

Alg. 2 ~ ACT Practice

Solutions
2010-2011 ACT

#1-32

① $|7-3| - |3-7| = ?$

$$|4| - |-4|$$

$$4 - 4 = \boxed{0}$$

② $C = \text{Charge } (\$)$ $h = \text{hours worked}$

$C = 45h + 30$ if $C = \$210$, $h = ?$

$$\begin{array}{r} 210 = 45h + 30 \\ - 30 \qquad - 30 \end{array}$$

$$180 = 45h$$

$$\therefore \boxed{h = 4 \text{ hrs}}$$

③ Vehicle A $\Rightarrow 14 \frac{\text{mi}}{\text{gal}}$ $\Rightarrow$ How many more
gal for A if
trip = 1008 mi
B $\Rightarrow 36 \frac{\text{mi}}{\text{gal}}$

$$A \Rightarrow \frac{1008 \text{ mi}}{14 \frac{\text{mi}}{\text{gal}}} = \frac{504}{7} = 72 \text{ gal}$$

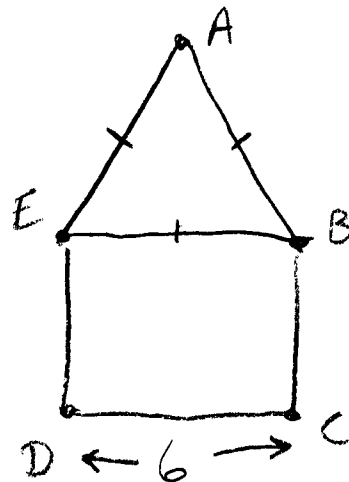
$$B \Rightarrow \frac{1008}{36} = \frac{112}{4} = -28 \text{ gal}$$

$\boxed{44 \text{ gal more}}$

$$\textcircled{4} \quad \underline{\underline{t^2 - 59t + 54 - 82t^2 + 60t}}$$

$$\boxed{-81t^2 + t + 54}$$

⑤



$\triangle AEB = \text{Equilateral}$

$\square BCDE = \text{Square}$

Perimeter $ABCDE$?

$\therefore$ SIDES OF SQUARE
EQUAL SIDE OF $\triangle$

$$\text{Perimeter} = 5 \cdot 6 = \boxed{30 \text{ units}}$$

$$\textcircled{6} \quad (4z+3)(z-2)$$

$$4z^2 - 8z + 3z - 6$$

$$\boxed{4z^2 - 5z - 6}$$

$$\textcircled{7} \quad 40\% = .4 = \frac{4}{10}$$

$$\frac{.4X}{.4} = \frac{8}{.4} \quad \therefore X = \frac{8}{\frac{4}{10}} = 8 \cdot \frac{10}{4} = 20$$

$$15\% = .15 = \frac{15}{100} = \frac{3}{20}$$

$$.15(20) = \frac{3}{20} \cdot 20 = \boxed{3}$$

$\textcircled{8}$ Find X if

$$X - 2$$

$$X - 1$$

$$X$$

$$X + 1$$

$$X + 2$$

$$\textcircled{+} \quad X + 3$$

$$6X + 3 = 447$$

$$6X = 444$$

$$X = \frac{444}{6} = \frac{222}{3}$$

$$\boxed{X = 74}$$

$$\textcircled{9} \quad M = \left(\frac{X_1 + X_2}{2}, \frac{Y_1 + Y_2}{2} \right) \quad \begin{array}{|l} (X_1, Y_1) = A \\ (7, 3) = B \end{array}$$

$$(5, 4) = \left(\frac{X_1 + 7}{2}, \frac{Y_1 + 3}{2} \right)$$

$$\therefore 5 = \frac{X_1 + 7}{2}$$

$$10 = X_1 + 7$$

$$X_1 = 3$$

$$4 = \frac{Y_1 + 3}{2}$$

$$8 = Y_1 + 3$$

$$5 = Y_2$$

$$(3, 5) \text{ Point A}$$

⑩

$$M_{AB} = \frac{5-2}{4-0} = \frac{3}{4} \therefore m_{\perp} = -\frac{4}{3}$$

$$m_{AD} = \frac{3}{4}$$

$$\overline{AD} \Rightarrow 5 = -\frac{4}{3}(4) + b$$

$$\frac{15}{3} = 5 = -\frac{16}{3} + b$$

$$\frac{31}{3} = b \therefore y = -\frac{4}{3}x + \frac{31}{3}$$

$$\overline{CD} \Rightarrow -6 = \frac{3}{4} \cdot 6 + b$$

$$-\frac{12}{2} = -6 = \frac{9}{2} + b$$

$$-\frac{21}{2} = b \therefore y = \frac{3}{4}x - \frac{21}{2}$$

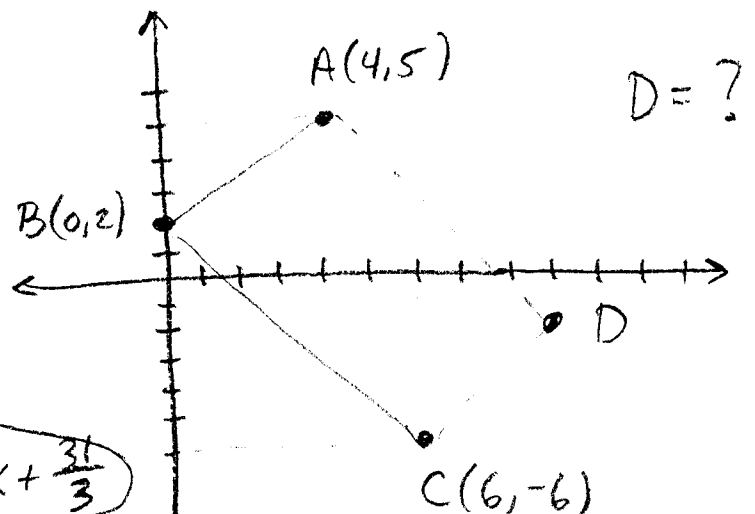
$\overline{AD}$
 $\overline{CD}$

$$-\frac{4}{3}x + \frac{31}{3} = \frac{3}{4}x - \frac{21}{2}$$

$$-16x + 124 = 9x - 126$$

$$250 = 25x \therefore x = 10$$

$$y = -3$$

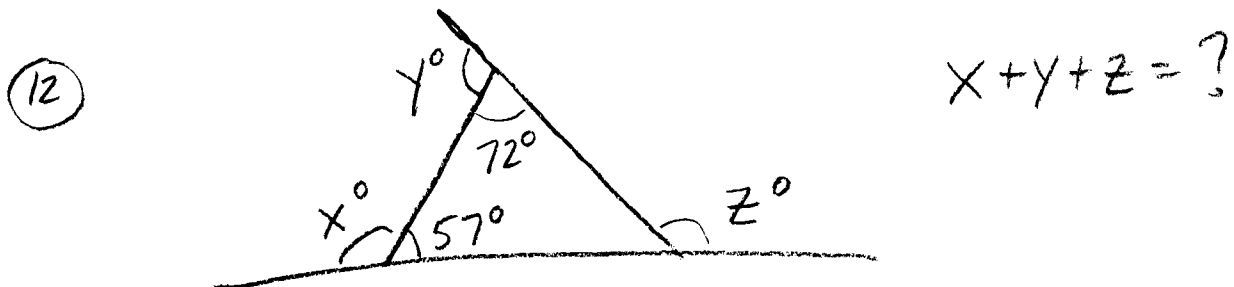


$$\textcircled{11} \quad \begin{array}{ccc} \cancel{5} & 10 & \cancel{15} \end{array} \quad [2 \times 3] \cdot [3 \times 1] = [2 \times 1] \checkmark$$

$$\begin{bmatrix} 100 & 200 & 150 \\ 120 & 50 & 100 \end{bmatrix} = \begin{bmatrix} 500 + 2000 + 2250 \\ 600 + 500 + 1500 \end{bmatrix}$$

$$= \begin{bmatrix} 4750 \\ 2600 \end{bmatrix}$$

$$\boxed{\nabla 7350}$$



$$y = 180 - 72 = \textcircled{108^\circ}$$

$$z \Rightarrow [180 - (72 + 57)] = 180 - 129 = 51$$

$$z = 180 - 51 = \textcircled{129^\circ}$$

$$x = 180 - 57 = \textcircled{123^\circ}$$

$$\therefore x + y + z = \boxed{360^\circ}$$

⑬ $\Rightarrow$ ⑮ $\Rightarrow$

CANDIDATE	No. OF VOTERS
B	50
L	80
G	40
W	30
	<u>200</u>

⑬ % W = ?

$$\frac{30}{200} = \frac{15}{100} = \boxed{15\%}$$

⑭ 10,000 Voters vote proportionately
Est. votes for L?

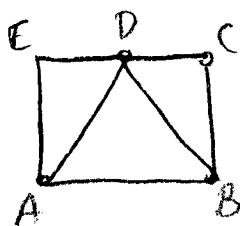
$$L \Rightarrow \frac{80}{200} \cdot 10000 = 40 \cdot 100 = \boxed{4000}$$

L VOTES

⑮ G $\Rightarrow$ WHAT part of 360°

$$G = \frac{40}{200} \cdot 360 \Rightarrow 2 \cdot 36 = \boxed{72^\circ}$$

⑯



SQUARE ABCE
 $\overline{ED} = \overline{DC}$

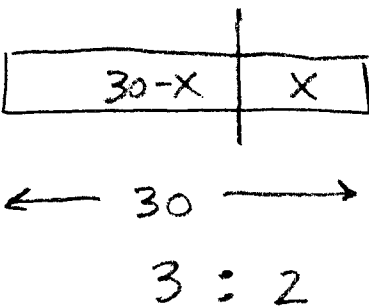
RATIO AREA $\triangle ADE$ to $\triangle ADB$?

$$\therefore \frac{\frac{1}{4} \overline{AB} \cdot \overline{EA}}{\frac{1}{2} \overline{AB} \cdot \overline{EA}} = \frac{\frac{1}{4}}{\frac{1}{2}} = \frac{2}{4} = \boxed{\frac{1}{2}}$$

$\frac{1}{2} \left(\frac{1}{2} \right) \overline{AB} \cdot \overline{EA}$ $\frac{1}{2} \cdot \overline{AB} \cdot \overline{EA}$
base $\cdot$ h base $\cdot$ h

①⑦ $y = \frac{2}{3}x - 4$ $m_{//} = \frac{2}{3}$

①⑧



$$\frac{30-X}{X} = \frac{3}{2}$$

$$3X = 60 - 2X$$

$$+2X \quad \quad +2X$$

$$5X = 60$$
 $X = 12$

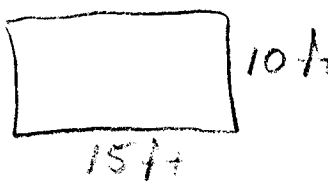
$\therefore 18 : \boxed{12}$
 SHORTER PIECE

①⑨ Smallest integer greater than $\sqrt{58}$

$7^2 = 49$ $8^2 = 64$ $\sqrt{58} \approx 7.5ish$

$\therefore \boxed{8}$ smallest integer $> \sqrt{58}$

②⑦



4 walls $\Rightarrow 150 \cdot 4 = 600 ft^2$

1 door $\Rightarrow 3\frac{1}{2} \cdot 7 = 24\frac{1}{2}$ -24.5

1 window $\Rightarrow 3 \cdot 5 = 15$ -15.0

$560.5 ft^2$

Each gal $\Rightarrow 300 - 350 ft^2$

$\Rightarrow$ NEEDS $\geq \boxed{2 \text{ GAL}} = \boxed{2 \text{ CANS}}$

(21) $X^2 + 2X = 8$

$$x^2 + 2x - 8 = 0$$

$$\text{sum} \Rightarrow 6 = 2$$

$$p_{\text{rod}} \Rightarrow ac = \underset{-2 \quad +4}{-8}$$

$$(x-2)(x+4)=0 \quad \therefore X = \{2, -4\}$$

22 $a > 1$ $\frac{3a^4}{3a^6} = a^{-2} = \boxed{\frac{1}{a^2}}$

②③ $m(x \neq 0, y \neq 0)$, $x \neq y$ have opposite signs
 $\Rightarrow m(-, +)$ or $m(+, -)$

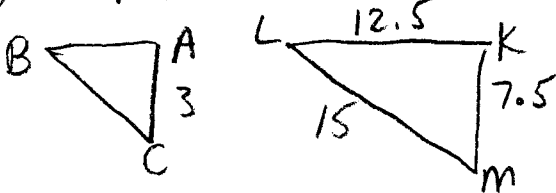
$\Rightarrow$



Quadrants II or IV

(24) $C = 5.25b + 1400$ or $1400 + 5.25b$

(25) $\triangle ABC \sim \triangle KLM$ Perimeter of $\triangle ABC$?



$$\frac{7.5}{3} = \frac{35}{p}$$

$$7.5p = 105$$

$$p = \frac{105}{7.5} = \frac{1050}{75} = \frac{210}{15}$$

$$P = \frac{42}{3} = \boxed{14 = P}$$

$$(26) \quad \frac{3\sqrt{7}}{a\sqrt{7}} = \frac{3\sqrt{7}}{7}$$

$$a = ?$$

$$7(3\sqrt{7}) = 3a \cdot 7$$

$$3\sqrt{7} = 3a$$

$$\boxed{\sqrt{7} = a}$$

$$(27) \quad h_1 = -6\frac{m}{s}t + 70$$

$$h_2 = +15\frac{m}{s}t + 10$$

$$-6t + 70 = 15t + 10$$

$$+6t \quad -10 \quad +6t \quad -10$$

$$\begin{array}{r} 2.85 \\ 7 \overline{) 20.00} \\ \underline{14} \\ 60 \\ \underline{56} \\ 40 \end{array}$$

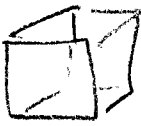
$$\frac{60}{21} = \frac{21t}{21}$$

$$\therefore t = \frac{60}{21} = \frac{20}{7}$$

$$\boxed{t \sim 2.9 \text{ sec}}$$

$$(28) \quad T \begin{array}{c} \Rightarrow \\ \Rightarrow \\ \Rightarrow \\ \Rightarrow \end{array} \begin{array}{c} V \\ (2) \end{array} \begin{array}{c} W \\ \Rightarrow \\ \Rightarrow \\ \Rightarrow \\ \Rightarrow \\ \Rightarrow \end{array} \begin{array}{c} C \\ (6) \end{array}$$

$$FCP \Rightarrow 4 \cdot 2 \cdot 6 = \boxed{48 \text{ possible ways}}$$

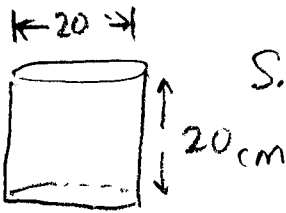
(29) Cube A $\Rightarrow$  2 in

 Cube B $\Rightarrow$ Edge double A:
 4 in per side
 $V = 4^3 = \boxed{64 \text{ in}^3}$

(30) $A = P(1+r)^N$
 $A = 10000(1.04)^5$

$\uparrow$ yearly rate $\leftarrow$ years

$A = 10000(1.21665\ldots) = \boxed{\$12167}$

(31) 

$\therefore r = 10 \text{ cm}$

S.A. $\Rightarrow 2\pi r^2 + 2\pi rh$
 $2\pi(10)^2 + 2\pi(10)(20)$
 $2\pi(100 + 200) = \boxed{600\pi \text{ cm}^2}$

(32) $f(x) = 4x + 1$ $g(x) = x^2 - 2$

$f(x^2 - 2) = 4(x^2 - 2) + 1$

$= 4x^2 - 8 + 1$

$= \boxed{4x^2 - 7}$