

THETA APPS SOLUTIONS

① $1,630,000 - 1,340,000 =$
 $290,000 / 10 \text{ years}$
 $2.5 \times 290,000 = 725,000$
 $1,630,000 + 725,000 =$
 $2,355,000$ D

② dilation A

③ latus rectum is $|\frac{1}{a}|$
 units long
 $|\frac{1}{-\frac{2}{3}}| = \frac{3}{2}$ C

④ $16x^2 + 25y^2 - 300y + 500 = 0$

transforms to
 $(\frac{x}{5})^2 + (\frac{y-6}{4})^2 = 1$

area = $ab\pi = 5 \cdot 4 \cdot \pi = 20\pi$ B

⑤ $3 \cdot 4 = 12$ A

⑥ $S_{100} = \frac{100}{2} [2 \cdot 12 + (100-1) \cdot 25]$
 $= 2437.50$ C

⑦ $\frac{11!}{2!3!}$ B

⑧ $4x^2 - y^2 - 80x = -340$
 $\frac{x^2 + y^2}{5x^2 - 80x} = \frac{40}{-300}$
 $x^2 - 16x + 60 = 0$
 $(x-10)(x-6) = 0$
 $x = 10 \quad x = 6$
 out of domain $(6, -2)$ D

⑨ $(\frac{1}{5} + \frac{1}{6})t = \frac{4}{15}$
 $\frac{11}{30}t = \frac{4}{15}$
 $t = 2\frac{2}{11}$ A

⑩

	D	R	T
1st half	1000	600	$\frac{1000}{600}$
2nd half	1000	r	$\frac{1000}{r}$
whole trip	2000	720	$\frac{2000}{720}$

$\frac{5}{3} + \frac{1000}{r} = \frac{25}{9}$
 $r = 900$ C

⑪ $\frac{(x+4)(x-3)}{(x+4)(x-2)} = f(x)$
 vertical asymptote
 at $x = 2$ C

⑫

pages	digits
1-9	9
10-99	$\frac{180}{189}$
1002-189	813
813 ÷ 3	271 3-digit pgs.
99 + 271	370 <u>B</u>

⑬ $SA = 4\pi r^2$
 $= 4\pi (3400)^2$
 $= 46,240,000\pi$ D

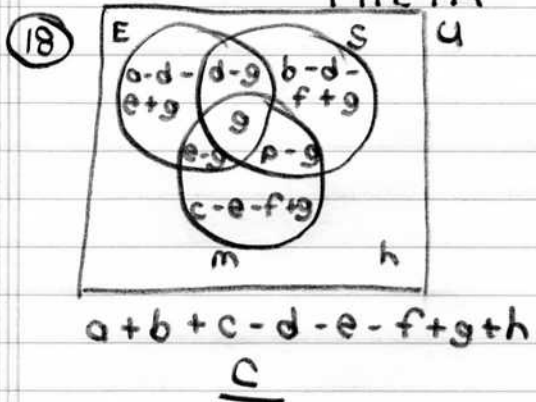
⑭ $SA = [2(152 + 196)][40]$
 $= 27,840$
 $27,840 \div 15 = 1856$ C

⑮ $1 \cdot \frac{1-2^n}{1-2} = 4095$
 $-1 + 2^n = 4095$
 $2^n = 4096$
 $n = 12$ C

⑯ A

⑰ $S = \frac{14,500}{1-.5} + 14,500$
 $= 43,500$ D

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19 $\frac{15 \cdot 12}{2} = 90$ A

20 E (step 4 to step 5 is not legal, \div by 0)

21 $2P = P(1.08)^n$
 $\log 2 = n \log 1.08$
 $\frac{\log 2}{\log 1.08} = n$ D

22 $t_{10} = t_4 r^6$
 $\frac{125}{64} = 125 r^6$
 $\frac{1}{64} = r^6$
 $\frac{1}{2} = r$
 $t_{15} = t_{10} r^5$
 $= \frac{125}{64} \cdot (\frac{1}{2})^5$
 $= \frac{125}{2048}$ D

23 $\frac{2(50)(40)}{50+40} = \frac{4000}{90}$
 $4000 \div 90 = 44 \frac{4}{9}$ B

24 Possible consecutive periods -
 123 234 345 456 567
 6 arrangements of classes
 $5 \cdot 6 = 30$ A

25 Marshall and Erica are traveling towards each other at 25 mph. It takes 1 hour to reach each other \Rightarrow Bee is flying 10 mph C

26 Total budget = \$6000
 $\frac{1200}{6000} = \frac{1}{5}$
 $\frac{1}{5} \cdot \frac{360}{1} = 72^\circ$ C

27 Let $y = \log_{10} X$
 $y^2 = 4y$
 $y^2 - 4y = 0$
 $y(y-4) = 0$
 $y = 0$ $y = 4$
 $\log_{10} X = 0$ $\log_{10} X = 4$
 $X = 1$ $X = 10,000$
 $10,000 + 1 = 10,001$ D

28 X: beginning with 5'
 5^n ends in 5
 $y: 3^0 = 1, 3^1 = 3, 3^2 = 9, 3^3 = 27,$
 $3^4 = 81, 3^{2008} = 3^0 = 1$
 $z: 2^0 = 1, 2^1 = 2, 2^2 = 4, 2^3 = 8,$
 $2^4 = 16, 2^5 = 32,$
 $2^{2008} = 2^4 = 16$
 $5 \cdot 1 \cdot 6 = 30$ B

29 $\begin{bmatrix} -2 & -4 \\ -2 & -8 \end{bmatrix}^{-1} = \frac{1}{8} \begin{bmatrix} -8 & 4 \\ 2 & -2 \end{bmatrix} = \begin{bmatrix} -1 & \frac{1}{2} \\ \frac{1}{4} & -\frac{1}{4} \end{bmatrix}$
 $-1 + \frac{1}{2} + \frac{1}{4} + -\frac{1}{4} = -\frac{1}{2}$ B

30 $(0.5)(0.2)(0.6) = 0.06$ B