

A Turvy is a drawing which has a caption right-side up and has another caption if you turn it topsy-turvy.

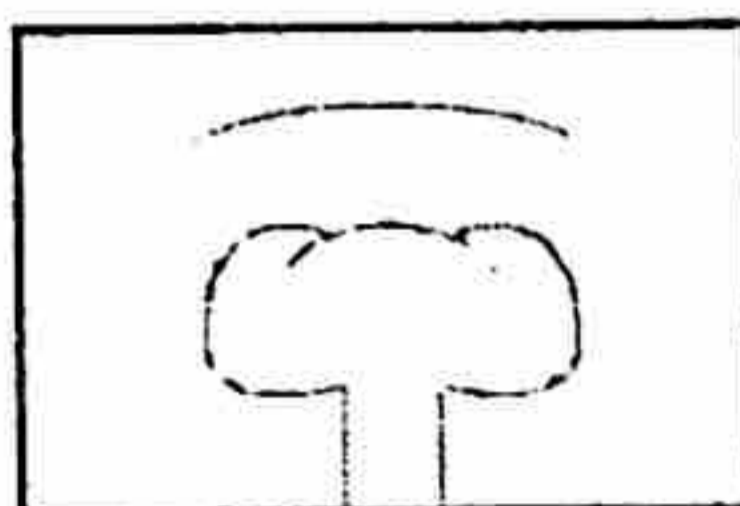
Caption for the picture:

Italian chef tossing pizza
14 08 17 07 14 17 03 12 01 16 02 08 18 10 10 14 03 04 11 14 15 15 17

Caption for the picture turned upside-down:

close up of a cabbage patch kid
12 07 18 10 16 05 11 18 02 17 12 17 13 13 17 04 16 11 17 08 12 01 09 14 06

To determine the titles to this turvy, solve the 18 problems about find the answers to each problem from the choices below. Then blank with the letter corresponding to the answer for that problem.



sequences and series. Then replace each numbered

- h 1. Determine the sum of the infinite series $5 + 1\frac{2}{3} + \frac{5}{9} + \dots$
- f 2. If the 6th term of an arithmetic sequence is 8 and the 11th term is -2, what is the first term?
- n 3. Find a_{10} in the sequence 1, 4, 7, 10, ...
- g 4. Determine the sum of the first 8 terms of the geometric sequence $4, -\frac{4}{3}, \frac{4}{9}, -\frac{4}{27}, \dots$
- u 5. Insert 4 geometric means between 160 and 5. What is the first of these geometric means?
- d 6. Determine the 5th term of the geometric sequence $2, -\frac{3}{2}, \frac{9}{8}, \dots$
- l 7. The 4th term of a geometric sequence is 0.5 and the 6th term is 0.125. Find the common ratio.
- t 8. Determine the sum of the infinite series $10, 3\frac{1}{3}, 1\frac{1}{9}, \dots$
- k 9. A person has 2 parents, 4 grandparents, and 8 great-grandparents, and so on. Determine the number of his ancestors during the 8 generations preceding his own (assuming no duplicates).
- s 10. Determine the sum of the first 25 positive even integers.
- p 11. Determine the sum of the arithmetic series $5 + 9 + 13 + \dots + 401$.
- c 12. Insert 4 arithmetic means between 1 and 36. Determine the first of these arithmetic means.
- b 13. If the 7th term of a geometric sequence is 192 and $r = 2$, determine the first term.
- i 14. Determine the sum of the first ten terms of the geometric sequence 15, 30, 60, 120, ...
- r 15. Determine the value of a_{17} for the sequence 6, 1, -4, ...
- e 16. Evaluate $\sum_{i=1}^3 (4i + 1)$.
- a 17. If the 6th term of an arithmetic sequence is 9 and the 11th term is -1, what is the first term?
- o 18. If the first term of an arithmetic sequence is -4 and the 12th term is 32, find the common difference.

ANSWERS:

a. 19	b. 3	c. 8	d. 81/128	e. 27	f. 18	g. 6500/2187
h. 7.5	i. 15,345	j. 17	k. 510	l. 1/2, -1/2	m. 0	n. 28
o. 36/11	p. 20,300	s. 650	t. 15	u. 80	w. 81	z. -74

$$(1) \quad r = \frac{\frac{5}{3}}{5} = \frac{5}{3} \cdot \frac{1}{5} = \frac{1}{3}$$

$$S = \frac{5}{1 - \frac{1}{3}} = \frac{5}{\frac{2}{3}} = \frac{5}{1} \cdot \frac{3}{2} = \frac{15}{2} = 7.5$$

$$(2) \quad a_6 = 8 \quad a_n = -2 \quad 8 = a_1 + (6-1)(-2)$$

$$-2 = 8 + (6-1)d$$

$$-10 = 5d \quad d = -2$$

$$8 = a_1 + 5(-2)$$

$$8 = a_1 - 10$$

$$18 = a_1$$

$$(3) \quad 1, 4, 7, 10, \dots$$

$$a_{10} = a_1 + (n-1)d$$

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

$$= 1 + 9(3)$$

$$= 28$$

$$(4) \quad 4, -\frac{4}{3}, \frac{4}{9}, -\frac{4}{27}, \dots$$

$$r = -\frac{1}{3}$$

$$S_8 = \frac{4(1 - (-\frac{1}{3})^8)}{1 + \frac{1}{3}} = \frac{4(1 - \frac{1}{6561})}{\frac{4}{3}} = \frac{1 - \frac{1}{6561}}{\frac{1}{3}} = \frac{6560}{6561} \cdot \frac{3}{1} = \frac{6560}{2187}$$

$$(5) \quad 160, \frac{80}{2}, \frac{40}{4}, \frac{20}{8}, \frac{10}{16}, 5$$

$$S = 160r^{n-1}$$

$$\frac{5}{160} = r^5$$

$$\sqrt[5]{\frac{1}{32}} = r$$

$$\frac{1}{2} = r$$

$$(6) \quad 2, -\frac{3}{2}, \frac{9}{8}$$

$$r = -\frac{3}{2} \cdot \frac{1}{2} = -\frac{3}{4}$$

$$\begin{aligned} a_5 &= 2 \left(-\frac{3}{4}\right)^4 \\ &= 2 \left(\frac{81}{256}\right) \\ &= \frac{81}{128} \end{aligned}$$

$$(8) \quad 10, 3\frac{1}{3}, 1\frac{1}{9}, \dots$$

$$r = \frac{10}{3} \cdot \frac{1}{10} = \frac{1}{3}$$

$$S = \frac{10}{1 - \frac{1}{3}} = \frac{10}{\frac{2}{3}} = 5 \cdot \frac{10}{1} \cdot \frac{3}{2} = 15$$

$$(9) \quad 2, 4, 8, \dots \quad r = 2$$

$$\begin{aligned} S_8 &= \frac{2(1 - 2^8)}{1 - 2} \\ &= \frac{2(1 - 256)}{-1} = 510 \end{aligned}$$

$$(11) \quad 5 + 9 + 13 + \dots + 401, \quad d = 4$$

$$401 = 5 + (n-1)4$$

$$\frac{296}{4} + 1 = n$$

$$100 = n$$

$$\begin{aligned} S_{100} &= \frac{100}{2} (5 + 401) \\ &= 20300 \end{aligned}$$

$$(7) \quad a_4 = 0.5 \quad a_6 = 0.125$$

$$a_6 = a_4 r^{n-1}$$

$$0.125 = 0.5 r^{3-1}$$

$$\frac{0.125}{0.5} = r^2$$

$$\pm 0.5 = r$$

$$(10) \quad 2, 4, 6, 8, \dots$$

$$a_{25} = 2 + (25-1)2$$

$$a_{25} = 2 + 24(2)$$

$$a_{25} = 50$$

$$S_{25} = \frac{25}{2} (2 + 50)$$

$$S_{25} = 650$$

$$(12) \quad 1, \frac{8}{5}, \frac{15}{5}, \frac{22}{5}, \frac{29}{5}, 36$$

$$36 = 1 + (6-1)d$$

$$\frac{35}{5} = d \quad d = 7$$

$$(13) \quad a_7 = 192 \quad r = 2 \quad a_1 = ?$$

$$192 = a_1 \cdot 2^{7-1}$$

$$192 = a_1 \cdot 2^6$$

$$\frac{192}{64} = a_1$$

$$3 = a_1$$

$$(18) \quad a_1 = -4 \quad a_{12} = 32$$

$$32 = -4 + (12-1)d$$

$$\frac{36}{11} = d$$

$$(14) \quad 15, 30, 60, 120 \quad r = 2$$

$$S_{10} = \frac{15(1-2^{10})}{1-2}$$

$$S_{10} = 15(1-1024)$$

$$S_{10} = 15345^{-1}$$

$$(15) \quad 6, 1, -4$$

$$d = -5$$

$$a_{17} = 6 + (17-1)(-5)$$

$$a_{17} = 6 + (16)(-5)$$

$$a_{17} = 6 - 80$$

$$a_{17} = -74$$

$$(16) \quad \sum_{i=1}^3 (4i+1) = 5+9+13 = 27$$

$$(17) \quad a_6 = 9 \quad a_{11} = -1 \quad a_1 = ?$$

$$-1 = 9 + (6-1)d$$

$$\frac{-1-9}{5} = d$$

$$-2 = d$$

$$9 = a_1 + (6-1)(-2)$$

$$9 = a_1 - 10$$

$$19 = a_1$$