

BRONX COMMUNITY COLLEGE
of The City University of New York

MATH 05 Test 3 Practice

Chapters 5, 6, 10

1. Factor each polynomial completely.

(a) $5x^2 - 10x + 20$

(c) $a^2 - 5a - 14$

(e) $3w^2 + 10w + 7$

(g) $x^4 - 81$

(b) $32a^2b - 50b^3$

(d) $9x^2 - 12xy + 4y^2$

(f) $8x^2 - 2xy - 3y^2$

2. Solve each equation for the variable x

(a) $x^2 - 11x = -30$

(b) $2x^2 + 16x + 30 = 0$

3. If a ball is thrown upward from the roof of an 18-m building with an initial velocity of 20 m/s, its approximate height h after t seconds is given by $h = -5t^2 + 20t + 18$. When is the ball at a height of 38 m?

4. For each of the following sets of ordered pairs, identify the domain and the range.

(a) $\{(1, 6), (-3, 5), (2, 1), (4, -2), (3, 0)\}$

(b) $\{(UnitedStates, 101), (Germany, 65), (Russia, 63), (China, 50)\}$

5. For each of the following, determine whether the given relation is a function.

(a) $\{(2, 5), (-1, 6), (0, -2), (-4, 5)\}$

(b)

6. If $f(x) = x^2 - 5x + 6$, find (a) $f(0)$, (b) $f(-1)$, (c) $f(1)$

7. If $f(x) = -3x^2 - 2x + 3$, find (a) $f(-1)$, (b) $f(-2)$

8. Graph the function $f(x) = -2x + 3$

9. If $f(x) = 6x - 3$, find $\frac{f(x+h) - f(x)}{h}$

10. Use the vertical line test to determine whether the following graphs represent function.

(a)

(b)

11. Use the graph to determine the domain and the range of the relation

(a)

(b)

12. Simplify each expression. Assume that the variables represent positive real numbers.

(a) $\sqrt{49a^4}$

(b) $\sqrt[3]{-27w^6z^9}$

(c) $\sqrt[3]{9p^7q^5}$

(d) $\frac{7x}{\sqrt{64y^2}}$

(e) $\sqrt{\frac{5x}{8y}}$

(f) $\frac{3}{\sqrt[3]{9x}}$

Answers:

1. (a) $5(x^2 - 2x + 4)$, (b) $2b(4a - 5b)(4a + 5b)$, (c) $(a - 7)(a + 2)$, (d) $(3x - 2y)(3x - 2y)$,
(e) $(3w + 7)(w + 1)$, (f) $(2x - y)(4x - 3)$, (g) $(x - 3)(x + 3)(x^2 + 9)$

2. (a) $\{5, 6\}$, (b) $\{-3, -5\}$

3. Solve $-5t^2 + 20t + 18 = 38$ or $t^2 - 4t + 4 = 0$. Answer: $t = 2$ seconds.

4. (a) domain: $\{-3, 1, 2, 3, 4\}$, range: $\{-2, 0, 1, 5, 6\}$

(b) domain: $\{\text{United States, Germany, Russia, China}\}$, range: $\{101, 65, 63, 50\}$

5. (a) function, (b) not a function

6. (a) $f(0) = 6$, (b) $f(-1) = 12$, (c) $f(1) = 2$

7. (a) $f(-1) = 2$, (b) $f(-2) = -5$

8.

9. $f(x + h) = 6x + 6h - 3$; thus $\frac{f(x+h)-f(x)}{h} = \frac{(6x+6h-3)-(6x-3)}{h} = \frac{6h}{h} = 6$

10. (a) represents a function, (b) does not represent a function

11. (a) domain: $[-7, 7]$ or $\{x \mid -7 \leq x \leq 7\}$, range: $[-7, 7]$ or $\{y \mid -7 \leq y \leq 7\}$;

(b) domain: $(-\infty, +\infty)$ or \mathbb{R} , range: $(-\infty, +\infty)$ or \mathbb{R}

12. (a) $7a^2$, (b) $-3w^2z^3$, (c) $p^2q\sqrt[3]{9pq^2}$, (d) $\frac{7x}{8y}$, (e) $\frac{\sqrt{10xy}}{4y}$, (f) $\frac{3\sqrt[3]{3x^2}}{3x} = \frac{\sqrt[3]{3x^2}}{x}$