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THETA INDIVIDUAL
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1) Distributive Property → **D**

2) $m\angle ABC + m\angle BCA = 105$

Since $m\angle ABC = 2 \bullet m\angle BCA$, then

$2 \bullet m\angle BCA + m\angle BCA = 105$

$3 \bullet m\angle BCA = 105$

$m\angle BCA = 35$

$\therefore m\angle ABC = 70 \rightarrow$ **C**

3) $P(x) = 2004(x^{2004} + x^{2003} + x^{2002} + x^{2001} + \ldots + x^0)$
$P(-1) = 2004(1 + -1 + 1 + -1 + \ldots + 1)$
$= 2004(1)$
$= 2004 \rightarrow$ **A**

4) $\det[A] = (7 \bullet 5) - (-4 \bullet 9) = 71$

$$A^{-1} = \frac{1}{71}\begin{pmatrix} 5 & -9 \\ 4 & 7 \end{pmatrix}$$

$$\text{sum of entries} = \frac{1}{71}(5 + -9 + 4 + 7) = \frac{7}{71} \rightarrow \textbf{C}$$

5) Can not be done. You can not take the even root of a negative number over the Real numbers → **E**

$$6)\ \frac{r^2 - s^2}{2s^2 - rs - r^2} \bullet \frac{r^2 - 4s^2}{s^2 + rs - 2r^2} = \frac{-1(r+s)(s-r)}{(2s+r)(s-r)} \bullet \frac{(r+2s)(r-2s)}{-1(s+2r)(r-s)}$$

$$= \frac{(r+s)(r-2s)}{(2r+s)(r-s)} \rightarrow \textbf{C}$$

7) Convergent Geometric Series

$$r = \frac{\frac{D}{36}}{\frac{D}{6}} = \frac{1}{6}; \qquad S = \frac{t_1}{1-r} = \frac{\frac{D}{6}}{1-\frac{1}{6}} = \frac{D}{5} \rightarrow \textbf{A}$$

$$8)\ \begin{pmatrix} (6 \bullet -2) + (3 \bullet 1) & (6 \bullet -3) + (3 \bullet 4) \\ (-4 \bullet -2) + (5 \bullet 1) & (-4 \bullet -3) + (5 \bullet 4) \\ (2 \bullet -2) + (-1 \bullet 1) & (2 \bullet -3) + (-1 \bullet 4) \end{pmatrix}$$

$$= \begin{pmatrix} -9 & -6 \\ 13 & 32 \\ -5 & -10 \end{pmatrix} \rightarrow \textbf{C}$$

9) Area = $(28)(12)(\pi) \approx 1055.6$ ft.^{2}
$1055.6 \div 200 \approx 5.3$ gallons
Will need to buy 6 gallons → **C**

10) Exponential decay.
Value = $(23000)(0.82)^8$
$= \$4701.52 \rightarrow$ **B**

11) Vertex is at (0, -2). Point on parabola is (-4, 2).
$x = a(y-k)^2 + h \rightarrow -4 = a(2+2)^2 + 0$
$-4 = 16a$
$\frac{-1}{4} = a$
Sun is at the focus. $\frac{-1}{4} = \frac{1}{4m} \rightarrow m = -1$
$(-1, -2) \rightarrow$ **D**

12) $4.4 + (-6.3) - (-8.1) = 6.2$
$\sqrt[5]{7^{6.2}} = 7^{\frac{6.2}{5}} = 7^{1.24} \rightarrow$ **B**

13) $SA = 2\pi rh + 2\pi r^2$
$= 2\pi(2)(6) + 2\pi(2)^2$
$= 24\pi + 8\pi$
$= 32\pi \rightarrow$ **C**

$$14)\ \frac{3x+16}{(x-3)(x+2)} = \frac{A}{x-3} + \frac{B}{x+2}$$
$3x + 16 = A(x+2) + B(x-3)$
let $x = -2 \rightarrow 10 = -5B$
$-2 = B$
let $x = 3 \rightarrow 25 = 5A$
$5 = A$
$-2 + 5 = 3 \rightarrow$ **A**

15) $(\sqrt{35 + 14\sqrt{6}})^2 = (\sqrt{x} + \sqrt{y})^2$
$35 + 14\sqrt{6} = x + 2\sqrt{xy} + y$
$35 = x + y$
$14\sqrt{6} = 2\sqrt{xy}$
$(7\sqrt{6})^2 = (\sqrt{xy})^2$
$294 = xy$
$\therefore 21, 14$
$|21 - 14| = 7 \rightarrow$ **C**

$$16)\ \frac{1}{\sqrt[3]{4} + \sqrt[3]{10} + \sqrt[3]{25}} \bullet \frac{\sqrt[3]{2} - \sqrt[3]{5}}{\sqrt[3]{2} - \sqrt[3]{5}} = \frac{\sqrt[3]{2} - \sqrt[3]{5}}{2 - 5}$$
$$= \frac{\sqrt[3]{2} - \sqrt[3]{5}}{-3}$$
$$= \frac{\sqrt[3]{5} - \sqrt[3]{2}}{3} \rightarrow \textbf{D}$$

17) **C**

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18) 75 + 50 = 125. Discounts are taken separately.
125 • 0.4 = 50 → 125 – 50 = 75
75 • 0.2 = 15 → 75 – 15 = 60
60 • 0.06 = 3.6
60 + 3.6 = \$63.60 → **C**

19) Paul mowed $\frac{1}{4}$ of the lawn in one hour, so his rate is $\frac{1}{4}$ or 0.25. $\frac{3}{4}$ or 0.75 of the lawn remains. Let g = Greg's rate. 1 hour, 48 minutes = 1.8 hours.

(g)(1.8) + (0.25)(1.8) = 0.75
1.8g + 0.45 = 0.75
1.8g = 0.3
g = 0.1666… or $\frac{1}{6}$

So, Greg can mow the lawn in 6 hours alone → **A**

20) ${}_{15}C_6(3x^2)^9(\frac{-2}{x^3})^6$ = (5005)(19683)(64) = 6304858560 → **D**

21) $F = \frac{9}{5}C + 32$

$= \frac{9}{5}(30) + 32$

$= 86 \rightarrow$ **C**

22) P(exactly 1 will be in an accident) = $\frac{25000}{500000} = 0.05$
P(1 will not be in an accident) = 1 – 0.05 = 0.95
P(2 of 3 will be in an accident) =

$${}_3C_2(0.05)^2(0.95)^1 = 0.007125 \rightarrow \textbf{C}$$

23) Geometric Means. $82 = 39 \bullet r^{6-1}$

$\frac{82}{39} = r^5 \rightarrow r \approx 1.160245383$
R = 39(1.160245383) = 45.2496
S = 39(1.160245383)^2 = 52.5006
T = 39(1.160245383)^3 = 60.9136
V = 39(1.160245383)^4 = 70.6747
R+S+T+V ≈ 229 → **A**

24) determinant = $x^3 - 3x + 2$
$x^3 - 3x + 2 = 0$
$(x - 1)(x^2 + 2x - 2) = 0$
$(x - 1)(x + 2)(x - 1) = 0$
x = 1, -2, 1
1 + (-2) + 1 = 0 → **C**

25) $y = \log_5 x$
$x = \log_5 y$
$y = 5^x$
$g\text{-}1(x) = 5^x \rightarrow$ **A**

26) Similar triangles.

$\frac{TN}{TG} = \frac{TG}{TR} \rightarrow \frac{2}{TG} = \frac{TG}{6}$
$(TG)^2 = 12$
$TG = \sqrt{12}$
$= 2\sqrt{3} \rightarrow$ **B**

27) $\log_6 36 = 2; \log_{\frac{1}{2}} \frac{1}{8} = 3; \log_3 \frac{3}{\sqrt{3}} = \frac{1}{2}; \log_4 2 = \frac{1}{2};$

$2 + 3 + \frac{1}{2} + \frac{1}{2} = 6 \rightarrow$ **C**

28) The units digit is periodic every 4 times.

$3^0 = 1$	$3^4 = 1$
$3^1 = 3$	$3^5 = 3$
$3^2 = 9$	$3^6 = 9$
$3^3 = 7$	$3^7 = 7$

2004 ÷ 4 has a remainder of 0, so the units digit is 1 → **A**

29) (0.43)(60) + 0.8x = 0.6(60 + x)
25.8 + 0.8x = 36 + 0.6x
0.2x = 10.2
x = 51 → **B**

30) $P(-x) = 6x^7 - 2x^6 - 3x^5 + 2x^4 + 7x^3 + x^2 + 9x - k$
3 sign changes → **C**