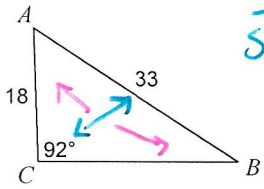
Math Studies Name Solutions ID: 1

Trig, Sequence, & Financial Review

Find each measurement indicated. Round your answers to the nearest tenth.

1) Find $m\angle B$



$\frac{33}{\sin 92} = \frac{18}{\sin B}$

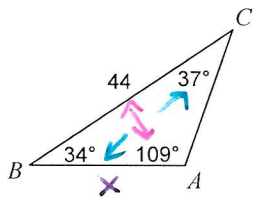
$33 \sin B = 18 \sin 92$

$\sin B = \frac{(18 \sin 92)}{33}$

$\sin B \approx .545$

$B = 33.0°$

2) Find AB



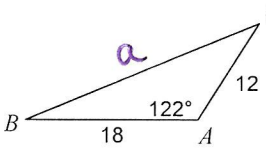
$\frac{44}{\sin 109} = \frac{x}{\sin 37}$

$44 \sin 37 = x \sin 109$

$\frac{(44 \sin 37)}{\sin 109} = x$

$x = 28.0$

3) Find BC



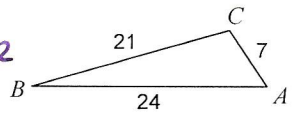
$a^2 = b^2 + c^2 - 2bc\cos A$

$a^2 = 12^2 + 18^2 - 2(12)(18)\cos 122$

$a^2 = 696.92...$

$a = 26.4$

4) Find $m\angle A$



$\cos A = \frac{b^2 + c^2 - a^2}{2bc}$

$\cos A = \frac{(7^2 + 24^2 - 21^2)}{(2 \cdot 7 \cdot 24)}$

$\cos A \approx .547...$ $A = 56.8°$

For each sequence, state if it is arithmetic, geometric, or neither.

5) $-1, 2, 7, 14, 23, \ldots$ (add constant)

Neither

6) $9, 209, 409, 609, 809, \ldots$ (multiply constant)

$+200 \Rightarrow$ Arithmetic

Find the first four terms in each sequence.

7) $a_n = 7 - 3n$

$a_1 = 7 - 3(1) = 4$

$a_2 = 7 - 3(2) = 1$

$a_3 = 7 - 3(3) = -2$

$a_4 = 7 - 3(4) = -5$

8) $a_n = -4 \cdot 5^{n-1}$

$a_1 = -4 \cdot 5^{1-1} = -4 \cdot 5^0 = -4$

$a_2 = -4 \cdot 5^{2-1} = -4 \cdot 5 = -20$

$a_3 = -4 \cdot 5^{3-1} = -4 \cdot 5^2 = -100$

$a_4 = -4 \cdot 5^{4-1} = -4 \cdot 5^3 = -500$

Find the tenth term in each sequence.

9) $a_n = -5 + 2n$

$a_{10} = -5 + 2(10)$

$a_{10} = 15$

10) $a_n = -2.5 \cdot (-4)^{n-1}$

$a_{10} = -2.5(-4)^{10-1} = -2.5(-4)^9 =$

655,360

Find the explicit formula for the given arithmetic sequence.

11) $-5, 5, 15, 25, \ldots$ $d = 10$, $u_1 = -5$

$u_n = u_1 + (n-1)d$

$= -5 + (n-1)(10)$

$= -5 + 10n - 10$

$u_n = 10n - 15$

12) $8, 5, 2, -1, \ldots$ $d = -3$ $u_1 = 8$

$u_n = u_1 + (n-1)d$

$u_n = 8 + (n-1)(-3)$

$u_n = 8 - 3n + 3$

$u_n = -3n + 11$

Find the explicit formula for the given geometric sequence.

13) 4, 12, 36, 108, ... $r=3$ $u_1=4$

$u_n = u_1 \cdot r^{n-1}$

$u_n = 4 \cdot (3)^{n-1}$

14) −2, 8, −32, 128, ... $r=-4$ $u_1=-2$

$u_n = u_1 \cdot r^{n-1}$

$u_n = (-2) \cdot (-4)^{n-1}$

Use a formula to evaluate each arithmetic series described.

15) $\sum_{n=1}^{13} (3n - 13)$

sum

$S_n = \frac{n}{2}(u_1 + u_n)$ $n=13$

$u_1 = 3(1)-13 = -10$

$u_{13} = 3(13)-13 = 26$

$\frac{13}{2}(-10+26) = 104$

16) The sum of the first 10 terms of 29, 38, 47, ...

$S_n = \frac{n}{2}(2u_1 + (n-1)d)$ $n=10$ $u_1=29$ $d=9$

$\frac{10}{2}(2 \cdot 29 + (10-1)(9)) = 5(58+81) = 695$

Use a formula to evaluate each geometric series described.

17) The sum of the first 8 terms of 4, −20, 100, ... $u_1=4$ $r=-5$

$S_n = \frac{u_1(r^n-1)}{r-1} = \frac{4((-5)^8-1)}{-5-1} = \frac{4(390{,}624)}{-6} = -260{,}416$

18) The sum of the first 5 terms of $-2, -1, -\frac{1}{2}, \ldots$ $u_1=-2$ $r=\frac{1}{2}$

$S_n = \frac{u_1(r^n-1)}{r-1} = \frac{(-2)\left(\left(\frac{1}{2}\right)^5-1\right)}{1/2-1} = \frac{-2(-.96875)}{-.5} = -3.875$ or $-\frac{31}{8}$

Find the indicated amount to the nearest penny.

19) Jill invests $5,393 in a savings account with a fixed annual interest rate of 8% compounded 2 times per year. What will the account balance be after 10 years?

$FV = PV\left(1 + \frac{r}{100k}\right)^{k \cdot n}$

$PV = 5393$ $r=8$ $k=2$ $n=10$

$FV = 5393\left(1 + \frac{8}{100 \cdot 2}\right)^{2 \cdot 10}$

$= 5393\left(1 + \frac{8}{200}\right)^{20} = \$11{,}816.73$

20) Ndiba invests a sum of money in a savings account with a fixed annual interest rate of 6% compounded 12 times per year. After 10 years, the balance reaches $2,183.28. What was the amount of the initial investment?

$FV = 2183.28$ $r=6$ $k=12$ $n=10$

$2183.28 = PV\left(1 + \frac{6}{100 \cdot 12}\right)^{12 \cdot 10}$

$2183.28 = PV\left(1 + \frac{6}{1200}\right)^{120}$

$2183.28 \div \left(1 + \frac{6}{1200}\right)^{120} = PV$

$PV = \$1200.00$