

Unit 1: Sequences and Series

- 1a) 4, 7, 10, 13
b) -2, 1, 6, 13
c) 3, 5, 9, 17
d) 1, 4/3, 3/2, 8/5
e) -1, 6, 25, 62
f) 1, 3, 6, 10
2) 3, -3, -15
3a) $4n - 2$
b) $2(3)^{n-1}$
c) $18 - 5n$
d) $(n-1)/n^2$

Unit 2 : Rational Expressions

Multiplication & Division:

1. 0 2. 3 3. $-\frac{2}{3}$ 4. 2 5. -2, 5 6. None 7. $16x$ 8. $\frac{5x}{3y^2}$ 9. $\frac{t}{t+4}$ 10. $\frac{a-5}{a}$
11. $\frac{x+3}{x-1}$ 12. $\frac{20a}{4a+3}$ 13. $\frac{6(b-5)}{b-3}$ 14. $\frac{x^2+9}{(x+2)(x-2)}$ 15. $\frac{5}{6}$ 16. 3 17. $\frac{a}{6(a-1)}$
18. $\frac{(x-7)(x-2)}{x}$ 19. $\frac{5}{2}$ 20. $\frac{3a^2}{a-b}$ 21. 1 22. $\frac{y+1}{y-8}$ 23. $\frac{x+3}{x(x+1)}$ 24. $\frac{t-1}{2}$

Addition & Subtraction:

1. 2 2. $\frac{2(x^2+3x+10)}{(x-2)(x+6)}$ 3. $a+4$ 4. $\frac{-y^2+7y}{(y-2)(y+1)(y+3)}$ 5. $\frac{2x-3}{x-1}$ 6. $\frac{2a-13}{(a-2)(a+2)}$
7. $\frac{-y-13}{6(y+3)}$ 8. $\frac{2}{a}$ 9. $\frac{x+7}{(x-5)(x+1)}$ 10. $\frac{2}{b+3}$ 11. $\frac{2a-5}{a(a-5)}$ 12. $\frac{4(y+2)}{(y-7)(y+7)}$
13. $\frac{3x+1}{x(x+1)}$ 14. $\frac{3b-4}{6b}$ 15. $\frac{4x-3}{x+2}$ 16. $\frac{x-20}{x(x-4)(x+3)}$ 17. $\frac{2a^2-4a-5}{(a-1)(a+1)}$ 18. $\frac{x+3}{x-5}$
19. $\frac{-23y-11}{6y}$ 20. $\frac{3x(x-6)}{(x-9)(x+9)}$

- 4a) arithmetic, $3n + 2$, 62
b) geometric, 3^n , 6561
c) arithmetic, $60 - 6n$, -30
5a) arithmetic, 32
b) geometric, 7
c) geometric, 10
d) arithmetic, 25
6) 126
7a) 48 m
b) 15.7 m
8a) geometric,
b) arithmetic, 5777
9) 12
10) 3995

Simplifying & Restrictions:

- 1a) $9/(x-7)$; -2, 7
b) $(2-x)/x$; 3, 0
c) ; -8, -3/2
d) $(x-2)/6$; 4, 0
e) $(2x+3)/(3x+2)$; -2/3
f) $(x+3)/(x-3)$; 1, 3

Unit 3 – Quadratic Functions

$1) y = ax^2 + bx + c$	$y = a(x-r)(x-s)$	$y = a(x-h)^2 + k$
$y = x^2 - 3x + 2$	$y = (x-2)(x-1)$	$y = (x-3/2)^2 - 1/4$
$y = 2x^2 + 8x - 24$	$y = 2(x+6)(x-2)$	$y = 2(x+2)^2 - 32$
$y = x^2 - 6x + 9$	$y = (x-3)(x-3)$	$y = (x-3)^2$

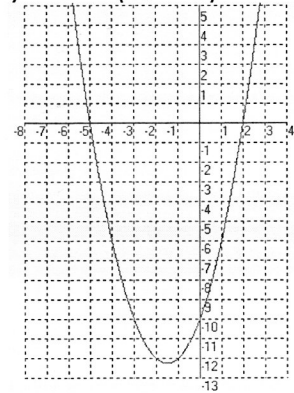
2) $y = -1(x+2)(x-5)$
 $y = -x^2 + 3x + 10$

- 3a) -2; 0 real roots
 b) 0; 1 double real root
 c) 7; 2 real roots

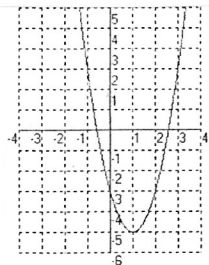
4a) $y = (x-3)^2 + 1$
 b) $y = 2(x-4)^2 - 21$
 c) $y = -3(x-0.5)^2 - 4.25$

5a) $x = +/- \sqrt{5}$
 b) $x = 4, 3$
 c) $x = -3/2, 5$
 d) $x = 5/3, -3$
 e) $x = -0.15, -6.85$

6a) $y = (x+1.5)^2 - 12.25$
 x – int: (-5, 0), (2, 0)
 y – int: (0, -10)



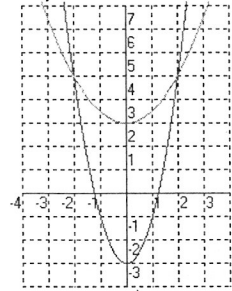
b) $y = 2(x-1)^2 - 5$
 x – int: (2.58, 0), (-0.58, 0)
 y – int: (0, -3)



7a) 40.5 m

b) 5.73 s

8a)



b) (-2, 5) and (2, 5)

Unit 4 – Transformations

1a) yes b) no c) yes

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

b) $f(3) = 19$ false

c) true

3) $f(2) = 7$

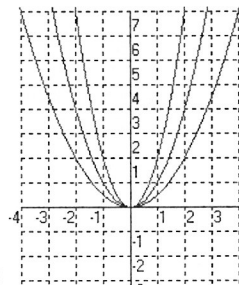
4) $f(-2) = -1$

5)

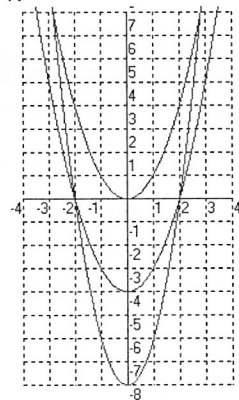
$y=x^2$	$y=2x^2$	$y=1/2 x^2$
(x, y)	(x, 2y)	(x, 1/2 y)
(-2, 4)	(-2, 8)	(-2, 2)
(-1, 1)	(-1, 2)	(-1, 1/2)
(0, 0)	(0, 0)	(0, 0)
(1, 1)	(1, 2)	(1, 1/2)
(2, 4)	(2, 8)	(2, 2)
D: $x \in \mathbb{R}$	$x \in \mathbb{R}$	$x \in \mathbb{R}$
R: $y \geq 0, y \in \mathbb{R}$	"	"

6)

$y=x^2$	$y=2(x^2-4)$	$y=x^2-4$
(x, y)	(x, 2y-8)	(x, y-4)
(-2, 4)	(-2, 0)	(-2, 0)
(-1, 1)	(-1, -6)	(-1, -3)
(0, 0)	(0, -8)	(0, -4)
(1, 1)	(1, -6)	(1, -3)
(2, 4)	(2, 0)	(2, 0)
D: $x \in \mathbb{R}$	$x \in \mathbb{R}$	$x \in \mathbb{R}$
R: $(y \geq 0)$	$y \geq -8$	$y \geq -4, y \in \mathbb{R}$



5)



6)

7) $f^{-1}(x) = (x + 7)/6$

8) $y = \sqrt{x}$ $y = 2\sqrt{x-4} + 3$

(x, y) (x + 4, 2y + 3)

(9, 3) (13, 9)

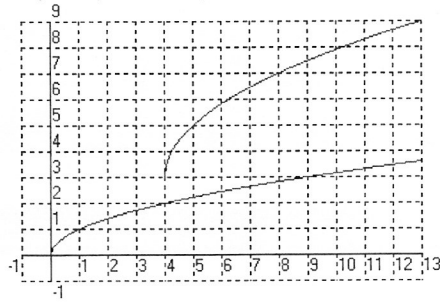
(4, 2) (8, 7)

(1, 1) (5, 5)

(0, 0) (4, 3)

D: $x \geq 0, x \in \mathbb{R}$ $x \geq 4, x \in \mathbb{R}$

R: $y \geq 0, y \in \mathbb{R}$ $y \geq 3, y \in \mathbb{R}$



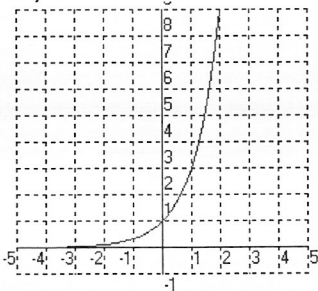
Unit 5 – Exponential Functions

- 1a) 1/16 b) 1/390625 c) 243 d) 1/256
 e) 256 f) 3/4 g) 3 h) 8
 i) 81 j) 1/8

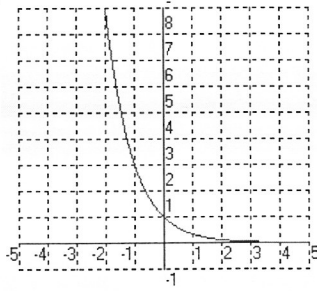
- 2a) 1.811 b) 0.055 c) 1000

- 3a) first differences = -2, linear
 b) ratio = 2, exponential
 c) in $y = ax^2 + bx + c$ form, quadratic

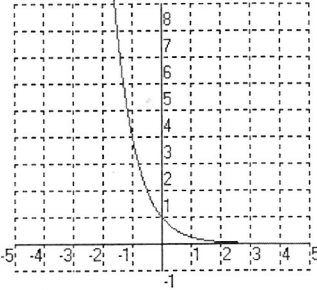
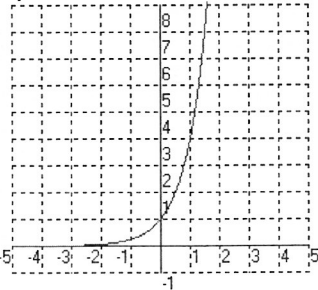
4a)



b)



c)



5a) ratio = 2, a = 1, b = 2

Equation: $y = 2^x$

Increasing

b) ratio = 1/4, a = 1, b = 1/4

Equation: $y = 1/4^x$

Decreasing

6a) none of the above

Domain: $0 \leq x \leq 10, x \in \mathbb{I}$

Range: $6 \leq y \leq 66, y \in \mathbb{I}$

b) Exponential, ratio = 3

Domain: $0 \leq x \leq 4, x \in \mathbb{R}$

Range: $y \geq 2, y \in \mathbb{R}$

7a) $V = 10000(0.75)^5 = \$2373.05$

b) $500 = 10000(0.75)^t$

$t = 10.4$ in about 11 years

8) $V = 1000(1.04)^{35} = \$3946.09$

Chart

Function	Vertex	# of x-int	Transform.	Domain & Range
$y = 3(x-2)^2 - 1$	(2,-1)	2	(x+2, 3y-1)	D: $x \in \mathbb{R}$ R: $y \geq -1, y \in \mathbb{R}$
$y = -1/3(x-2)^2 + 5$	(2,5)	2	(x+2, -1/3y+5)	D: $x \in \mathbb{R}$ R: $y \leq 5, y \in \mathbb{R}$
$y = x^2 - 25$	(0,-25)	2	(x, y - 25)	D: $x \in \mathbb{R}$ R: $y \geq -25, y \in \mathbb{R}$
$y = 1/2(x-5)^2$	(5, 0)	1	(x+5, 1/2y)	D: $x \in \mathbb{R}$ R: $y \geq 0, y \in \mathbb{R}$

Unit 6 – Financial Mathematics

1) Simple Interest: $I = Prt$

- i) \$450 ii) \$4500 iii) \$14500

2) Compound Interest: $A = P(1 + i)^n$

- a) $A = \$903.50$
 b) $P = \$24\,870.90$
 c) $P = \$3278.29$
 d) $i = 7.24\%$

3) Option 1: $A = \$1445.04$

Option 2: $A = \$1417.63$

Option 1 is better.