

$$\boxed{D} \quad \textcircled{\#1} \quad 3^2 + 4^2 = 9 + 16 = 25 = \boxed{5^2}$$

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#3

$$\boxed{A} \quad \textcircled{\#2} \quad 5^x = 125$$

$$5^x = 5^3 \quad \leftarrow \begin{array}{l} \text{exponents} \\ \text{with} \\ \text{same base} \end{array}$$

$$\boxed{x=3} \longrightarrow 3^x = 3^3 = \boxed{27}$$

$$\boxed{F} \quad \textcircled{\#3} \quad (2x^3 + 7) - (2x^3 + 15) = 7 - 15 = \boxed{-8}$$

$$\boxed{D} \quad \textcircled{\#4} \quad (2(9) + 7) - (9 + 9) + 5$$

$$\boxed{a=9} \quad 25 - 18 + 5 = \boxed{12}$$

$$\boxed{E} \quad \textcircled{\#5} \quad \boxed{r=1} \quad (2+7) - 2(1+9) = 9 - 20 = \boxed{-11}$$

$$\boxed{B} \quad \textcircled{6} \quad (\underline{x^3})^5 = (\underline{x^3})(x^3)(x^3)(x^3)(x^3)$$

$$= x^{3+3+3+3+3} = x^{5(3)} = \boxed{x^{15}}$$

#7 $2^{10} \times 2^{10} = 2^{10+10} = 2^{20}$

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#8 $(2^4 - 4^2) + (2^3 - 3^2)$
 $(16 - 16) + (8 - 9) = 0 - 1 = -1$

#9 $\frac{3^3 + 3^2 + 3}{3} = \frac{27 + 9 + 3}{3} = \frac{39}{3} = 13$

#10 $x = 2 \quad y = 3x + 1 = 6 + 1 = 7$

A $(2(7)^2 + 7) - (2(7) - 9)$
 $(2(49) + 7) - (2(7) - 9)$
 $(2(49) + 7) - (14 - 9)$
 $(2(49) + 7) - 2(49) + 9$
 $7 + 9 = 16$

#11

$2c + 7$	\rightarrow	$2c$	7
$-(c + 9)$	\rightarrow	$-c$	-9
$+ (4c - 1)$		$+4c$	-1
		<hr style="width: 50%; margin: 0;"/>	
		$5c$	-3

A

$$\textcircled{\#12} \quad 4^3 - 4^2 + 4^3 - 4^2$$

$$\underbrace{64 - 16} + \underbrace{64 - 16}$$

$$48 + 48 = \boxed{96}$$

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\textcircled{\#3}

$$6 \times 4^2 = 6(16) = \boxed{96}$$

A

\textcircled{\#13}

$$\underline{2^{10}} + \underline{2^{10}} = 2^1(2^{10}) = 2^{11}$$

$$\boxed{} + \boxed{} = 2 \boxed{}$$

\textcircled{\#14}

$$8^7 - 2^{20}$$

C

$$(2^3)^7 - 2^{20}$$

$$2^{21} - 2^{20}$$

$$2[2^{20}] - 1[2^{20}] = \boxed{2^{20}}$$

$$2 \boxed{} - 1 \boxed{} = \boxed{}$$

E

\textcircled{\#15}

$$n = \{-3, -2, -1, 0, 1, 2, 3, 4\}$$

ORIGINAL
SET

$$n^2 = \{9, 4, 1, 0, 1, 4, 9, 16\}$$

SQUARES

$$n^2 = \{0, 1, 4, 9, 16\}$$

$$0 \leq \text{Range} \leq 16$$

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#16

$$\frac{4^6 \cdot 3^4 \cdot 2^2}{4^2 \cdot 3^4 \cdot 2^6} = \frac{\cancel{44} \cancel{44} \cancel{44} \cancel{22}}{\cancel{44} \cancel{22} \cancel{22} \cancel{22}} = \frac{4^2}{1} = 16$$

↑ SAME

#17

$$(100\% R - 10\% R) = \$180$$

$$90\% R = \$180$$

$$0.9R = 180$$

$$R = \frac{180}{0.9} = \frac{1800}{9} = \$200$$

#18

$$(a-1) - (a-2) + (a-3)$$

$$a-1-a+2+a-3$$

$$(a-a+a) + (-1+2-3)$$

$$(a) + (-2) = a-2$$

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C #19

$$3(2g^2+7) - 2(g^2+9) - (7g^2-8)$$

$$6g^2 + 21 - 2g^2 - 18 - 7g^2 + 8$$

$$(6g^2 - 2g^2 - 7g^2) + (21 - 18 + 8)$$

$$(-3g^2) + (11)$$

A #20

$a * b \rightarrow$ rule is a^b

$$2 * (3 * 2)$$

$$\downarrow$$

$$2 * (3^2) = (2 * 9) = 2^9 = 512$$

B #21

$$\frac{2 * 3 * 5 * 7 * 11}{2 * 3 * 11 * 4 * 3 * 7} = \frac{5}{4} = 1.25$$

#22

$$-3x(2y-5)$$

$$-21xy + 15x$$

C

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#23

$$\frac{.26}{*.37} \xrightarrow{\text{approximately equal}} \left(\frac{1}{4}\right)\left(\frac{2}{5}\right) = \frac{2}{20} = \frac{1}{10}$$

0.25 0.40

B

Choice X A) $\frac{1}{4} = 0.25$

✓ B) $\frac{3}{32} \approx \frac{3}{30} = \frac{1}{10}$

X C) $\frac{3}{5} = \frac{6}{10}$

X D) $\frac{2}{3} \approx 0.66$

X E) $\frac{2}{10}$

#24

$$2^{10} + 1^{10} + \left(\frac{1}{2}\right)^{10} + \left(\frac{1}{3}\right)^{10} + \left(\frac{1}{4}\right)^{10}$$

$$\downarrow \quad \downarrow \quad \downarrow$$

$$1024 + 1 + \left(\frac{1}{1024}\right) + \left(\frac{1}{3^{10}}\right) + \left(\frac{1}{4^{10}}\right) = 1025$$

D

Close to "zero" ≈ 0 .

15

#25

$$(x^5)^3 = x^{(5)} \cdot x^{(5)} \cdot x^{(5)} = x^{15}$$

$a = 15$

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144

#26

$$2^4 + 4^3 + 8^2 = 16 + 64 + 64 = 80 + 64 = 144$$

33

#27

David	Ethel	Fred
$3(F-5)$	$(F-5)$	(F)
$3(\text{Ethel})$	"5 yrs younger"	$F = \text{Fred's age}$
	$(16-5)$	\downarrow
	$\boxed{11}$	$\boxed{16}$

$33 = 3(11)$

128

#28

$$\frac{1}{2} (2^8) = \underbrace{2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2}_{\substack{\text{eight} \quad \text{eight} \quad \text{two} \\ \text{cancel}}} = 8 \cdot 8 \cdot 2 = 64 \cdot 2 = 128$$

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#29 $\frac{6^{10}}{6^{19}} = \frac{\cancel{6^{10}}}{\cancel{6^{10}}(6^9)} = \frac{1}{6^9} = 6^{-9}$

-9

#30 $2^4 \times 4^3 \times 8^2$

8

$\begin{array}{c} \swarrow \downarrow \downarrow \downarrow \quad \downarrow \downarrow \\ (2)(2)(2)(2) \quad (8)(8) \\ \swarrow \downarrow \downarrow \quad \downarrow \downarrow \\ (4)(4) \quad (4^3) \quad (4)(2)(4)(2) \\ \swarrow \downarrow \downarrow \quad \downarrow \downarrow \\ (4^2) \quad (4^3) \quad (4^2)(4) \end{array} = 4^{2+3+2+1}$

$= 4^8$

4⁸