

2008 ML-2

D ① Place value of 9 in 9,354

ten thousand

A ② dimes (d) and quarters (q)
12 coins
sum = \$1.80

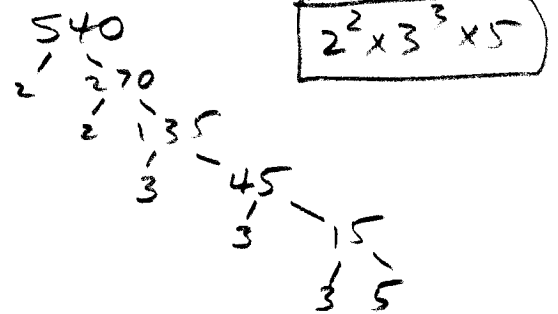
$$\begin{aligned}
 d + q &= 12 \rightarrow d = 12 - q \\
 (10d + 25q &= 180) \text{ multi. by } 10 \\
 10d + 25q &= 180 \\
 10(12 - q) + 25q &= 180 \\
 120 - 10q + 25q &= 180 \\
 15q &= 60 \rightarrow q = 4
 \end{aligned}$$

A ③ $27 \div 36 = \boxed{0.75}$

C ④ $50 + 30n$ where $n = 114$
 $50 + 30(114) = 50 + 3420 = \boxed{\$3470}$

B ⑤ $x - 5 = 6$
 $+5 +5$
 $\boxed{x = 11}$

C ⑥ Prime factorization of 540:



A ⑦ $\frac{2}{3} \square \frac{33}{55}$

cross multiply: $2 \times 55 \square 33 \times 3$
 $110 > 99$

so $\frac{2}{3} \square \frac{33}{55}$

OR common denominator:

$$\frac{2}{3} = \frac{110}{165}$$

$$\frac{33}{55} = \frac{99}{165}$$

$$A \quad (8) \quad 7\frac{1}{2} - 6\frac{3}{10} = 7\frac{5}{10} - 6\frac{3}{10} = 1\frac{2}{10} = \boxed{1\frac{1}{5}}$$

$$B \quad (9) \quad -8 - (-7) = -8 + 7 = \boxed{-1}$$

$$D \quad (10) \quad \frac{2}{3} + \frac{1}{5} = \frac{10}{15} + \frac{3}{15} = \boxed{\frac{13}{15} \text{ gallon}}$$

(11) Elapsed time between 7:16 AM and 4:27 PM

$$C \quad \begin{array}{l} 7:16 \text{ AM to } 12:00 \text{ PM (noon)} \rightarrow 4 \text{ hr } 44 \text{ min} \\ 12:00 \text{ PM to } 4:27 \text{ PM} \rightarrow 4 \text{ hr } 27 \text{ min} \\ \hline 8 \text{ hr } 71 \text{ min} \\ = \boxed{9 \text{ hr } 11 \text{ min}} \end{array}$$

$$A \quad (12) \quad 10\frac{1}{6} \text{ yds} \times \frac{3 \text{ ft}}{1 \text{ yd}} = \frac{61}{6} \times \frac{3}{1} = \frac{61}{2} = \boxed{30\frac{1}{2} \text{ feet}}$$

(13) A van travels 180 miles on 6 gallons.
How many gallons for 750 miles?

$$B \quad \frac{6}{180} = \frac{x}{750} \quad \text{cross multiply} \quad 4500 = 180x$$

$$\boxed{x = 25 \text{ gallons}}$$

or 6 gal for 180 miles $\rightarrow \frac{1 \text{ gal}}{30 \text{ miles}}$

$$750 \div 30 = 25$$

$$D \quad (14) \quad 59\% \text{ of } 11 = .59 \times 11 = \boxed{6.49}$$

$$B \quad (15) \quad 15\% \text{ of } 21.50 = (.15)(21.50) = 3.225 \sim \boxed{\$3.25}$$

$$\text{or } 10\% \text{ of } 21.50 = 2.15$$

$$5\% \text{ is } \frac{1}{2} \text{ of } 10\% = 1.075$$

$$\underline{3.225}$$

C (16) complement of $54^\circ = 90 - 54 = \boxed{36^\circ}$

D (17) Area of triangle with base = 74 feet, height = 17 feet
 $A = \frac{1}{2}bh = \frac{1}{2}(74)(17) = \boxed{629 \text{ ft}^2}$
 or estimate: $\frac{1}{2}(70)(15) = 525$ }
 $\frac{1}{2}(70)(20) = 700$ }

(18) Estimate area of circle with diameter of 48 meters

A $r = 24 \text{ m}$
 $A = \pi r^2 = (3.14)(24)^2 = 1808.64 \sim \boxed{1800 \text{ m}^2}$
 or estimate: $A = (3)(25)^2 = 3(625) = 1875$
 $\pi \sim 3, r \sim 25$ (1800 is only close answer)

(19) Total S.A. of rectangular prism with $l = 15.5, w = 16.5,$
 $h = 4.5$

A $SA = 2lw + 2lh + 2wh$
 $= 2(15.5)(16.5) + 2(15.5)(4.5) + 2(16.5)(4.5)$
 $= 511.5 + 139.5 + 148.5 = \boxed{799.5}$

or estimate: $l = 16, w = 16, h = 5$

$SA \sim 2(16)(16) + 2(16)(5) + 2(16)(5)$

$512 + 160 + 160 = 832$ (799.5 only close answer)

E (20) $\sqrt{74} \sim 8.6 \rightarrow$ between $\boxed{8 \text{ and } 9}$

$\sqrt{64} = 8, \sqrt{81} = 9$ so $\sqrt{74}$ is between 8, 9

B (21) $(2.75)(5.84) = \boxed{16.06}$

or
 Est: $(2.5)(6) = 15$
 $(3)(5.8) = 17.4$

A (22) $11 - \underbrace{6 \times 1.4}_{8.4} = 2.6$ $\boxed{<}$ $(11 - 6) \times 1.4 = 7$
 $5 \times 1.4 = 7$

- (23) Divisibility of 75,243 by 2, 3, 5, 9, 10
- 2: does not end in even number - NO
- A 3: sum of digits = 21 - YES
- 5: does not end in 0 or 5 - NO
- 9: sum of digits = 21 - NO
- 10: does not end in 0 - NO

- B (24) "A" train leaves every 12 minutes } look for LCM
 "E" train leaves every 9 minutes } $9 = 3 \times 3$
 $12 = 3 \times 4$
- LCM = $3 \times 3 \times 4 = 36$ minutes

- B (25) Jessie = $\frac{4}{9}$ mile } $\frac{4}{5}n = \frac{4}{9}$ mult. by $\frac{5}{4}$
 Nicole = "n" miles }
- $n = \frac{4}{9} \times \frac{5}{4} = \frac{5}{9}$ miles

- C (26) Sales price = 200 $(1 - .45)n = 200$
 45% off $.55n = 200$
 Original = n $n = 200 / .55 = \$363.64$
 $\approx \$365$

- D (27) mean of $\{18.1, 17.9, 16.8, 18.7, 15.1\}$
 notice, mean MUST be between high + low values
 so (B) 21.7 and (C) 14.4 cannot be correct
- Sum = 86.6 mean = $\frac{86.6}{5} = 17.32 \approx 17.3$

- C (28) Median of $\left\{\frac{1}{2}, \frac{1}{8}, \frac{5}{6}, \frac{3}{10}, \frac{7}{12}\right\}$
- in order: $\frac{1}{8}, \frac{3}{10}, \frac{1}{2}, \frac{7}{12}, \frac{5}{6}$ Median = $\frac{1}{2}$

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(29) Sunflower = 1.8 meters

D

Grows 12 cm in one week \rightarrow 12 cm = .12 m

$$\text{Current height} = 1.8 + .12 = \boxed{1.92 \text{ m}}$$

(30)

B



$$1 \text{ ft} = 12 \text{ in}$$

$$1 \text{ ft} = 12 \text{ in}$$

$$\text{Area} = 1 \times 1 = 1 \text{ ft}^2$$

$$\text{or } 12 \times 12 = 144 \text{ in}^2$$

$$1 \text{ ft}^2 = \boxed{144 \text{ in}^2}$$

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①



$$\text{Perimeter} = 2(8+7) = 30$$

$$\text{Area} = (8)(7) = 56$$

$$\frac{\text{Area}}{\text{Perimeter}} = \frac{56}{30} = 1 \frac{26}{30} = \boxed{1 \frac{13}{15}}$$

②

$$A = 0.824 \div 0.26 = 3.4$$

$$B = 6.4 \times 9.05 = 57.92$$

$$A + B = 57.92 + 3.4$$

$$= \boxed{61.32}$$

③

$$C \text{ kiloliters} = 120 \text{ liter}$$

$$C = 120/1000 = 0.12$$

$$D = 42.9 - 26.74$$

$$D = 16.16$$

$$CD = (0.12)(16.16) = \boxed{1.9392}$$

④

$$\text{Data: } \{2, 2, 3, 6, 7, 7, 8, 9, 10, 11, 12\} \quad \text{Mean} = \frac{77}{11} = 7$$

$$\text{Median} = 7$$

$$\frac{\text{Mean}}{\text{Median}} = \frac{7}{7} = \boxed{1}$$

⑤

GCF of 32 and 26

$$32 = 2 \times 2 \times 2 \times 2 \times 2$$

$$26 = 2 \times 13$$

$$\text{GCF} = 2$$

LCM of 12 and 16

$$12 = 2 \times 2 \times 3$$

$$16 = 2 \times 2 \times 2 \times 2$$

$$\text{LCM} = 2 \times 2 \times 2 \times 2 \times 3 = 48$$

$$\frac{\text{GCF}}{\text{LCM}} = \frac{2}{48} = \boxed{\frac{1}{24}}$$

⑥

$$A = 7\frac{3}{4} + 1\frac{5}{6} = 7\frac{9}{12} + 1\frac{10}{12} = 8\frac{19}{12} = 9\frac{7}{12} = \frac{115}{12}$$

$$B = 5\frac{1}{2} - 3\frac{3}{8} = 5\frac{4}{8} - 3\frac{3}{8} = 2\frac{1}{8} = \frac{17}{8}$$

$$A - B = \frac{115}{12} - \frac{17}{8} = \frac{230}{24} - \frac{51}{24} = \frac{179}{24} = \boxed{7\frac{11}{24}}$$

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⑦

$$C = \frac{5}{8} \times 4\frac{4}{9} = \frac{5}{8} \times \frac{40}{9} = \frac{25}{9}$$

$$D = \frac{7}{24} \div 1\frac{3}{4} = \frac{7}{24} \div \frac{7}{4} = \frac{7}{24} \times \frac{4}{7} = \frac{1}{6}$$

$$\left. \begin{array}{l} C = \frac{25}{9} \\ D = \frac{1}{6} \end{array} \right\} C \div D = \frac{25}{9} \div \frac{1}{6} \\ = \frac{25}{9} \times \frac{6}{1} = \frac{50}{3} \\ = \boxed{16\frac{2}{3}}$$

⑧

$$\left. \begin{array}{l} E = -8 - (-6) - 5 = -7 \\ F = -12 + 14 = -4 \end{array} \right\} EF = (-7)(-4) \\ = \boxed{28}$$

⑨

$$\left. \begin{array}{l} G = (-3)(-4)(-2) = -24 \\ H = -42 \div (-14) = 3 \end{array} \right\} \frac{G}{H} = \frac{-24}{3} = \boxed{-8}$$

⑩

$$\left. \begin{array}{l} 2x + 7 = -6 \\ \quad \quad \quad -7 \quad -7 \\ \hline 2x = -13 \\ x = -6.5 \end{array} \right\} \left. \begin{array}{l} \frac{1}{4}y - 1 = 1 \\ \quad \quad \quad +1 \quad -1 \\ \hline \frac{1}{4}y = 2 \\ y = 8 \end{array} \right\} xy = (-6.5)(8) = \boxed{-52}$$

⑪

$\frac{30}{12} = \frac{6}{K}$ $S = \text{slope between } (7, 2) \text{ and } (-5, 4)$

$$K = \frac{(12)(6)}{30} = 2.4 \quad S = \frac{4-2}{-5-7} = \frac{2}{-12} = -\frac{1}{6}$$

$$KS = (2.4)\left(-\frac{1}{6}\right) = \boxed{-0.4}$$

⑫

P% of 32 is 12

Q is 27% of 250

$$\frac{P}{100} = \frac{12}{32}$$

$$Q = (.27)(250)$$

$$P = \frac{1200}{32} = 37.5$$

$$Q = 67.5$$

$$P - Q = 37.5 - 67.5 = \boxed{-30}$$

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(13)

$$R = \% \text{ increase } 32 \text{ to } 35 = \frac{35-32}{32} \times 100 = 9.375$$

$$S = \% \text{ decrease } 48 \text{ to } 45 = \frac{48-45}{48} \times 100 = 6.25$$

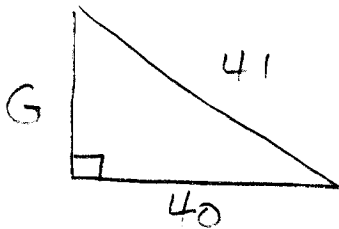
$$R + S = 9.375 + 6.25 = \boxed{15.625}$$

(14) Supplementary of $86^\circ = 180 - 86 = 94$

Complementary of $86^\circ = 90 - 86 = 4$

$$\frac{\text{Supplementary}}{\text{Complementary}} = \frac{94}{4} = \boxed{23.5}$$

(15)



$$G^2 + 40^2 = 41^2$$

$$G^2 + 1600 = 1681$$

$$\begin{array}{r} -1600 \\ -1600 \end{array}$$

$$G^2 = 81 \implies$$

$$G = 9$$

$$H = \text{area of triangle} = \frac{1}{2}(9)(40) = 180$$

$$\frac{G}{H} = \frac{9}{180} = \boxed{\frac{1}{20}}$$