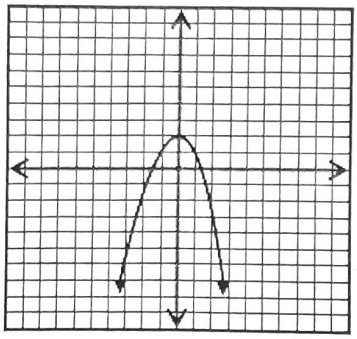
H Math 2

Name Answer Key

Unit 3 Review

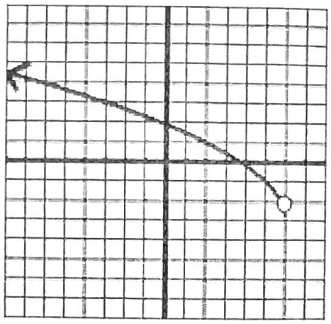
Date _____ Block _____

State the domain and range using interval notation.

1) 

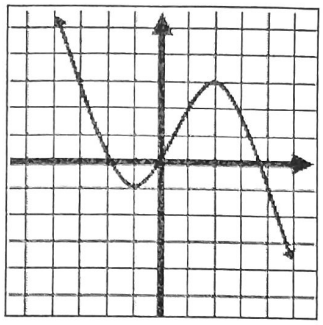
Domain: $(-\infty, \infty)$

Range: $(-\infty, 2]$

2) 

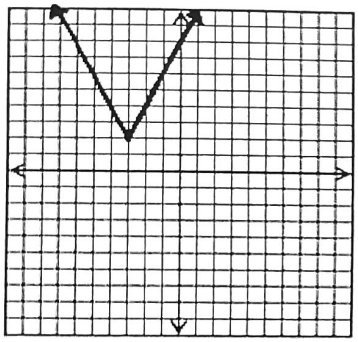
Domain: $(-\infty, 6)$

Range: $(2, \infty)$

3) 

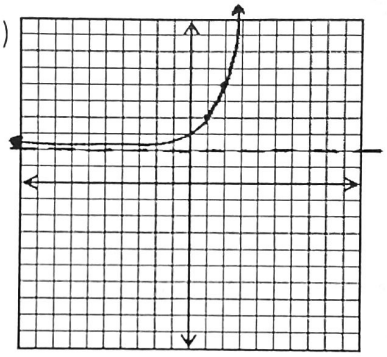
Domain: $(-\infty, \infty)$

Range: $(-\infty, \infty)$

4) 

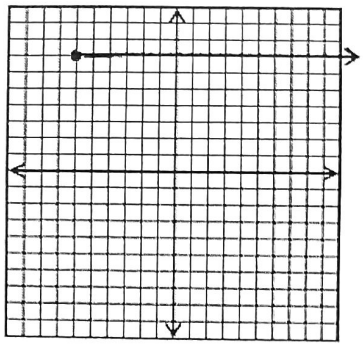
Domain: $(-\infty, \infty)$

Range: $[2, \infty)$

5) 

Domain: $(-\infty, \infty)$

Range: $(-\infty, \infty)$

6) 

Domain: $[6, \infty)$

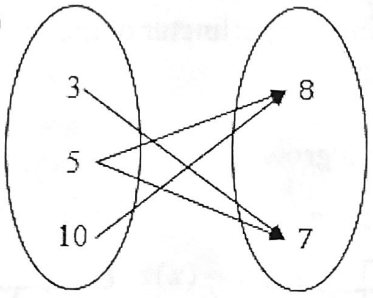
Range: $[7]$

Determine whether each of the following is a function.

7) Yes

x	$f(x)$
3	3
4	−1
−5	6
−3	−6
5	0

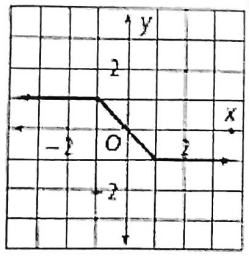
8) No



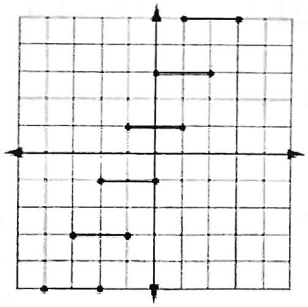
9) $\{(2,3),(4,-1),(6,-3),(8,-5)\}$

Yes

10) Yes



11) No



12) $\{(1,0),(1,4),(1,7),(1,9)\}$

No

Identify the Rate of Change in each of the representations below.

13) $(1,4),(3,-5)$

$\frac{-5-4}{3-1} = \frac{-9}{-1} = \boxed{9}$

14) $f(5) = 17$ and $f(8) = 29$

$\frac{29-17}{8-5} = \frac{12}{3} = \boxed{4}$

15) $h(x) = 3x + 1$

$\boxed{3}$

16) $f(1) = 3,\ f(n) = f(n-1) + 7$

$\boxed{7}$

17) $f(x) = x^2 - 1$ on the interval $[2,4]$

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

$f(4) = (4)^2 - 1 = 15$

$\frac{15-3}{4-2} = \frac{12}{2} = \boxed{6}$

18) $g(x) = 2^x$ on the interval $[0,3]$

$g(0) = 2^0 = 1$

$g(3) = 2^3 = 8$

$\frac{8-1}{3-0} = \boxed{\frac{7}{3}}$

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19) Here are the first four figures in a growing pattern.

Figure 1 | Figure 2 | Figure 3 | Figure 4

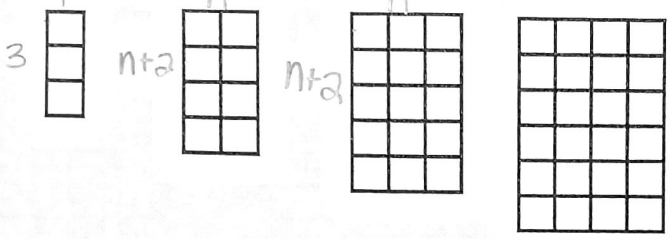

Figure	Area	First Diff
1	3	3
2	8	5 (2+2)
3	15	7 (2+2)
4	24	9 (2+2)

a) Write a **recursive rule** for finding the **total area** of the nth figure in the pattern.

$f(n) = f(n-1) + 2n + 1 \quad f(1) = 3$

b) Write an **explicit rule** for finding the **total area** of the nth figure in the pattern.

Area is a quadratic

$f(n) = (n)(n+2)$ or $f(n) = n^2 + 2n$

c) Write a **recursive rule** for finding the **perimeter** of the nth figure in the pattern.

$f(n) = f(n-1) + 4 \quad f(1) = 8$

Figure	Perimeter
1	8 (2+4)
2	12 (2+4)
3	16 (2+4)
4	20

d) Write an **explicit rule** for finding the **perimeter** of the nth figure in the pattern.

Perimeter is linear

$f(n) = 4n + 6$

20) Here are the first four figures in a growing pattern.

Figure 1 | Figure 2 | Figure 3

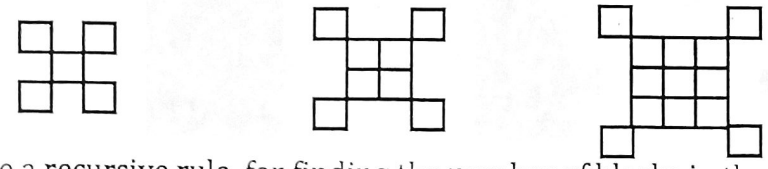

Figure	Blocks	
1	5	+1
2	8	+3 (2+2)
3	13	+5 (2+2)

a) Write a **recursive rule** for finding the **number of blocks in** the nth figure.

$f(x) = f(x-1) + 2x - 1 \quad f(1) = 5$

b) Write an **explicit rule** for finding the **number of blocks in** of the nth figure.

$f(x) = ax^2 + bx + c \quad a = 1 \quad c = 4$

$f(x) = x^2 + bx + 4$

$5 = (1)^2 + b(1) + 4 \rightarrow 5 = b + 5$

$b = 0$

$f(x) = x^2 + 4$

21) Function Type:

Quadratic

x	$f(x)$	
1	2	2
2	6	4
3	12	6
4	20	8

Recursive Rule:

$f(n)=f(n-1)+2n+0$

$f(1)=2$

Explicit Rule:

$f(n)=n^2+n$

Check:

$f(2)=(2)^2+2=6$

$f(3)=(3)^2+3=12$

22) Function Type:

Linear

x	$f(x)$	
-2	5	3
-1	8	3
0	11	3
1	14	3
2	17	

Recursive Rule:

$f(0)=11$

$f(n)=f(n-1)+3$

Explicit Rule:

$f(n)=3n+11$

23) Function Type:

Quadratic

x	$f(x)$	
1	6	1
2	9	3
3	14	5
4	21	7

Recursive Rule:

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

$f(1)=6$

Explicit Rule:

$f(n)=ax^2+bx+c$

$f(n)=x^2+bx+5$

$6=(1)^2+b(1)+5$

$6=b+6$

$b=0$

$f(n)=x^2+0x+5$

24) Function Type:

Exponential

x	$f(x)$
-1	$\frac{1}{9}$
0	$\frac{1}{3}$
1	1
2	3

Recursive Rule:

$f(n)=f(n-1)\cdot 3$

$f(0)=1/3$

Explicit Rule:

$f(n)=ab^x$

$f(n)=(\frac{1}{3})(3)^x$

Given the following functions determine the following operations.

$f(x)=2x^2-3x+2$ $\quad g(x)=2x-5$ $\quad h(x)=4x^3-5x^2+1$

$m(x)=-x^2+3x-6$ $\quad t(x)=5x+2$ $\quad d(x)=x^2+4x-8$

25) $h(x)+g(x)$

$(4x^3-5x^2+1)+(2x-5)$

$4x^3-5x^2+2x-4$

26) $g(x)\cdot t(x)$

$(2x-5)(5x+2)$

	$5x$	2
$2x$	$10x^2$	$4x$
-5	$-25x$	-10

$10x^2-21x-10$

27) $d(x)-f(x)$ DISTRIBUTE

$(x^2+4x-8)-(2x^2-3x+2)$

$x^2+4x-8-2x^2+3x-2$

$-x^2+7x-10$

28) $g(x)\cdot d(x)$

$(2x-5)(x^2+4x-8)$

$2x^3+8x^2-16x-5x^2-20x+40$

$2x^3+3x^2-36x+40$

29) $d(x)-m(x)$

$(x^2+4x-8)-(-x^2+3x-6)$

$x^2+4x-8+x^2-3x+6$

$2x^2+x-2$

30) $3g(x)-4t(x)$ DISTRIBUTE FIRST

$[3(2x-5)]-[4(5x+2)]$

$(6x-15)-(20x+8)$

$6x-15-20x-8$

$-14x-23$

Simplify & Classify.

31) $(x-4)^2$

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

$x^2-8x+16$

Quadratic Trinomial

32) $4x(x-3y)-5x(2x^2-5y)$

$4x^2-12xy-10x^3+25xy$

$-10x^3+4x^2+13xy$

Cubic Trinomial

33) $\frac{2x^8y^5}{8x^5y^4}$

$\frac{1x^3y}{4}$

Quartic Monomial

35) $x^2 \cdot x^{-5} \cdot x^3$

$x^0 = \boxed{1}$

36) $5(x-1)+(x-5)-2$

$5x-5+x-5-2$

$6x-12$

Linear Binomial

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37) Determine the GCF of $21a^5bc^3$ and $28a^3c$ → $7a^3c$

1
1 1
1 2 1
1 3 3 1
1 4 6 4 1
1 5 10 10 5 1
1 6 15 20 15 6 1

Expand:

38) $2(x+1)^6$

$2(x^6+6x^5+15x^4+20x^3+15x^2+6x+1)$

$=2x^6+12x^5+30x^4+40x^3+30x^2+12x+2$

$a=2y$ 39) $(x+2y)^4$

$x^4+4(2y)x^3+6(2y)^2(x^2)+4(2y)^3(x)+(2y)^4$

$=x^4+8x^3y+24x^2y^2+32xy^3+16y^4$

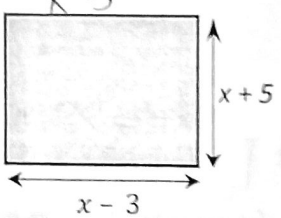
40) $(3x-5)^3$

$(x+a)^3=x^3+3x^2a+3xa^2+a^3$

$(1)(3x)^3+(3)(3x)^2(-5)+(3)(3x)(-5)^2+(-5)^3$ → $27x^3-135x^2+225x-125$

Find algebraic expressions for the perimeter and area of these rectangles.

41)

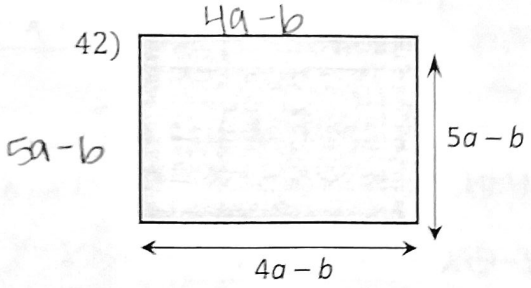


Perimeter: $4x+4$ units

Area: $x^2+2x-15$ units^2

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

42)



Perimeter: $18a-4b$ units

Area: $20a^2-9ab+b^2$ units^2

$(5a-b)(4a-b)$

$20a^2-5ab-4ab+b^2$