

## PreCalc 11 Chapter 1 Review Pack v1

### Answer Section

#### MULTIPLE CHOICE

1. ANS: A                   PTS: 1                   DIF: Easy                   REF: 1.1 Arithmetic Sequences  
LOC: 11.RF9           TOP: Relations and Functions           KEY: Procedural Knowledge
2. ANS: A                   PTS: 1                   DIF: Easy                   REF: 1.1 Arithmetic Sequences  
LOC: 11.RF9           TOP: Relations and Functions           KEY: Procedural Knowledge
3. ANS: B                   PTS: 1                   DIF: Easy                   REF: 1.1 Arithmetic Sequences  
LOC: 11.RF9           TOP: Relations and Functions           KEY: Procedural Knowledge
4. ANS: B                   PTS: 1                   DIF: Easy                   REF: 1.1 Arithmetic Sequences  
LOC: 11.RF9           TOP: Relations and Functions           KEY: Procedural Knowledge
5. ANS: C                   PTS: 1                   DIF: Moderate           REF: 1.2 Arithmetic Series  
LOC: 11.RF9           TOP: Relations and Functions           KEY: Procedural Knowledge
6. ANS: A                   PTS: 1                   DIF: Difficult           REF: 1.2 Arithmetic Series  
LOC: 11.RF9           TOP: Relations and Functions           KEY: Procedural Knowledge
7. ANS: D                   PTS: 1                   DIF: Easy                   REF: 1.3 Geometric Sequences  
LOC: 11.RF10          TOP: Relations and Functions           KEY: Conceptual Understanding
8. ANS: C                   PTS: 1                   DIF: Easy                   REF: 1.3 Geometric Sequences  
LOC: 11.RF10          TOP: Relations and Functions           KEY: Procedural Knowledge
9. ANS: A                   PTS: 1                   DIF: Difficult           REF: 1.3 Geometric Sequences  
LOC: 11.RF10          TOP: Relations and Functions           KEY: Procedural Knowledge
10. ANS: B                   PTS: 1                   DIF: Easy                   REF: 1.3 Geometric Sequences  
LOC: 11.RF10          TOP: Relations and Functions           KEY: Procedural Knowledge
11. ANS: C                   PTS: 1                   DIF: Easy                   REF: 1.3 Geometric Sequences  
LOC: 11.RF10          TOP: Relations and Functions           KEY: Procedural Knowledge
12. ANS: A                   PTS: 1                   DIF: Difficult           REF: 1.3 Geometric Sequences  
LOC: 11.RF10          TOP: Relations and Functions  
KEY: Problem-Solving Skills | Procedural Knowledge
13. ANS: D                   PTS: 1                   DIF: Moderate           REF: 1.4 Geometric Series  
LOC: 11.RF10          TOP: Relations and Functions           KEY: Procedural Knowledge
14. ANS: D                   PTS: 1                   DIF: Easy                   REF: 1.4 Geometric Series  
LOC: 11.RF10          TOP: Relations and Functions           KEY: Procedural Knowledge
15. ANS: C                   PTS: 1                   DIF: Moderate           REF: 1.5 Graphing Geometric Sequences and Series           LOC: 11.RF9 | 11.RF10  
TOP: Relations and Functions           KEY: Conceptual Understanding
16. ANS: C                   PTS: 1                   DIF: Easy                   REF: 1.5 Graphing Geometric Sequences and Series           LOC: 11.RF9 | 11.RF10  
TOP: Relations and Functions           KEY: Conceptual Understanding
17. ANS: B                   PTS: 1                   DIF: Easy                   REF: 1.5 Graphing Geometric Sequences and Series           LOC: 11.RF9 | 11.RF10  
TOP: Relations and Functions           KEY: Procedural Knowledge
18. ANS: C                   PTS: 1                   DIF: Moderate           REF: 1.5 Graphing Geometric Sequences and Series           LOC: 11.RF9 | 11.RF10  
TOP: Relations and Functions           KEY: Conceptual Understanding

19. ANS: D                   PTS: 1                   DIF: Moderate  
REF: 1.5 Graphing Geometric Sequences and Series                   LOC: 11.RF9 | 11.RF10  
TOP: Relations and Functions                   KEY: Conceptual Understanding | Procedural Knowledge
20. ANS: A                   PTS: 1                   DIF: Easy                   REF: 1.6 Infinite Geometric Series  
LOC: 11.RF10                   TOP: Relations and Functions                   KEY: Procedural Knowledge
21. ANS: B                   PTS: 1                   DIF: Easy                   REF: 1.6 Infinite Geometric Series  
LOC: 11.RF10                   TOP: Relations and Functions  
KEY: Conceptual Understanding | Procedural Knowledge
22. ANS: A                   PTS: 1                   DIF: Easy                   REF: 1.6 Infinite Geometric Series  
LOC: 11.RF10                   TOP: Relations and Functions                   KEY: Procedural Knowledge
23. ANS: B                   PTS: 1                   DIF: Easy                   REF: 1.6 Infinite Geometric Series  
LOC: 11.RF10                   TOP: Relations and Functions                   KEY: Procedural Knowledge
24. ANS: B                   PTS: 1                   DIF: Moderate                   REF: 1.6 Infinite Geometric Series  
LOC: 11.RF10                   TOP: Relations and Functions                   KEY: Procedural Knowledge

### SHORT ANSWER

25. ANS:  
No, this could not be an arithmetic sequence because the difference between consecutive terms is not constant.
- PTS: 1                   DIF: Easy                   REF: 1.1 Arithmetic Sequences  
LOC: 11.RF9                   TOP: Relations and Functions                   KEY: Conceptual Understanding
26. ANS:  
 $-3 - 1 + 1 + 3$
- PTS: 1                   DIF: Difficult                   REF: 1.2 Arithmetic Series  
LOC: 11.RF9                   TOP: Relations and Functions                   KEY: Conceptual Understanding
27. ANS:  
 $r = \frac{1}{5}, t_5 = 5, t_6 = 1$
- PTS: 1                   DIF: Moderate                   REF: 1.3 Geometric Sequences  
LOC: 11.RF10                   TOP: Relations and Functions                   KEY: Procedural Knowledge
28. ANS:  
10 924
- PTS: 1                   DIF: Moderate                   REF: 1.4 Geometric Series  
LOC: 11.RF10                   TOP: Relations and Functions                   KEY: Procedural Knowledge
29. ANS:  
The common ratio is  $\frac{1}{3}$ , which is between 0 and 1, so the partial sums increase and approach a constant value.
- PTS: 1                   DIF: Moderate                   REF: 1.5 Graphing Geometric Sequences and Series  
LOC: 11.RF9 | 11.RF10                   TOP: Relations and Functions  
KEY: Conceptual Understanding

30. ANS:  
 $r = 1.7$ , so the sum is not finite.

PTS: 1                      DIF: Easy                      REF: 1.6 Infinite Geometric Series  
 LOC: 11.RF10              TOP: Relations and Functions  
 KEY: Conceptual Understanding | Procedural Knowledge

### PROBLEM

31. ANS:  
 a)  $t_1 = 4, d = 2$

$$t_1 = 4$$

$$t_2 \text{ is } t_1 + d = 4 + 2, \text{ or } 6$$

$$t_3 \text{ is } t_2 + d = 6 + 2, \text{ or } 8$$

$$t_4 \text{ is } t_3 + d = 8 + 2, \text{ or } 10$$

$$t_5 \text{ is } t_4 + d = 10 + 2, \text{ or } 12$$

The first 5 terms are: 4, 6, 8, 10, 12

- b) The arithmetic sequence has  $t_1 = 4, d = 2$ , and  $n = 10$ .

$$t_n = t_1 + d(n - 1) \quad \text{Substitute: } t_1 = 4, d = 2, n = 10$$

$$t_{10} = 4 + 2(10 - 1) \quad \text{Solve for } t_{10}.$$

$$t_{10} = 22$$

There are 22 seats when 10 tables are arranged in a single row.

PTS: 1                      DIF: Moderate                      REF: 1.1 Arithmetic Sequences  
 LOC: 11.RF9                      TOP: Relations and Functions  
 KEY: Communication | Problem-Solving Skills

32. ANS:

$$\text{a) Use: } S_n = \frac{n[2t_1 + d(n-1)]}{2} \quad \text{Substitute: } n = 22, t_1 = 1, d = 3$$

$$S_{22} = \frac{22[2(1) + 3(22-1)]}{2}$$

$$S_{22} = 715$$

$$\text{b) Use: } S_n = \frac{n[2t_1 + d(n-1)]}{2} \quad \text{Substitute: } n = 22, t_1 = -7, d = -4$$

$$S_{22} = \frac{22[2(-7) + (-4)(22-1)]}{2}$$

$$S_{22} = -1078$$

PTS: 1                      DIF: Moderate                      REF: 1.2 Arithmetic Series

LOC: 11.RF9                      TOP: Relations and Functions

KEY: Conceptual Understanding | Procedural Knowledge

33. ANS:

The prices of the tickets form an arithmetic sequence with first 3 terms \$95, \$89, \$83, ...

The total cost of Joe's tickets is the sum of the first 10 terms of the arithmetic series:

\$95 + \$89 + \$83 + ...

$$\text{Use: } S_n = \frac{n[2t_1 + d(n-1)]}{2} \quad \text{Substitute: } n = 10, t_1 = 95, d = -6$$

$$S_{10} = \frac{10[2(95) - 6(10-1)]}{2}$$

$$S_{10} = 680$$

To buy 1 ticket from each section, Joe will have to spend \$680.

PTS: 1                      DIF: Difficult                      REF: 1.2 Arithmetic Series

LOC: 11.RF9                      TOP: Relations and Functions

KEY: Communication | Conceptual Understanding | Problem-Solving Skills

34. ANS:

a)  $r$  is  $\frac{2}{8} = \frac{1}{4}$

Use:  $t_n = t_1 r^{n-1}$       Substitute:  $t_n = 8, r = \frac{1}{4}, n = 4$

$$8 = t_1 \left(\frac{1}{4}\right)^{4-1}$$

$$t_1 = 512$$

$$t_2 = 512 \left(\frac{1}{4}\right) = 128$$

$$t_3 = 512 \left(\frac{1}{4}\right)^2 = 32$$

The first 3 terms are:

$$t_1 = 512, t_2 = 128, t_3 = 32$$

b) The sequence is convergent because the terms approach a constant value of 0.

PTS: 1      DIF: Moderate      REF: 1.3 Geometric Sequences

LOC: 11.RF10      TOP: Relations and Functions

KEY: Communication | Conceptual Understanding | Problem-Solving Skills

35. ANS:

The geometric sequence has first term 0.0005 and common ratio 2.

Use:  $t_n = t_1 r^{n-1}$       Substitute:  $t_1 = 0.0005, r = 2, n = 25$

$$t_{25} = 0.0005(2)^{25-1}$$

$$t_{25} = 8388.608$$

Term 25 is 8388.608.

PTS: 1      DIF: Moderate      REF: 1.3 Geometric Sequences

LOC: 11.RF10      TOP: Relations and Functions

KEY: Communication | Problem-Solving Skills

36. ANS:

Car

When the value of the car decreases by 13.5%, the new value is 86.5% of the original value.

To determine a depreciation value of 13.5%, multiply by 0.865.

The initial cost of the car is the first term. So, the value of the car at the end of 10 years is the 11th term.

The values, in dollars, at the end of each year form a geometric sequence with first term 38 500 and common ratio 0.865.

$$\text{Use: } t_n = t_1 r^{n-1} \qquad \text{Substitute: } t_1 = 38\,500, r = 0.865, n = 11$$

$$t_{11} = 38\,500(0.865)^{11-1}$$

$$t_{11} = 9028.63$$

At the end of 10 years, the value of the car is \$9028.63.

Truck

When the value of the truck decreases by 7.0%, the new value is 93% of the original value.

To determine a depreciation value of 7.0%, multiply by 0.93.

The initial cost of the truck is the first term. So, the value of the truck at the end of 10 years is the 11th term.

The values, in dollars, at the end of each year form a geometric sequence with first term 26 500 and common ratio 0.93.

$$\text{Use: } t_n = t_1 r^{n-1} \qquad \text{Substitute: } t_1 = 26\,500, r = 0.93, n = 11$$

$$t_{11} = 26\,500(0.93)^{11-1}$$

$$t_{11} = 12\,825.53$$

At the end of 10 years, the value of the truck is \$12 825.53.

The truck will be worth more at the end of 10 years.

PTS: 1                      DIF: Difficult                      REF: 1.3 Geometric Sequences

LOC: 11.RF10              TOP: Relations and Functions

KEY: Communication | Problem-Solving Skills

37. ANS:

$$\text{Use: } S_n = \frac{t_1(1-r^n)}{1-r}, r \neq 1 \quad \text{Substitute: } n = 6, S_n = -315, r = 2$$

$$-315 = \frac{t_1(1-2^6)}{1-2}$$

$$-315 = \frac{t_1(1-64)}{-1}$$

$$315 = -63t_1$$

$$t_1 = -5$$

So, the first term is  $-5$ .

PTS: 1                      DIF: Moderate              REF: 1.4 Geometric Series

LOC: 11.RF10              TOP: Relations and Functions

KEY: Problem-Solving Skills | Procedural Knowledge

38. ANS:

To determine  $t_1$ , use:

$$S_n = \frac{t_1(1-r^n)}{1-r}, r \neq 1 \quad \text{Substitute: } S_{12} = 12, n = 12, r = \frac{1}{4}$$

$$12 = \frac{t_1 \left( 1 - \frac{1}{4}^{12} \right)}{1 - \frac{1}{4}}$$

$$12 = \frac{t_1 \left( 1 - \frac{1}{16\,777\,216} \right)}{\frac{3}{4}}$$

$$9 = \frac{16\,777\,215}{16\,777\,216} t_1$$

$$t_1 = 9.0000\dots$$

The 1st jump is approximately 9.00 m.

To determine  $t_2$ , use:

$$t_n = t_1 r^{n-1} \quad \text{Substitute: } t_1 = 9.0000\dots, r = \frac{1}{4}, n = 2$$

$$t_2 = 9.0000\dots \left( \frac{1}{4} \right)^{2-1}$$

$$t_2 = 2.2500\dots$$

The 2nd jump is approximately 2.25 m.

To determine  $t_3$ , use:

$$t_n = t_1 r^{n-1} \quad \text{Substitute: } t_1 = 9.0000\dots, r = \frac{1}{4}, n = 3$$

$$t_3 = 9.0000\dots \left( \frac{1}{4} \right)^{3-1}$$

$$t_3 = 0.5625\dots$$

The 3rd jump is approximately 0.56 m.

PTS: 1

DIF: Difficult

REF: 1.4 Geometric Series

LOC: 11.RF10

TOP: Relations and Functions

KEY: Communication | Conceptual Understanding | Problem-Solving Skills



39. ANS:

Sample response:

For the term values to alternate between positive and negative, and increase in numerical value, the common ratio must be less than  $-1$ ; for example, with  $r = -\frac{5}{4}$ , a possible sequence is:  $-4, 5, -\frac{25}{4}, \frac{125}{16}, -\frac{625}{64}, \frac{3125}{256},$

...

PTS: 1                      DIF: Moderate              REF: 1.5 Graphing Geometric Sequences and Series

LOC: 11.RF9 | 11.RF10                      TOP: Relations and Functions

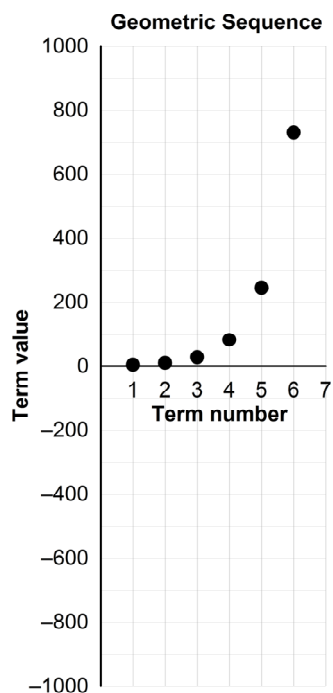
KEY: Communication | Conceptual Understanding | Procedural Knowledge

40. ANS:

a) The common ratio is 3, which is greater than 1, so the term values increase.

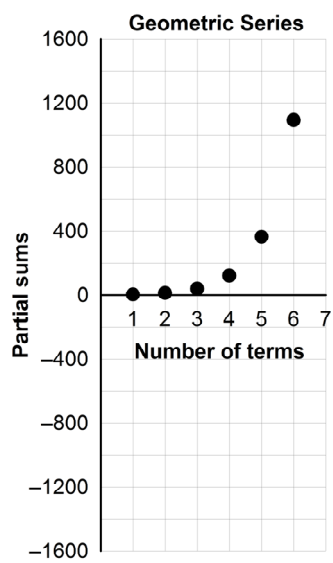
b) The common ratio is 3, which is greater than 1, so the partial sums increase.

c)



To graph the geometric series, determine the partial sums.

$S_1$	$S_2$	$S_3$	$S_4$	$S_5$	$S_6$
3	$S_2 = S_1 + t_2$	$S_3 = S_2 + t_3$	$S_4 = S_3 + t_4$	$S_5 = S_4 + t_5$	$S_6 = S_5 + t_6$
	$S_2 = 3 + (9)$	$S_3 = 12 + (27)$	$S_4 = 39 + (81)$	$S_5 = 120 + (243)$	$S_6 = 363 + (729)$
	$S_2 = 12$	$S_3 = 39$	$S_4 = 120$	$S_5 = 363$	$S_6 = 1092$



PTS: 1                    DIF: Moderate            REF: 1.5 Graphing Geometric Sequences and Series  
LOC: 11.RF9 | 11.RF10                    TOP: Relations and Functions  
KEY: Communication | Conceptual Understanding | Procedural Knowledge