

CMC Level F Answer Key

Note to teachers: The test is not timed. There is a total of 100 points for the test. Unit names are required for answers unless otherwise indicated. Points are sometimes awarded for steps in the process or showing the appropriate problem set-up.

Part 1.
[6 pts]

	Decimal	<div style="display: inline-block; width: 15px; height: 15px; background-color: black; margin-bottom: 5px;"></div> $\frac{\quad}{100}$	Percent	
a.	1.50	$\frac{150}{100}$ (1)	150% (1)	
b.	.60 (1)	$\frac{60}{100}$ (1)	60%	((or .6))
c.	.05 (1)	$\frac{5}{100}$	5% (1)	

Part 2.
[2 pts]

$$\underbrace{\overset{\textcircled{1}}{-9}} + \underbrace{\overset{\textcircled{1}}{+6}} = -3 \quad \text{((or } \underbrace{\overset{\textcircled{1}}{-9}} + \underbrace{\overset{\textcircled{1}}{+6}} = -3\text{))}$$

Part 3.
[3 pts]

- a. octagon (1)
- b. triangle (1)
- c. quadrilateral (1)

Part 4.
[3 pts]

- a. 3:16 p.m. (1)
- b. 5:01 a.m. (1)
- c. 10:22 p.m. (1)

Part 5.
[6 pts]

<p>a. $16 + 30 = 46$ (1) $3 + 9 + 6 = 18$ (1)</p>	$\begin{array}{r} 31 \\ \cancel{4}6 \\ -18 \\ \hline 28 \end{array}$ (1)
<p>b. $9 + 75 = 84$ (1) $12 + 56 + 1 = 69$ (1)</p>	$\begin{array}{r} 71 \\ \cancel{8}4 \\ -69 \\ \hline 15 \end{array}$ (1)

Part 6.
[8 pts]

a. $\overbrace{3^3 \times 3^4}^{(1)} = 3^7$ ⁽¹⁾

b. $\overbrace{9^1 \times 9^2 \times 9^5}^{(1)} = 9^8$ ⁽¹⁾

c. $\frac{7 \times 7 \times 7}{7 \times 7 \times 7 \times 7} = \frac{7^3}{7^4} = \frac{1}{7^1}$ ⁽¹⁾
(or 7^{-1}) ⁽¹⁾

d. $\frac{R \times R \times R \times R}{R \times R \times R \times R} = \frac{R^4}{R^4} = R^0$ ⁽¹⁾

Part 7.
[5 pts]

a. $-20 (-2) = \boxed{+40}$ ⁽¹⁾ ((or 40))

d. -14
 $x - 1$
 $\boxed{+ 14}$ ⁽¹⁾
((or 14))

e. $+ 3$
 $x - 4$
 $\boxed{- 12}$ ⁽¹⁾

b. $+4 (-6) = \boxed{-24}$ ⁽¹⁾

c. $-9 (+3) = \boxed{-27}$ ⁽¹⁾

Part 8.
[3 pts]

- a. 20 tigers ⁽¹⁾ (unit name required)
- b. 6 lions ⁽¹⁾ (unit name required)
- c. 2 lions ⁽¹⁾ (unit name required)

Part 9.
[5 pts]

a. container
area of $b \times h = v$
 $70 \times 12 = v$
840 cu in ⁽¹⁾
(unit name optional)

cube
area of $b \times h = v$
 $9 \times 3 = v$
27 cu in ⁽¹⁾
(unit name optional)

$$\begin{array}{r} 8 \overline{) 670} \\ \underline{56} \\ 110 \\ \underline{84} \\ 260 \\ \underline{252} \\ 80 \end{array}$$
 ⁽¹⁾ (for subtraction problem)

$\boxed{813}$ ⁽¹⁾ cu in ⁽¹⁾

Part 10.

[10 pts]

a. $3 \times \boxed{40} = 120$ $\frac{120}{3} = 3 \overline{)120}$
 (or $\frac{120}{3}$)

e. $35 \left(\frac{1}{35} \right) = \boxed{\frac{35}{35}} = 1$

i. $\frac{10}{15} \left(\frac{15}{10} \right) = \boxed{\frac{150}{150}} = 1$
 (or $\frac{10}{15} \left(\frac{15}{10} \right) = \boxed{\frac{15}{15}} = 1$)

b. 2.05
 $\times \quad 7$
 $\boxed{14.35}$

f. $\boxed{\frac{3}{5}} \times 5 = 3$

j. $7 \frac{4}{5}$
 $\times 1 \frac{1}{9}$
 $\boxed{8 \frac{30}{45}}$ (or $\frac{390}{45}$ or $8 \frac{2}{3}$)
 $\frac{39}{5} \times \frac{10}{9} = \frac{390}{45}$ $45 \overline{)390}$
 $\quad \underline{-360}$
 $\quad \quad 30$

c. $\frac{12}{8} \times \frac{5}{8} = \boxed{\frac{60}{64}}$ (or $\frac{15}{16}$)

g. 3.75
 $\times \quad .02$
 $\boxed{.0750}$ (or .0750)

d. $5.3 \times 100 = \boxed{530}$

h. $\boxed{50} \times 4 = 200$ $4 \overline{)200}$
 (or $\frac{200}{4}$)

Part 11. Rectangle

[5 pts]

$b \times h = A$
 30
 $\times 20$
 $\underline{\quad \quad}$
 $\boxed{600 \text{ sq in}}$
 ((unit name optional))

Circle

$\pi r^2 = A$
 $3.14 \times 10 \times 10 = A$
 $3.14 \times 100 = A$
 $\boxed{314 \text{ sq in}}$
 ((unit name optional))

Shaded Part

$\begin{array}{r} 591 \\ -600 \\ \hline -314 \end{array}$ (for subtraction problem)
 $\boxed{286 \text{ sq in}}$

Part 12.

[5 pts]

- a. 180°
- b. pentagon
- c. 180°
- d. 360°
- e. 90°

((degree signs optional))

Part 13.
[8 pts]

a. $b \times h = A$ (parallelogram) $\frac{b \times h}{2} = A$ (top Δ) $\frac{b \times h}{2} = A$ (bottom Δ)

$8 \times 3 = A$ $\frac{3 \times 4}{2} = A$ $\frac{8 \times 3}{2} = A$

$24^{\textcircled{1}}$ sq units $6^{\textcircled{1}}$ sq units $12^{\textcircled{1}}$ sq units
((optional)) ((optional)) ((optional))

$$\begin{array}{r} 24 \\ 6 \\ +12 \\ \hline \end{array}$$

A = 42 sq units^①

b. $\frac{b \times h}{2} = A$ (triangle) $b \times h = A$ (rectangle) $b \times h = A$ (parallelogram)

$\frac{5 \times 4}{2} = A$ $10 \times 3 = A$ $10 \times 2 = A$

$10^{\textcircled{1}}$ sq cm $30^{\textcircled{1}}$ sq cm $20^{\textcircled{1}}$ sq cm
((optional)) ((optional)) ((optional))

$$\begin{array}{r} 10 \\ 30 \\ +20 \\ \hline \end{array}$$

A = 60 sq cm^①

Part 14.
[5 pts]

a. $8 \overline{) 4600}^{\textcircled{1}}$ 575 pounds^① or $\frac{\text{pounds}}{\text{piles}} \frac{4600}{8} \left(\frac{\frac{1}{8}}{\frac{1}{8}} \right) = \frac{\square}{1}$

((results in same division problem))

b.

	#	x value	amount
Q	6	.25	1.50 ^①
D	14	.10	1.40 ^①
N	40	.05	2.00
	60	 	4.90

\$4.90^①

Part 15.
[5 pts]

a. $\frac{3}{5} \times \textcircled{F}$ $\textcircled{1}$ (multiplication problem)

$$\frac{3}{5} \times 210 = \frac{630}{5}$$

$$5 \overline{) 630} \quad \boxed{126 \text{ pounds}} \textcircled{1}$$

b. $\frac{\text{dif}}{3} \frac{J}{2} \rightarrow \frac{\text{Elm}}{3}$

or $\frac{2}{3} E = J$

$$\left(\frac{3}{2}\right) \frac{2}{3} E = 40 \frac{3}{2}$$

$$E = \frac{120}{2} = 60$$

	Ratio	Yrs
dif	1	
Jane	2	40
Elm	3	60

$$2 \overline{) 40}$$

$$3 \times 20 = 60$$

or

$$\frac{J}{E} \frac{2}{3} \left(\frac{20}{20}\right) = \frac{40}{\boxed{60}}$$

$\boxed{60 \text{ years old}} \textcircled{1}$

$\textcircled{1}$ For showing appropriate set-up (ratio table/equation or algebraic)

Part 16.
[6 pts]

a. $\frac{\text{dif}}{4} \frac{T}{3} \rightarrow \frac{S}{7}$

	Ratio	Sec
D	4	
T	3	19
S	7	

$$1. \frac{T}{S} \frac{3}{7} \left(\frac{19}{3}\right) = \frac{19}{\square}$$

$$\frac{6}{133} \times 7$$

$$\frac{133}{3} = 3 \overline{) 44 \frac{1}{3}}$$

$\textcircled{1}$ (division problem)

$\boxed{44 \frac{1}{3} \text{ seconds}} \textcircled{1}$

$$2. \text{ Dif} = \begin{array}{r} 3 \cancel{4} \frac{1}{3} \\ -19 \\ \hline 25 \frac{1}{3} \end{array}$$

$\textcircled{1}$ subtraction problem
(or ratio) setup, i.e., showing calculations

$\boxed{25 \frac{1}{3} \text{ seconds}} \textcircled{1}$

Part 16.
(cont.)
[6 pts]

b.

	Ratio	#
blue	3	
white	1	
total	4	25

① Correct ratio or multiplication setup

1. $\frac{\text{blue}}{\text{tot}} = \frac{3}{4} \left(\frac{25}{4} \right) = \frac{\square}{25}$ $3 \times \frac{25}{4} = \frac{75}{4}$

$18 \frac{3}{4}$ ① gallons ①

$4 \overline{) 75 \frac{3}{4}}$

2.
$$\begin{array}{r} 114 \frac{4}{4} \\ -18 \frac{3}{4} \\ \hline 6 \frac{1}{4} \end{array}$$
 ① Correct subtraction or ratio setup

$\frac{\text{white}}{\text{Total}} = \frac{1}{4} \left(\frac{25}{4} \right) = \frac{\square}{25}$

2. $6 \frac{1}{4}$ ① gallons ①

$4 \overline{) 25 \frac{1}{4}}$

Part 17.
[3 pts]

a. $\square \div 10 = \square$ ①

$\square \times 7 = \square$ ①

$\square - 2 = \square$ ①

Part 18.
[6 pts]

	Ratio	Expected	actual
yellow	6	120	128
blue	4	80	83
red	3	60	52
green	2	40	37
total	15	300	300

a. 300 trials ①

b.
$$\begin{array}{r} 128 \\ + 83 \\ + 37 \\ \hline 248 \end{array}$$
 ①

$$\begin{array}{r} 29 \\ 300 \\ - 248 \\ \hline 52 \end{array}$$
 ①

52 times ①

c. 37 times ①

d. 40 ①

e. yellow ①