

Answers

Mixed Midterm Review 2013

What is the product of $(2 + a)$ and $(3 - b)$?

- A) $6 + ab - b^2$
 B) $6 - ab$
 C) $6 - 2b + 3a - ab$
 D) $5 + ab + 3a - 2b$

$$(2+a)(3-b)$$

$$6 - 2b + 3a - ab$$

2) The expression $(y - 2)^2$ is equivalent to

- A) $y^2 - 4y - 4$ C) $y^2 + 4y + 4$
 B) $y^2 - 4$ D) $y^2 - 4y + 4$

$$(y-2)(y-2) = y^2 - 2y - 2y + 4$$

3) The expression $(2a + 3b)^2$ is equivalent to

- A) $4a^2 + 6ab + 9b^2$
 B) $4a^2 + 12ab + 9b^2$
 C) $4a^2 + 12a^2b^2 + 9b^2$
 D) $4a^2 + 9b^2$

$$(2a+3b)(2a+3b) = 4a^2 + 6ab + 6ab + 9b^2$$

4) If $(2x - 3)$ and $(x + 5)$ are multiplied to form the trinomial $ax^2 + bx + c$, what is the value of b ?

- A) 7 C) 4
 B) 2 D) -15

$$(2x-3)(x+5) = 2x^2 + 10x - 3x - 15 = 2x^2 + 7x - 15$$

5) What will be one of the factors when $4x^4 - 16$ is factored completely?

- A) $x^4 - 4$ C) $x + 1$
 B) $x^2 - 2$ D) $x - 1$

$$4x^4 - 16$$

$$4(x^4 - 4)$$

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

6) Factor completely: $x^4 - 81y^4$

- A) $(x + 3y)(x - 3y)(x^2 + 9y^2)$
 B) $(x + 3y)(x - 3y)^2(x + 9y)^2$
 C) $(x^2 - 9y^2)(x^2 + 9y^2)$
 D) $(x + 3y)(x - 3y)(x + 3y)^2$

$$(x^2 - 9y^2)(x^2 + 9y^2)$$

$$(x-3y)(x+3y)(x^2+9y^2)$$

7) When factored completely, $x^3 - 9x$ is equivalent to

- A) $x(x - 3)$
 B) $(x + 3)(x - 3)$
 C) $x(x + 3)$
 D) $x(x + 3)(x - 3)$

$$x^3 - 9x$$

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

$$x(x-3)(x+3)$$

8) What factor do the following trinomials have in common?

$$x^2 + 6x + 9 = (x+3)(x+3)$$

$$x^2 - 3x - 18 = (x-6)(x+3)$$

- A) $x - 6$ C) $x + 6$
 B) $x + 3$ D) $x - 3$

9) When factored completely, $3x^2 + 7x - 20$ is equivalent to

- A) $(3x + 5)(x - 4)$
 B) $(3x - 4)(x + 5)$
 C) $(3x - 5)(x + 4)$
 D) $(3x + 4)(x - 5)$

$$(3x-5)(x+4)$$

$$-5x$$

$$12x$$

10) Factor: $5x + 10$

$$5(x+2)$$

- 11) Factor:
- $17x^2y - 34xy$

$$17xy(x-2)$$

- 12) Factor:
- $y^2 - 16$

$$(y-4)(y+4)$$

- 13) Factor:
- $121 - x^2$

$$(11-x)(11+x)$$

- 14) Factor:
- $x^2 - 2x - 3$

$$(x-3)(x+1)$$

- 15) Factor:
- $3a^2 - 2ab - b^2$

$$(3a+b)(a-b)$$

- 16) Factor completely:
- $x^3 - 6x^2 - 7x$

$$x(x^2 - 6x - 7) \\ = x(x-7)(x+1)$$

- 17) The solution set of the equation
- $x^2 + 5x = 0$
- is

- A) $\{5\}$ C) $\{-5\}$
 B) $\{0, -5\}$ D) $\{0\}$

$$x(x+5) = 0$$

- 18) The solution set of the equation
- $x^2 - 2x - 15 = 0$
- is

- A) $\{3, 5\}$ C) $\{-3, -5\}$
 B) $\{-3, 5\}$ D) $\{3, -5\}$

$$(x-5)(x+3) = 0$$

- 19) What is the solution set to
- $x^2 - 9 = 0$
- ?

- A) $+3$ and -3 C) $\{9, -1\}$
 B) -3 , only D) $+3$, only

$$(x-3)(x+3) = 0$$

- 20) What is the solution set to
- $3x^2 + 21x = 24$
- ?

- A) $\{-1, 8\}$ C) $\{-8, 1\}$
 B) $\{-4, 2\}$ D) $\{3\}$

$$3x^2 + 21x - 24 = 0 \\ 3(x^2 + 7x - 8) = 0 \\ 3(x+8)(x-1) = 0$$

- 21) What is the solution set to
- $x^2 + 8x + 16 = 0$
- ?

- A) $\{-2, -8\}$ C) $\{2, 8\}$
 B) $\{+4\}$ D) $\{-4\}$

$$(x+4)(x+4) = 0$$

- 22) Given
- $f(x) = x - 2$
- and
- $g(x) = 5x + 3$
- , find the value of the following:

 $(f \circ f)(1)$

$$f(1) = 1 - 2 = -1$$

$$f(-1) = -1 - 2 = -3$$

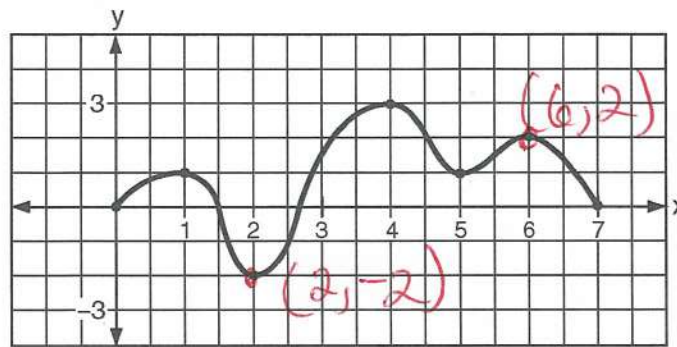
- 23) If
- $f(x) = 3x + 2$
- and
- $g(x) = \frac{x-2}{3}$
- , then determine the value of the following:

 $(g \circ f)(8)$

$$f(8) = 3(8) + 2 = 26$$

$$g(26) = \frac{26-2}{3} = 8$$

- 24) The accompanying graph is a sketch of the function $y = f(x)$ over the interval $0 \leq x \leq 7$.



What is the value of $(f \circ f)(6)$?

- A) 1 B) 2 C) 0 D) -2

$$f(6) = 2 \rightarrow f(2) = -2$$

- 25) Expressed as a fraction in lowest terms, $\frac{3-x}{2x-6}$, $x \neq 3$, is equivalent to

- A) $-\frac{1}{4}$
B) $\frac{1}{4}$

- C) $\frac{1}{2}$
D) $-\frac{1}{2}$

$$\frac{3-x}{2(x-3)} = -\frac{1}{2}$$

- 26) Expressed as a fraction in lowest terms, $\frac{x^2-4}{2x-4}$, $x \neq 2$, is equivalent to

- A) $\frac{x-2}{2}$
B) $\frac{x+2}{2}$

- C) $\frac{x}{2}$
D) x

$$\frac{(x-2)(x+2)}{2(x-2)}$$

- 27) Expressed as a fraction in lowest terms, $\frac{x^2-x-2}{x^2-4}$, $x \neq \pm 2$, is equivalent to

- A) $\frac{x+1}{x+2}$
B) $\frac{x}{x+2}$

- C) $\frac{-x-2}{-4}$
D) $\frac{x-1}{x-2}$

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

- 28) Which of the following expressions is in simplest form?

- A) $\frac{x}{x^2} = \frac{1}{x}$
B) $\frac{x^2-6x+9}{x^2-x-6}$

- C) $\frac{9}{x^2+9}$
D) $\frac{x^2-4}{x+2}$

$$\frac{(x-3)(x-3)}{(x-3)(x+2)}$$

$$\frac{(x-2)(x+2)}{x+2}$$

- 29) What is the coefficient of ab when $\frac{27a^3b^2 - 9a^2b - 3ab}{-3a}$ is expressed in simplest form?

- A) -9
B) 9

- C) -3
D) 3

$$\frac{27a^3b^2}{-3a} - \frac{9a^2b}{-3a} - \frac{3ab}{-3a}$$

$$-9a^2b^2 + 3ab + b$$

30) Simplify: $\left(\frac{x^2 - 4}{10x}\right)\left(\frac{5x^2}{x^2 + 2x}\right)$

A) $\frac{x-2}{2}$

C) $x-1$

B) $\frac{x-2}{2x}$

D) $\frac{x+2}{2x}$

$\frac{(x-2)(x+2)}{2 \cancel{10} \cancel{x}} \cdot \frac{\cancel{5} \cancel{x}^2}{x(x+2)}$

31) Simplify: $\frac{x^2 - 4x - 12}{x^2 - 4} \cdot \frac{1}{x-6}$

A) $\frac{x^2 - 36}{x-2}$

C) $\frac{2x-12}{x-2}$

B) $\frac{(x-6)^2}{x+2}$

D) $\frac{1}{x-2}$

$\frac{(x-6)(x+2)}{(x-2)(x+2)} \cdot \frac{1}{x-6}$

32) Simplify: $\frac{x^2 + 10x + 21}{x^2 - 9} \cdot \frac{1}{x+7}$

A) $\frac{x}{7}$

C) $\frac{x^2 + 14x + 49}{x+7}$

B) $\frac{1}{x-3}$

D) $\frac{(x^2 + 49)}{x+7}$

$\frac{(x+7)(x+3)}{(x-3)(x+3)} \cdot \frac{1}{x+7}$

33) As a fraction in lowest terms when $b \neq 1$, the expression $\frac{6}{b-1} \cdot \frac{5-5b}{10}$ is equivalent to

A) $-\frac{1}{3}$

C) -3

B) $\frac{3}{5}(1-b)$

D) $3(b-1)$

$\frac{\cancel{6}^3}{b-1} \cdot \frac{\cancel{5}^1(\cancel{1-b}^{-1})}{10 \cancel{2}^1}$

34) Simplify: $\frac{2 \cdot 10w^2}{8x} \cdot \frac{16x^2}{5w}$

$\frac{\cancel{2}^1 \cancel{10}^2 w^2}{\cancel{8}^2 x} \cdot \frac{\cancel{16}^2 x^2}{\cancel{5}^1 w}$
 $\frac{4wx}{1} = 4wx$

35) Simplify: $\frac{9a^3}{4b} \cdot \frac{8b^3}{3a^2}$

$\frac{\cancel{9}^3 \cancel{a}^2 b^2}{\cancel{4}^2 \cancel{b}^2}$
 $6ab^2$

36) Simplify: $\frac{x}{3x+15} \cdot \frac{2x^2+11x+5}{2x^2+x}$

$\frac{\cancel{x}}{3(\cancel{x}+5)} \cdot \frac{(2x+1)(x+5)}{x(2x+1)} = \frac{1}{3}$

37) As a fraction in lowest terms when $x \neq 2, 0, -2$, the expression $\frac{1}{x^2-4} \div \frac{x}{x-2}$ is equivalent to

A) $\frac{1}{x(x-2)}$

C) $\frac{-2}{x^2-4}$

B) $\frac{1}{x(x+2)}$

D) $\frac{1}{2}$

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

38) As a fraction in lowest terms when $x \neq 0$ and

$w \neq 0$, the expression $\frac{5x}{18w} \div \frac{10x}{9w}$ is equivalent to

A) $\frac{1}{4}$

C) $\frac{x^2 w^2}{4}$

B) $\frac{25x^2}{81w^2}$

D) 4

$\frac{\cancel{5}^1 x}{2 \cdot \cancel{18}^2 w} \cdot \frac{\cancel{9}^1 w}{\cancel{10}^2 x} = \frac{1}{4}$

39) Simplify: $\frac{7x^2 y^3}{9ab} \div \frac{14x^2 y}{3a^2 b^2}$

$\frac{\cancel{7}^1 x^2 y^3}{\cancel{9}^3 ab} \cdot \frac{\cancel{3}^1 a^2 b^2}{\cancel{14}^2 x^2 y}$
 $\frac{aby^2}{6}$

40) Simplify: $\frac{2x-14}{5x-10} \div \frac{x^2-49}{x^2-4}$

$$\frac{2(x-7)}{5(x-2)} \cdot \frac{(x-2)(x+2)}{(x-7)(x+7)} = \frac{2(x+2)}{5(x+7)}$$

41) What is the sum of $\frac{x+4}{x}$ and $\frac{x-4}{4x}$?

A) $\frac{1}{2}$

B) $\frac{2x}{x+4}$

C) $4+x$

D) $\frac{x^2+16}{4x}$

$$4(x+4) + x(x-4) = 4x+16+x^2-4x = x^2+16$$

42) What is the sum of $(c-5) + \frac{3}{c+2}$?

A) $\frac{c-2}{c+2}$

B) $c-5$

C) $\frac{c^2-3c-7}{c+2}$

D) $\frac{c^2-7}{c+2}$

$$(c+2)(c-5) + \frac{3}{(c+2)} = \frac{c^2-5c+2c-10+3}{c+2} = \frac{c^2-3c-7}{c+2}$$

43) What is $\frac{2}{x+3} + \frac{1}{x}$, $x \neq -3, 0$, expressed as a single fraction?

A) $\frac{3x+3}{x^2+3x}$

B) $\frac{3x+3}{2x+3}$

C) $\frac{3}{2x+3}$

D) $\frac{3x+1}{x^2+3x}$

$$\frac{x \cdot 2}{x(x+3)} + \frac{1(x+3)}{x(x+3)} = \frac{2x+x+3}{x(x+3)}$$

44) Expressed in simplest form, $\frac{3(x-7)}{3 \cdot 2} + \frac{x+2}{6}$ is equivalent to

A) $\frac{2x-5}{2}$

B) $\frac{8x-5}{12}$

C) $\frac{x^2-14}{12}$

D) $\frac{4x-19}{6}$

$$\frac{3x-21+x+2}{6} = \frac{4x-19}{6}$$

45) Express $\frac{4(x+2)}{3} + \frac{(x-3)3}{3 \cdot 4}$ as a single fraction in simplest form.

$$\frac{4x+8+x-9}{12} = \frac{5x-1}{12}$$

46) Combine and simplify: $\frac{3 \cdot 2x}{3 \cdot 3} + \frac{x}{9} + \frac{2x \cdot 3}{3 \cdot 3}$

$$\frac{6x+x+6x}{9} = \frac{13x}{9}$$

47) Combine and simplify: $\frac{3}{x^2-9} + \frac{2(x+3)}{(x-3)(x+3)}$

$$\frac{3+2x+6}{(x-3)(x+3)} = \frac{2x+9}{(x-3)(x+3)}$$

48) Expressed in simplest form, $\frac{2(5x+3)}{2 \cdot x} - \frac{x-1}{2x}$ is

A) $\frac{2x+2}{x}$

B) $\frac{9x-5}{2x}$

C) $\frac{9x+7}{2x}$

D) $\frac{4x+4}{3x}$

$$\frac{10x+6-x+1}{2x} = \frac{9x+7}{2x}$$

49) Expressed in simplest form, $\frac{2(x-7)}{2 \cdot 6} - \frac{3x-2}{12}$ is equivalent to

A) $\frac{-x-12}{12}$

B) $\frac{2x+5}{6}$

C) $\frac{2x+9}{6}$

D) $\frac{-x-16}{12}$

$$\frac{2x-14-3x+2}{12} = \frac{-x-12}{12}$$

50) The expression $\frac{(a+5)^6}{(a+5)(a-5)} \cdot \frac{a+5}{a^2-25}$ is equivalent to

- A) $\frac{5a}{a+5}$ C) $\frac{5}{a+5}$
 B) $\frac{5}{a-5}$ D) $\frac{5a}{a-5}$

$$\frac{6a+30-a-5}{(a+5)(a-5)}$$

$$\frac{5a+25}{(a+5)(a-5)}$$

51) Expressed in simplest form, $\frac{\frac{a-1}{a^2-1}}{\frac{a}{a^2}}$ is equivalent to

- A) $\frac{a}{a-1}$ C) $\frac{a+1}{a}$
 B) $\frac{a-1}{a}$ D) $\frac{a}{a+1}$

$$\frac{\frac{a-1}{a}}{\frac{a}{(a-1)(a+1)}}$$

$$\frac{a}{a+1}$$

52) What is the quotient of $\frac{x+3}{x^2-4} \div \frac{x^2-9}{x-2}$ when expressed in simplest form?

- A) $(x+2)(x+3)$ C) $\frac{1}{(x-3)(x-2)}$
 B) $\frac{1}{(x+2)(x-3)}$ D) $\frac{x-3}{x+2}$

$$\frac{x+3}{(x-2)(x+2)} \cdot \frac{x-2}{(x+3)(x-3)}$$

53) What is the positive root of x in the equation $\frac{4}{x-1} = \frac{x+1}{12}$, $x \neq 1$?

- A) $\sqrt{7}$ C) 7
 B) 24 D) 1

$$(x-1)(x+1) = 48 \rightarrow (x-7)(x+7) = 0$$

$$x^2 - 1 = 48 \rightarrow x^2 - 49 = 0$$

$$x = 7, -7$$

54) What is the solution set of $\frac{2x+3}{5} = \frac{x+6}{4}$?

- A) {9} C) {3}
 B) {6} D) {1}

$$8x+12 = 5x+30$$

$$3x = 18$$

$$x = 6$$

55) Solve for x : $\frac{2}{x+1} = \frac{x}{1}$

$$x(x+1) = 2$$

$$x^2 + x - 2 = 0$$

$$(x+2)(x-1) = 0$$

$$x = -2, x = 1$$

56) Solve by factoring: $\frac{1}{x-1} = \frac{x-1}{4}$

$$x^2 - 1x - 1x + 1 = 4$$

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

$$(x-3)(x+1) = 0$$

$$x = 3, x = -1$$

57) Solve by factoring: $\frac{2}{c-1} = \frac{c}{c+2}$

$$c^2 - c = 2c + 4$$

$$c^2 - 3c - 4 = 0$$

$$(c-4)(c+1) = 0$$

$$c = 4, c = -1$$

58) Solve: $\frac{2x-2x}{2x-1} + \frac{5x-3}{2x} = \frac{3}{2}$

$$A) x = \frac{4}{3} \text{ or } x = -2$$

$$B) \emptyset$$

$$C) x = -\frac{3}{4} \text{ or } x = 2$$

$$D) x = \frac{3}{4} \text{ or } x = -2$$

$$4x^2 + 5x = 6$$

$$4x^2 + 5x - 6 = 0$$

$$(4x-3)(x+2) = 0$$

$$4x-3=0, x+2=0$$

$$x = \frac{3}{4}, x = -2$$

59) Solve: $\frac{x \cdot 2x}{x \cdot 3} - \frac{4 \cdot 3 \cdot 5 \cdot x}{x \cdot 3 \cdot 3 \cdot x}$

$$A) x = \frac{3}{2} \text{ or } x = 4$$

$$B) x = -\frac{3}{2} \text{ or } x = -4$$

$$C) x = -\frac{3}{2} \text{ or } x = 4$$

$$D) x = \frac{3}{2} \text{ or } x = -4$$

$$2x^2 - 12 = 5x$$

$$2x^2 - 5x - 12 = 0$$

$$(2x+3)(x-4) = 0$$

$$2x+3=0, x-4=0$$

$$x = -\frac{3}{2}, x = 4$$

- 60) What is the solution set of the equation

$$\frac{x}{x-4} - \frac{1}{x+3} = \frac{28}{x^2 - x - 12}?$$

- A) $\{4, -6\}$ C) $\{4\}$
 B) $\{-6\}$ D) $\{\}$

$$x(x+3) - (x-4) = 28$$

$$x^2 + 3x - x + 4 = 28$$

- 61) Solve for
- x
- :
- $\frac{1}{x} + \frac{1}{6} = \frac{1}{2}$

$$\frac{6}{6x} + \frac{x}{6x} = \frac{3x}{6x}$$

$$6 + x = 3x$$

$$6 = 2x$$

$$x = 3$$

- 62) Solve for
- x
- :
- $\frac{1}{2} + \frac{5}{x-2} = 3$

$$\frac{x-2+10}{2(x-2)} = 3$$

$$\frac{x+8}{2(x-2)} = 3$$

$$x+8 = 6x-12$$

$$20 = 5x$$

$$x = 4$$

- 63) Solve for
- x
- :
- $\frac{5}{x-3} - \frac{30}{x^2-9} = 1$

$$\frac{5(x+3)-30}{(x-3)(x+3)} = 1$$

$$5x+15-30 = x^2-9$$

$$0 = x^2-5x+6$$

$$(x-2)(x-3) = 0$$

$$x = 2, x = 3$$

- 64) Solve for
- x
- :
- $\frac{9}{x} + \frac{9}{x-2} = 12$

$$\frac{9(x-2)+9x}{x(x-2)} = 12$$

$$9x-18+9x = 12x^2-24x$$

$$0 = 12x^2-42x+18$$

$$x = \frac{1}{2}, x = 3$$

- 65) Find the roots of the equation
- $x^2 + 8x + 15 = 0$
- .

$$(x+5)(x+3) = 0$$

$$x = -5, x = -3$$

- 67) What is the positive root of the equation

$$c^2 - 6c = 27?$$

$$c^2 - 6c - 27 = 0$$

$$(c-9)(c+3) = 0$$

$$c = 9, c = -3$$

- 68) What is the positive root of the equation

$$x^2 - 5x = 14?$$

$$x^2 - 5x - 14 = 0$$

$$(x-7)(x+2) = 0$$

$$x = 7, x = -2$$

- 69) Which of the following sets represents a relation?

- A) $\{2, 4, 6, 8, \dots\}$
 B) the set of all rational numbers
 C) $\{\text{student first names}\}$
 D) a list that matches students to their heights

↑
 rel. between
 2 variables

- 70) Which of the following sets represents a function?

- A) $\{(-4, 1), (6, 2), (-4, 3), (5, 2)\}$
 B) $\{(x, y) \mid x + 2 = y^2\}$
 C) $\{(-2, 5), (4, 1), (5, 1), (0, -2)\}$
 D) the set of real numbers

- 71) Which of the following sets is
- not
- a function?

- A) $\{(3, 1), (2, 3), (1, 1)\}$
 B) $\{(3, 1), (2, 2), (1, 3)\}$
 C) $\{(3, 1), (3, 2), (3, 3)\}$
 D) $\{(3, 2), (2, 2), (1, 2)\}$

#64 cont:

$$6(2x^2 - 7x + 3) = 0$$

$$6(2x-1)(x-3) = 0$$

$$2x-1=0 \quad x-3=0$$

$$2x=1$$

$$x = \frac{1}{2}$$

$$x = 3$$

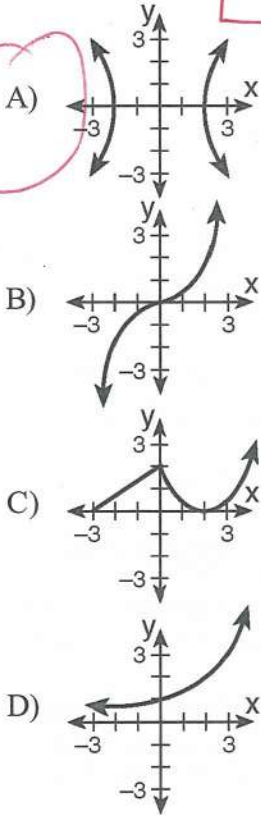
- 5) Find the roots of the equation
- $2x^2 = 13x - 15$
- .

$$2x^2 - 13x + 15 = 0$$

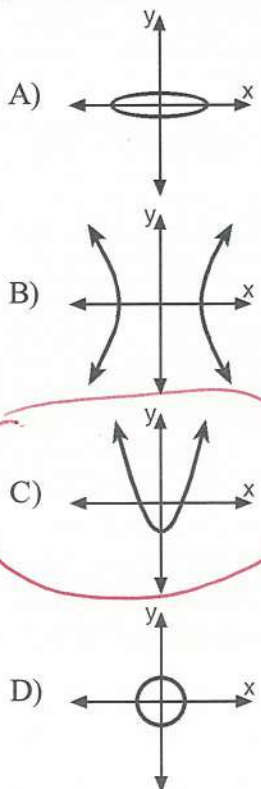
$$(2x-3)(x-5) = 0$$

$$x = \frac{3}{2}, x = 5$$

72) Which graph does not represent a function?

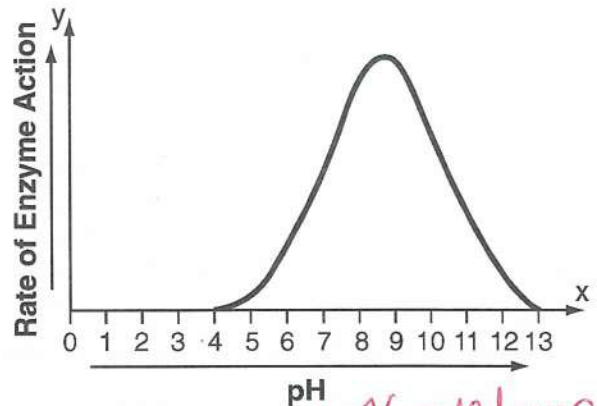


73) Which graph illustrates a quadratic relation whose domain is all real numbers?



domain is $\mathbb{R}$

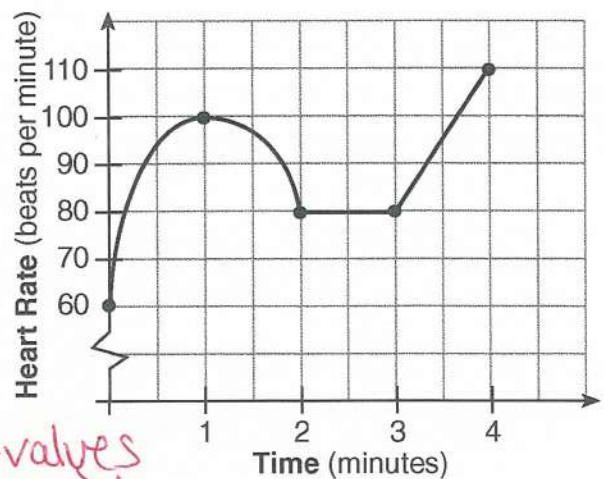
74) The effect of pH on the action of a certain enzyme is shown on the accompanying graph.



What is the domain of this function?

- A) $\{x \mid 4 \leq x \leq 13\}$
- B) $\{y \mid y \geq 0\}$
- C) $\{x \mid x \geq 0\}$
- D) $\{x \mid 4 \leq y \leq 13\}$

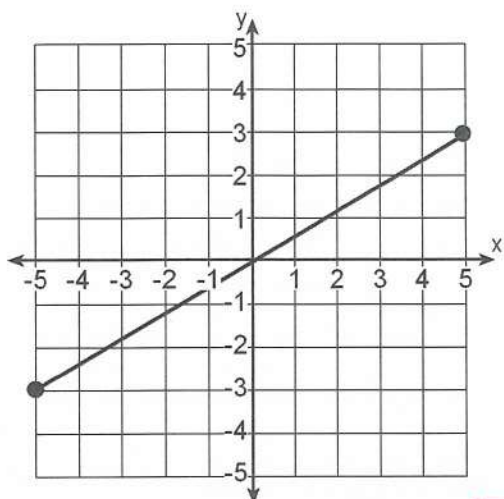
75) The accompanying graph shows the heart rate, in beats per minute, of a jogger during a 4-minute interval.



What is the range of the jogger's heart rate during this interval?

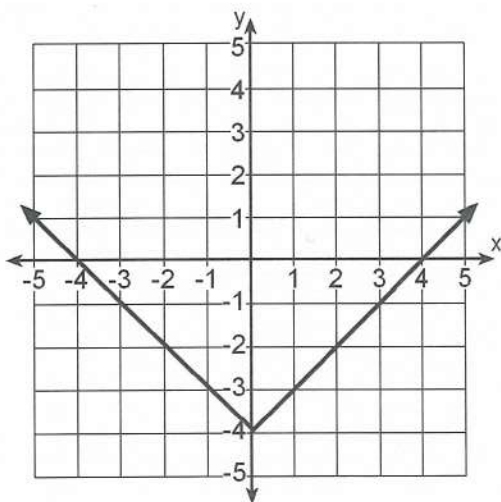
- A) 0-4
- B) 60-110
- C) 1-4
- D) 0-110

- 76) State the domain and range for the function shown below.



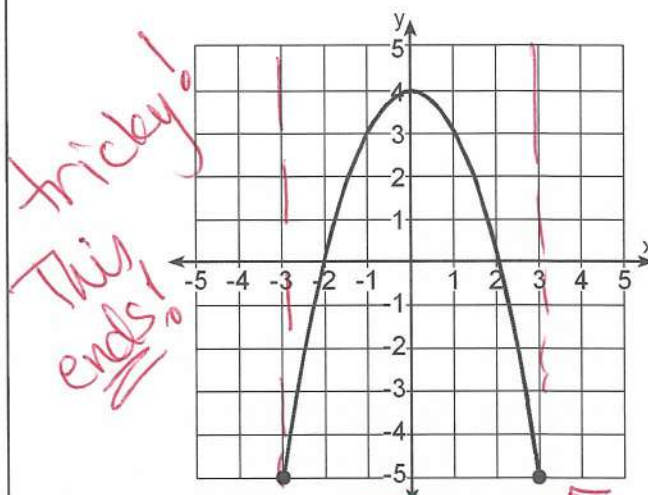
Domain: $-5 \leq x \leq 5$
 Range: $-3 \leq y \leq 3$

- 77) State the domain and range for the function shown below.



Domain: $\mathbb{R}$ (all Real #s)
 Range: $y \geq -4$

- 78) State the domain and range for the function shown below.



domain: $\mathbb{R} - 3 \leq x \leq 3$ ← ends
 range: $-5 \leq y \leq 4$

- 79) If $f(x) = 4x - 6$, what is the value of $f(\frac{x}{2})$?

A) $2x - 6$

C) $2x - 3$

B) $\frac{7}{2}x - 6$

D) $6 - 2x$

$$4\left(\frac{x}{2}\right) - 6 = \frac{4x}{2} - 6 = 2x - 6$$

- 80) If $f(x) = \frac{x-4}{x+4}$, then $f(4a)$ is equal to

A) $\frac{4a-1}{4a+1}$

C) $\frac{4a+1}{4a-1}$

B) $\frac{a+1}{a-1}$

D) $\frac{a-1}{a+1}$

$$\frac{4a-4}{4a+4} = \frac{4(a-1)}{4(a+1)}$$

- 81) If $g(x) = 2x^3 - 3x + 5$, find the value of $g(-2)$.

A) -5

C) -17

B) 27

D) -53

$$2(-2)^3 - 3(-2) + 5 = -16 + 6 + 5 = -5$$

82) If $f(x) = \frac{x^2 - 6x + 9}{x^2 - 9}$, find the value of $f(-2)$.

A) 2

B) -12

C) -5

D) $-\frac{1}{5}$

$$\frac{(-2)^2 - 6(-2) + 9}{(-2)^2 - 9} = \frac{25}{-5} = -5$$

83) If $f(x) = 3x - 1$ and $g(x) = 4x + 3$, what does $g(f(x))$ equal?

A) $12x + 8$

B) $12x - 1$

C) $12x^2 + 13x - 3$

D) $12x^2 + 5x - 3$

$$f(x) = 3x - 1$$

$$4(3x - 1) + 3$$

$$12x - 4 + 3$$

$$12x - 1$$

84) If $f(x) = 2x + 1$ and $g(x) = \frac{1}{2}(x - 1)$, what does $f(g(-4))$ equal?

A) 1

B) -4

C) $-\frac{1}{4}$

D) 4

$$g(-4) = \frac{1}{2}(-4 - 1)$$

$$= -\frac{5}{2}$$

$$f\left(-\frac{5}{2}\right) = 2\left(-\frac{5}{2}\right) + 1$$

$$= -5 + 1$$

$$= -4$$

85) If $g(x) = \sqrt{x}$ and $h(x) = x^3 - 1$, then $g(h(4))$ equals

A) 5

B) $\sqrt{63}$

C) 7

D) $\sqrt{11}$

$$h(4) = (4)^3 - 1 = 63$$

$$g(63) = \sqrt{63}$$

86) If $f(x) = x - 3$ and $g(x) = x^3$, then $f(g(3))$ equals

A) 30

B) 0

C) 6

D) 24

$$g(3) = (3)^3 = 27$$

$$f(27) = 27 - 3 = 24$$

87) If $f(x) = 2x$ and $g(x) = x - 4$, then $f(g(3))$ equals

A) 6

B) -6

C) 2

D) -2

$$g(3) = 3 - 4 = -1$$

$$f(-1) = 2(-1)$$

$$= -2$$