In the sequence $\overset{+3}{\underset{a_1}{2}}, 5, 8, 11, \ldots\ldots,$

find:

n

a_n

S_n

ⓐ a_{10}

$a_n = a_1 + d(n-1)$

$a_n = 2 + 3(n-1) = 3n-1$

$a_{10} = 2 + 3(10-1)$

29

ⓑ $S_{30} = \sum_{n=1}^{30} 3n-1$

$S_n = \dfrac{n(a_1 + a_n)}{2}$

$S_{30} = \dfrac{30(2 + a_{30})}{2}$

$\dfrac{\overset{15}{\cancel{30}}(2+89)}{\cancel{2}} = 1365$

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9 $a_1 = 3$

$a_n = 39$

$d = 4$

$a_n = a_1 + d(n-1)$

$39 = 3 + 4(n-1)$

$39 = 4n - 1$

$+1 \quad +1$

$40 = 4n \rightarrow n = 10$

$4n - 4 + 3$

$4n - 1$

a $\sum_{n=1}^{10} 4n - 1$

b $S_{10} = \frac{n(a_1 + a_n)}{2}$

$S_{10} = \frac{10(3+39)}{2}$

(3) $2+4+6+8+10+\overset{a_n}{12}$

$n=6$

$a_n=a_6=12$

$d=2$

$$S_n=\frac{n(a_1+a_n)}{2}$$

$$\frac{6(2+12)}{2}$$

(18) $a_5=15$

$d=2$

$n=12$

$a_n=a_1+d(n-1)$

Let $n=5$

$a_5=a_1+2(5-1)$

$15=a_1+8$

$-8 \qquad -8$

$7=a_1$

(a) $\sum_{n=1}^{12} 2n+5$

$a_n=a_1+d(n-1)$

$a_n=7+2(n-1)$

$a_n=2n+5$

114

$$\underbrace{8x^3+4x^2}_{GCF}\underbrace{-18x-9}_{GCF?}=0$$

Factor
x^2+x
$x(x+1)$

$$4x^2(2x+1)-9(+2x+1)=0$$

$$(2x+1)(4x^2-9)=0$$

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

$x=-1/2$ | $x=-3/2$ | $x=3/2$

126

$$\frac{5}{(3-\sqrt{2})} \cdot \frac{(3+\sqrt{2})}{\underbrace{(3+\sqrt{2})}_{\text{Conjugate of } 3-\sqrt{2}}} = \frac{15+5\sqrt{2}}{9+\cancel{3\sqrt{2}}-\cancel{3\sqrt{2}}-\underbrace{\sqrt{4}}_{-2}}$$

$$\frac{15+7\sqrt{2}}{10}$$

$$\frac{15+5\sqrt{2}}{7}$$

Geometric Series

Let's use the sequence $\overset{a_1}{3}, \overset{\cdot 4}{12}, 48, 192, \ldots$

$a_n = a_1 \cdot r^{n-1}$ Geom. Ex. formula

Ex.

(1) (a) Write the geometric series in Sigma Notation for the first 10 terms.

$$\sum_{n=1}^{10} \overset{*}{(3)}\, 4^{n-1}$$

$* \; a_n = a_1 \cdot r^{n-1}$

$3 \cdot 4^{n-1}$

(b) Find S_{10}

$$S_n = \frac{a_1(1-r^n)}{1-r}$$

$$S_{10} = \frac{3(1-4^{10})}{1-4} = \boxed{1{,}048{,}575}$$

② Find the sum of the first five terms of the geom. seq. whose first term is ~~2 and whose~~ fifth term is 162.

$\underset{a_1}{2}, \underline{-6}, \underline{18}, \underline{-54}, \underset{a_5}{162}$

$S_5 = ?$

$S_n = \dfrac{a_1(1-r^n)}{1-r}$

$r=3$

$S_5 = \dfrac{2(1-3^5)}{1-3}$

242

$r=-3$

$S_5 = \dfrac{2(1-(-3)^5)}{1-(-3)}$

122

$a_n = a_1 \cdot r^{n-1}$

Let $n=5$

$a_5 = 2 \cdot r^{5-1}$

$162 = 2 \cdot r^4$

$\dfrac{162}{2} = \dfrac{2 \cdot r^4}{2}$

$\sqrt[4]{81} = \sqrt[4]{r^4}$

$\pm 3 = r$

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