⑥ $t_1 = 2$

$t_{10} = 29$

$S_{10} = ?$

$S_{10} = \frac{10}{2}(2+29)$

$= 5(31)$

$= 155$

---

③b) $4+7+10+\ldots+34$

$a = 4$

$d = 3$

$t_n = 34$

$t_n = a+(n-1)d$

$34 = 4+(n-1)3$

$34 = 4+3n-3$

$34 = 3n+1$

$33 = 3n$

$\boxed{11 = n}$

$S_{11} = \frac{11}{2}(4+34)$

$= \frac{11}{2}(38)$

$= 209$

---

⑧ $t_{12} = 15$

$t_{12} = a+(12-1)d$

$t_{12} = a+11d$

$\boxed{a+11d = 15}$

$S_{15} = 105$

$S_{15} = \frac{15}{2}(2a+(15-1)d)$

$S_{15} = \frac{15}{2}(2a+14d)$

$S_{15} = 15a+105d$

$\boxed{15a+105d = 105}$

$a+11d = 15$

$15a+105d = 105 \quad (\div 15)$

$a+11d = 15$

$\leftrightarrow a+7d = 7$

$4d = 8$

$\boxed{d = 2}$

$a+11d = 15$

$a+11(2) = 15$

$a+22 = 15$

$\boxed{a = -7}$

$(-7)+(-5)+(-3)$

$\boxed{-7-5-3}$

(3) d) $\frac{1}{6} + \frac{1}{3} + \frac{1}{2} + \ldots + \frac{5}{3}$

$a = \frac{1}{6}$

$d = \frac{1}{6}$

$t_n = \frac{5}{3}$

$\frac{5}{3} = \frac{1}{6} + (n-1)\frac{1}{6}$

$\frac{9}{6} = \frac{1}{6}n - \frac{1}{6}$

$\frac{5}{3} = \frac{1}{6}n$

$3n = 30$

$\boxed{n = 10}$

$S_{10} = \frac{10}{2}\left(\frac{1}{6} + \frac{5}{3}\right)$

$S_{10} = 5\left(\frac{11}{6}\right)$

$\boxed{S_{10} = \frac{55}{6}}$

Geometric Series

A Geometric Series is the sum of the terms of a finite Geometric Sequence. (Remember geometric sequences have a common ratio, $r = t_2 \div t_1$)

2+6+18+54+162+486.

To find the sum of a geometric series we use the following formula:

$$S_n = \frac{a(r^n - 1)}{r - 1}$$

Try solving the series above!

$a = 2$
$r = 3$
$n = 6$

$$S_6 = \frac{2(3^6 - 1)}{3 - 1}$$

$$= \frac{2(729 - 1)}{2}$$

$$= 728$$

Geometric Series

$$S_n = \frac{a(r^n - 1)}{r - 1}$$

Find the indicated sum for the following series:

$S_7 = 1+3+9+\ldots$

a = 1
r = 3
n = 7

$S_7 = \frac{1(3^7 - 1)}{3-1}$

$= \frac{1(2187-1)}{2}$

$= \frac{2186}{2} = 1093$

$S_8 = 8-4+2-1+\ldots$

$r = \frac{t_2}{t_1} = \frac{-4}{8} = -\frac{1}{2}$

a = 8
r = -½
n = 8

$S_8 = \frac{8\left(\left(-\frac{1}{2}\right)^8 - 1\right)}{-\frac{1}{2} - 1}$

$= \frac{8\left(\frac{1}{256} - \frac{256}{256}\right)}{-\frac{1}{2} - \frac{2}{2}}$

$= \frac{8\left(-\frac{255}{256}\right)}{-\frac{3}{2}}$

$= \frac{-2040}{256} \times \frac{2}{-3}$

$= \frac{-4080}{-768}$

$= \frac{85}{16}$

Geometric Series

$$S_n = \frac{a(r^n - 1)}{r - 1}$$

Find the sum of the following series:

2+4+8+...1024

$a = 2$

$r = 2$

$t_n = 1024$

$n = 10$

$S_n =$

$t_n = ar^{n-1}$

$1024 = (2)(2)^{n-1}$

$\frac{1024}{2} = \frac{(2)(2)^{n-1}}{2}$

$512 = 2^{n-1}$

$2^9 = 2^{n-1}$ → $* \frac{\log 512}{\log 2} = 9$

$9 = n - 1$

$10 = n$

$$S_{10} = \frac{2(2^{10} - 1)}{2 - 1}$$

$$= \frac{2(1024 - 1)}{1}$$

$$= 2(1023)$$

$$= 2046$$

Geometric Series

$$S_n = \frac{a(r^n - 1)}{r - 1}$$

Word Problems ***(READ CAREFULLY!)***

A ball is dropped from a height of 16 m. It bounces to ½ of its original height after each bounce. How high will the ball be after its third bounce?

How far has the ball travelled when it touches the ground after the third bounce?

Homework

Do #1 - 8
Omit #4