1] a) True. Write n as $\frac{n}{1}$.   b) True. This is (a) defining property of rational numbers.

c) False. Negative rationals can't be.   d) True. Same reason as a).

e) False. $\frac{1}{3} = 0.3333...$ f) True, by definition.

2]

	$\mathbb{N}$	$\mathbb{Z}$	$\mathbb{Q}$	not rational	$\mathbb{R}$
$\frac{1}{3}$	X	X	✓	X	✓
$\sqrt{5}$	X	X	X	✓	✓
$-\sqrt{4}$	X	✓	✓	X	✓
0	X	✓	✓	X	✓
$-5/4$	X	X	✓	X	✓
$2.\overline{3}$	X	X	✓	X	✓
2π	X	X	X	✓	✓

3] 0, since $0 + (-0) = 0$.

4] Lots: ~~1, 2, 3, 12~~, $\sqrt{2}, \sqrt{3}, \sqrt{5}, \sqrt{7}$

5] We need to know how much longer we run each day.

6] $13 + \frac{n}{48} = 21$

$\frac{n}{48} = 8$

$n = 48 \cdot 8 = \boxed{384}$

7] a) True. $90° + 90° = 180°$.

b) Sometimes. ~~Yes~~ $60° + 30° = 90°$, but $40° + 20° \neq 90°$.

c) Sometimes. $\frac{1}{\frac{\sqrt{2}}{2}}$ but $3\frac{\sqrt{5}}{4}$.

d) Never. Two angles of any triangle are not supplementary because then the third angle would be $0°$.

e) ~~Sometimes. 120 and 60 are~~
Never. Adding two numbers greater than 90 gives a number greater than 180.

f) Sometimes. True for $120°$ and $60°$, false for $90°$ and $90°$.

g) True, since the right angle is $90°$ and all three sum to $180°$.

h) Never. The acute ~~for~~ angles of an obtuse triangle sum to less than ~~to~~ $90°$.

8] a) Sometimes, if it is a square.

b) Always. In order to have two parallel sides, a quadrilateral must be convex.

c) Sometimes, if it is a rectangle.

d) Sometimes, not for ⟋ all.

e) Never. Parallel lines do not intersect.

9] a) $180(n-2)°$

b) $\frac{180(n-2)°}{n}$. Since the regular n-gon has n angles and they sum to $180(n-2)$, each must measure $\frac{180(n-2)}{n} = \left(180 - \frac{360}{n}\right)°$

c) Only triangles, squares, and hexagons. All other regular n-gons have angle measures that do not divide $360°$, so there will be a gap (overlap in the attempted tessellation.

10] $24 \text{ fl.oz.} \cdot \frac{6}{10} \cdot \frac{1 \text{ cup}}{8 \text{ fl.oz}} \cdot \frac{1 \text{ gal}}{16 \text{ c}} \cdot \frac{1 L}{0.26 \text{ gal}} \approx \boxed{0.43 \text{ L of water}}$

↑ % not full
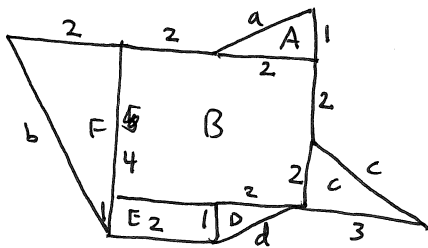
11] $\frac{3}{4} \text{ gal} \cdot \frac{16 c}{1 \text{ gal}} \cdot \frac{1 \text{ batch}}{\frac{1}{4} \text{ cup}} = \boxed{48 \text{ batches}}$

12) a) $d = r \cdot t$ (rate, distance, time)

$d = \left(340 \frac{m}{s}\right)(24s) \cdot \frac{1 \, km}{1000 \, m} = 8.16 \, km$

b) $d = rt \rightarrow 1 \, mi \approx 1.61 \, km \rightarrow = 1610 \, m$

$1610 = \left(340 \frac{m}{s}\right)t$

$t \approx \frac{1610}{340} \approx \boxed{4.74 \, s}$

13)

For perimeter, use Pyth. Thm to find a, b, c, d.

$2^2 + 5^2 = b^2 \Rightarrow b = \sqrt{29}$

$1^2 + 2^2 = a^2 \Rightarrow a = d = \sqrt{5}$
$\quad = d^2$

$2^2 + 3^2 = c^2 \Rightarrow c = \sqrt{13}$

$P = \sqrt{5} + 3 + \sqrt{13} + 3 + \sqrt{5} + 2 + \sqrt{29} + 4$

$= \boxed{12 + 2\sqrt{5} + \sqrt{13} + \sqrt{29} \text{ units}}$

For area, find A, B, C, D, E, F and add:

$A = \frac{1}{2}(1)(2) = 1 \quad B = 4 \cdot 4 = 16 \quad C = \frac{1}{2}(2)(3) = 3 \quad D = \frac{1}{2}(1)(2) = 1 \quad E = (1)(2) = 2 \quad F = \frac{1}{2}(2)(5) = 5$

$\text{Area} = 1 + 16 + 3 + 1 + 2 + 5 = \boxed{28 \text{ units}^2}$