

$$\begin{aligned} ① (1+i)^{16} &= \sqrt{2} (\cos 45^\circ + i \sin 45^\circ)^{16} \\ &= \sqrt{2}^{16} (\cos 16 \cdot 45^\circ + i \sin (16 \cdot 45^\circ)) \\ &= 2^8 \cdot \cos 720^\circ + i \sin 720^\circ \\ &= 256 \cdot (1 + 0i) = \boxed{256} \end{aligned}$$

$$\begin{aligned} ② a) \frac{4z}{5+4z} &= 1 + \frac{z}{5} \\ &= 1 + \frac{19}{5} \\ &= 1 + \frac{10}{19} \\ &= \frac{29}{19} \end{aligned}$$

$$\begin{aligned} ⑩ \begin{cases} x+2y+5z=33 \\ 2x-y+3z=16 \\ -x+3y-2z=-3 \end{cases} \quad \begin{cases} -2x-4y-10z=-66 \\ 2x-y+3z=16 \end{cases} \\ \hline \begin{cases} -5y-7z=-50 \\ -2x-y+3z=16 \\ -2x+6y-4z=-6 \end{cases} \quad \begin{cases} -5y-7z=-50 \\ 5y-z=10 \end{cases} \\ \hline \begin{cases} -8z=-40 \\ 5y-z=10 \\ 5y-5=10 \end{cases} \quad \begin{cases} z=5 \\ 5y-5=10 \\ 5y=15 \end{cases} \\ \hline \begin{cases} x+2y+5z=33 \\ x+2(3)+5(5)=33 \\ x+31=33 \end{cases} \\ \hline \begin{cases} x=2 \\ x+2y+5z=33 \\ x+2(3)+5(5)=33 \end{cases} \\ \hline \begin{cases} x=2 \\ x+2y+5z=33 \\ x+2(3)+5(5)=33 \end{cases} \\ \hline \begin{cases} x=2 \\ x+2y+5z=33 \\ x+2(3)+5(5)=33 \end{cases} \\ \hline \begin{cases} x=2 \\ x+2y+5z=33 \\ x+2(3)+5(5)=33 \end{cases} \end{aligned}$$

$$\begin{aligned} ③ x^2-7x+10=0 \\ x(x-2)(x-5)=0 \\ 0 \quad 2 \quad 5 \\ \frac{0+2+5}{3} = \boxed{\frac{7}{3}} \end{aligned}$$

$$b) (x-7)(x-12) \\ 7+12=19$$

$$c) \frac{3}{\frac{11}{1-2/19}} \\ \frac{3 \cdot 19}{11 \cdot 17} = \frac{57}{187}$$

$$d) 2, 3, 5, 7, 11, 13, 17 = 58$$

$$\text{Det} \begin{bmatrix} 1 & 2 \\ 3 & 5 \end{bmatrix} = 5 - 6 = \boxed{-1}$$

$$\begin{bmatrix} \frac{29}{19} & A \\ \frac{57}{187} & 58 \end{bmatrix}$$

$$\frac{58 \cdot 29}{19} - \frac{19 \cdot 57}{187}$$

$$\frac{1682}{19} - \frac{1083}{187}$$

$$\frac{314534}{3553} - \frac{20577}{3553}$$

$$\frac{293957}{3553}$$

$$\text{⑪}$$

1	2	3	4	5	6	7	8	9	10	11	12
1	2	3		5		7			11		13
2	5		5	7				11		13	
3		5	7					11		13	
4	5		7			11		13			17
5	7			11		13				17	
6	7			11		13				17	19
7			11		13				17		19
8		11		13				17		A	

$$\boxed{35/46}$$

$$\begin{aligned} ⑫ \quad A &= 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31 = 11 \\ B &= 2 \cdot 3 \cdot 5 = 30 \\ C &= \text{cube} \quad 4 \text{ Top} + 4 \text{ Bottom} = 8 \end{aligned}$$

$$\begin{aligned} 11x + 30y + 1 &= 0 \\ 8x + 17y + 2 &= 0 \end{aligned}$$

$$\begin{aligned} 88 \cdot x + 240 &= -8 \\ -88x - 187 &= +22 \end{aligned}$$

$$11x + 30 \left( \frac{14}{53} \right) = -1$$

$$\begin{aligned} 63y &= 14 \\ y &= 14/53 \end{aligned}$$

$$11x = -1 - 420/53$$

$$x = -473/583$$

$$\left( -\frac{43}{53}, \frac{14}{53} \right)$$

$$\begin{aligned} ⑬ \quad A &= Pe^{rt} \\ .6 &= e^{r(17.6)} \\ \ln(.6) &= 17.6r \\ \frac{\ln(.6)}{17.6} &= r \\ r &= -.029024832 \end{aligned}$$

$$\begin{aligned} ⑭ \quad \begin{bmatrix} 3 & 4 & 17 \\ 0 & 2 & 7 \\ 0 & 3 & 11 \end{bmatrix} \\ 3[22-27] &= \boxed{3} \end{aligned}$$

$$\begin{aligned} ⑮ \quad D &= R \cdot T \\ T_1 &= 2 \text{ min} = \frac{2}{60} \\ T_2 &= 1 \text{ min} = \frac{1}{60} \\ T &= \frac{1}{45} \end{aligned}$$

$$\begin{aligned} \ln(.1) &= -t \cdot 71.333329 \\ -.029024832 &= -t \cdot 71.333329 \\ t &= 7:02 + 79 \text{ min } 20 \text{ sec} \end{aligned}$$

$$\begin{aligned} \frac{2}{30} - \frac{1}{45} &= \frac{3}{90} - \frac{2}{90} = \frac{1}{90} \\ R &= \boxed{90 \text{ mph}} \end{aligned}$$

$$\boxed{8:21:20}$$

PreCalculus Team Feb 2001

$$\begin{aligned} ④ \quad \frac{5}{8}x - \frac{3}{7}y + 2 &= 0 \\ -\frac{3}{7}y &= -\frac{5}{8}x - \frac{7}{7} \quad A = \frac{35}{24} \\ 3y &= \frac{35}{8}x + \frac{19}{7} \quad B = \frac{19}{33} \\ y &= \frac{35}{24}x + \frac{19}{33} \\ \frac{A}{B} &= \frac{35}{24} \cdot \frac{33}{19} = \frac{55}{56} \end{aligned}$$

$$\begin{aligned} ⑤ \quad \lim_{x \rightarrow 0} \csc 2x \cdot \tan 3x \\ = \lim_{x \rightarrow 0} \frac{\tan 3x}{\sin 2x} = \frac{3}{2} \end{aligned}$$

$$\begin{aligned} ⑥ \quad \frac{1}{4}t + \frac{1}{6}t &= 1 \\ \frac{6t}{24} + \frac{4t}{24} &= \frac{10t}{24} = 1 \\ t &= \frac{24}{10} = 2.4 \\ 12 \times 2.4 &= 28.80 \\ - \frac{72.00}{28.80} & \quad 24 \mid 43.20 \\ \hline & 43.20 \end{aligned}$$

$$\boxed{18.00}$$

$$\begin{aligned} ⑦ \quad 3, 4, 5 &= 12 \\ 5, 12, 13 &= 30 \\ 6, 8, 10 &= 24 \\ 7, 24, 25 &= 56 \\ 8, 15, 17 &= 40 \\ 9, 12, 15 &= 36 \\ 9, 40, 41 &= 90 \end{aligned}$$

$$\boxed{288}$$

$$\begin{aligned} ⑧ \quad 3 \text{ Quarters} & .75 \\ 4 \text{ Dimes} & .40 \\ 4 \text{ cents} & .04 \\ \hline & \$1.19 \end{aligned}$$

⑨ EACH DAY HE  
MOVES UP 5 in. (TOT)  
(7-2) SUNDAY  
HE SLIDES BACK 3 in  
EVERY WEEK HE GETS  
6 \cdot 5 - 3 = 27 in.  
26 ft = 260 in.  
AFTER 8 WEEK  
8 \cdot 27 = 216 HE HAS  
ONLY 24 inches to go

MONDAY up 7 down 2 19 left  
TUESDAY " " 14 left  
WEDNESDAY " " 9 left  
THURSDAY " " 4 left

FRIDAY → FREEDOM