9-4-13

3rd Trig

If adding fractions, what do we do?

$$\frac{2}{17}+\frac{3}{17}=\frac{2+3}{17}=\frac{5}{17}$$

$$\frac{6+1}{11}=\frac{6}{11}+\frac{1}{11}$$

$$\frac{x+3}{3}=\frac{x}{3}+\frac{3}{3}=\frac{x}{3}+1$$

$$\frac{2+4\sqrt{7}}{2}$$

① $\frac{2}{2}+\frac{4\sqrt{7}}{2}=1+2\sqrt{7}$

② $\frac{\cancel{2}^{1}+\cancel{4}^{2}\sqrt{7}}{\cancel{2}_{1}}=1+2\sqrt{7}$

① $\frac{8+6\sqrt{6}}{2}$

$\frac{\cancel{8}^{4}+\cancel{6}^{3}\sqrt{6}}{\cancel{2}_{1}}$

$4+3\sqrt{6}$

② $\frac{10+\sqrt{40}}{2}$ $\quad \sqrt{40}=\sqrt{2\cdot2\cdot10}=2\sqrt{10}$

$\frac{\cancel{10}^{5}+\cancel{2}^{1}\sqrt{10}}{\cancel{2}_{1}}$

$5+\sqrt{10}$

③ $\frac{6+\sqrt{8}}{4}$ $\quad \sqrt{8}=\sqrt{2\cdot2\cdot2}=2\sqrt{2}$

$\frac{6^{3}+\cancel{2}^{1}\sqrt{2}}{\cancel{4}_{2}}$

$\frac{3+\sqrt{2}}{2}$

④ $\frac{8 \pm \sqrt{-20}}{2}$

$\sqrt{-20} = \sqrt{-1 \cdot 2 \cdot 2 \cdot 5}$

$2i\sqrt{5}$

$\frac{8 \pm 2i\sqrt{5}}{2}$

$4 \pm i\sqrt{5}$

⑤ $\frac{-15 + \sqrt{-75}}{10}$

$\sqrt{-75} = \sqrt{-1 \cdot 3 \cdot 5 \cdot 5}$

$5i\sqrt{3}$

$\frac{-15 + 5i\sqrt{3}}{10}$

$\frac{-3 + i\sqrt{3}}{2}$ or $-\frac{3}{2} + \frac{i\sqrt{3}}{2}$

SAT thought

Give me a number that is divisible by 8 and 10.

Factors

$8 = 1, 2, 4, 8$

$10 = 1, 2, 5, 10$

⑬ on tonight's HW

If n is a positive integer that is divisible by 12 and 16, then n must also be divisible by

A.) 28

B.) 32

C.) 48

D.) 96

E.) 192

$12 = 12, 24, 36, 48, 60$

$16 = 16, 32, 48, 64$

Factors

$12 = 1, 2, 3, 4, 6, 12$

$16 = 1, 2, 4, 8, 16$

$12 \cdot 16 = \frac{192}{4} = 48$

⑰ If $16^{w+2} = 2^{11}$, what is w?

$(2^4)^{w+2} = 2^{11}$

$2^{4w+8} = 2^{11}$

$4w + 8 = 11$

$-8 \quad -8$

$\frac{4w}{4} = \frac{3}{4}$

$w = \frac{3}{4}$

What is the 105th digit after the decimal point in ⑤

$\overline{137625}$

1 2 3 4 5 6 7
8 9 10 11 12 13 14
15 16 17 18 19 20 21

$7.15 = 105$

What about the 218th digit? ①

$31 \times 7 = 217$

9-4-13

4th Trig

What do you do in

$\frac{2}{17} + \frac{3}{17}$ $\frac{2+3}{17} = \frac{5}{17}$

$\frac{6+1}{11} = \frac{6}{11} + \frac{1}{11}$

$\frac{x+6}{6} = \frac{x}{6} + \frac{6}{6} = \frac{x}{6} + 1$

① $\frac{8+4\sqrt{3}}{4}$

① $\frac{8}{4} + \frac{4\sqrt{3}}{4} = 2 + \sqrt{3}$

② $\frac{8+4\sqrt{3}}{4} = 2+\sqrt{3}$

② $\frac{6+2\sqrt{7}}{2}$

$\frac{6+2\sqrt{7}}{2} = 3+\sqrt{7}$

③ $\frac{4+\sqrt{20}}{2}$ $\sqrt{20} = \sqrt{2\cdot 2\cdot 5}$ $2\sqrt{5}$

$\frac{4+2\sqrt{5}}{2} = 2+\sqrt{5}$

④ $\frac{6+\sqrt{18}}{3}$ $\sqrt{18} = \sqrt{2\cdot 3\cdot 3}$ $3\sqrt{2}$

$\frac{6+3\sqrt{2}}{3} = 2+\sqrt{2}$

⑤ $\frac{8+\sqrt{20}}{4}$ $\quad \sqrt{20} = 2\sqrt{5}$

$\frac{8+2\sqrt{5}}{4} = \frac{4+\sqrt{5}}{2}$ or $\frac{4}{2}+\frac{\sqrt{5}}{2} = 2+\frac{\sqrt{5}}{2}$

⑥ $\frac{9+\sqrt{-9}}{3} = \frac{3+3i}{3} = 3+i$

⑦ $\frac{6\pm\sqrt{-18}}{9}$ $\quad \sqrt{-18} = \sqrt{-1\cdot 2\cdot 33}$ $\quad 3i\sqrt{2}$

$\frac{6\pm 3i\sqrt{2}}{3} = \frac{2\pm i\sqrt{2}}{3}$

SAT thought

Which digit is in the 71st spot in $.\overline{213568}$

1 2 3 4 5 6
7 8 9 10 11 12
13 14 15 16 17 18
⋮
72

6 will be multiples of 6

$6 \times \frac{12}{72}$ close to 71

Which digit would be in the 70th spot in $.\overline{12345678}$

$8 \times \frac{9}{72} = 70$

8
16
24
32
40
72

What is the smallest number that is divisible by 4 and 6?

$\frac{12}{4}$ $\quad \frac{12}{6}$ ← LCM

8 and 20

40

If n is a positive integer that is divisible by 6 and 20, then n must be divisible by

a.) 80 $\quad n = 60$

b.) 50

c.) 60

d.) 40