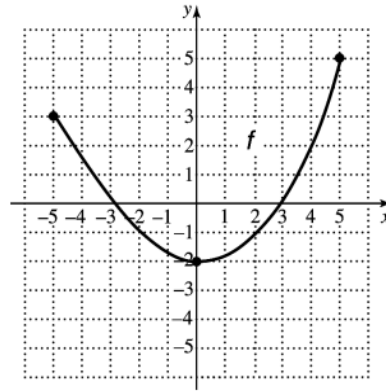
(b)



3.

For the graph of function f at right, determine

- a) $f(4)$;
- b) the domain;
- c) all x -values such that $f(x) = -1$;
- and d) the range.



4. Find the domain. Express answers in interval notation.

- (a) $f(x) = x^2 - 2x + 1$
- (b) $g(x) = \frac{7}{5-x}$
- (c) $T(x) = |2x - 3|$
- (d) $F(x) = \frac{x^3 - x^2 + x + 2}{x^2 + 12x + 35}$

5. If $f(x) = -5x + 2$ and $g(x) = x^2$. Find

- (a) $(f + g)(x)$
- (b) $(g - f)(x)$
- (c) $(f \cdot g)(-9)$
- (d) $(\frac{f}{g})(x)$

6. Given $f(x) = x^2 - 25$ and $g(x) = \frac{x}{3}$, Find:

- (a) $(f \circ g)(x)$
- (b) $(g \circ f)(x)$
- (c) $(f \circ f)(-2)$

7. Multiply the following polynomials.

- (a) $(3x^3y^5)(-4x^4y^6)$
- (b) $(2x^3 - 3x^2 + x + 5)(2x^2 + x - 1)$
- (c) $(2x + 3y)^2$
- (d) $(x + 2)(x - 2)(x^2 + 4)$
- (e) $(2x + 3y)(2x - 3y)$
- (f) $-4x^5(2x^3 - 3x^2 + x + 5)$
- (g) $(2x - 3y)^3$

8. Factor completely.

(a) $x^2 - 10x + 25$

(b) $4x^2 + 12x + 9$

(c) $9x^2 - 4$

(d) $6x^2 + 10x - 3x - 5$

(e) $x^2 + 4x - 12$

(f) $2x^4 - 16x$

(g) $2x^2 + x - 3$

(h) $12x^2 + 7x - 10$

(i) $2xy^3 - 22xy^2 + 48xy$

(j) $81x^2 - 36x + 4$

(k) $54x^6y - 16y$

9. Perform the indicated operations and simplify your answers.

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

(b) $\frac{1}{4x^2} - \frac{2x+1}{3x^3} + \frac{3}{12x}$

(c) $\frac{y-3}{y^2-4} - \frac{y+2}{y^2-4y+4} - \frac{2}{2-y}$

(d) $\frac{y^2-10y+9}{y^2-1} \cdot \frac{y+4}{y^2-5y-36}$

(e) $\frac{x+1}{x-x^2} \cdot \frac{x^2-2x+1}{x^2-1}$

(f) $\frac{4x^2-4x+1}{2x^2+5x-3} \div \frac{2x^2-3x-2}{2x^2+7x+3}$

(g) $\frac{4x^2-9y^2}{8x^3-27y^3} \div \frac{4x^2+12xy+9y^2}{4x^2+6xy+9y^2}$

10. Simplify:

(a) $\frac{\frac{x^2}{y^2}-1}{\frac{x}{y}+1}$

(b) $\frac{\frac{1}{x+h}-\frac{1}{x}}{h}$

(c) $\frac{\frac{x^2+8x+12}{x^2-5x-14}}{\frac{x^2-x-12}{x^2-2x-15}}$

(d) $\frac{\frac{1}{z^2}-\frac{1}{w^2}}{\frac{1}{z^3}+\frac{1}{w^3}}$

11. Divide. Use long division.

$$(a) \quad 2x^2 + x - 1 \overline{)2x^3 - 3x^2 + x + 5}$$

$$(b) \quad (6x^3 - x^2 - 10) \div (3x + 4)$$

$$(c) \quad (3x^4 + 2x^3 - 11x^2 - 2x + 5) \div (x^2 - 2)$$

12. Solve the following equations:

$$(a) \quad \frac{10}{x-5} - \frac{10}{x} = \frac{-25}{x+1}$$

$$(b) \quad \frac{2}{x^2-9} - \frac{3}{x-3} = \frac{1}{x+3}$$

$$(c) \quad \frac{3x+5}{x^2+3x+2} = \frac{1}{x+2} + \frac{2}{x+1}$$

$$(d) \quad \frac{x}{x-2} - \frac{4}{x(x-2)} = \frac{5}{x}$$