

SOLUTIONS

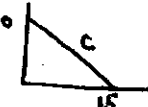
① $-18 + 6 + 2589 = 2589$ B

② D

③ $-\frac{1}{2}x - 5 \geq 11$ or $-\frac{1}{2}x - 5 \leq -11$
 $-\frac{1}{2}x \geq 16$ $-\frac{1}{2}x \leq -6$
 $x \leq -32$ or $x \geq 12$ C

④ C

⑤ $x = \frac{-9+8}{2} = -\frac{1}{2}$ $y = \frac{3+9}{2} = 6$
 $4x - y = c$
 $4(-\frac{1}{2}) - 6 = c \Rightarrow 4x - y = -8$
 $-8 = c$ A

⑥  $2x + 3y = 20$
 $y = -\frac{2}{3}x + 10$
 $10^2 + 15^2 = c^2$
 $225 = c^2$
 $18.03 = c$
C $\frac{18.03}{2.23} \approx 8.08$

⑦ $\begin{vmatrix} 8 & 5 \\ 3 & -2 \end{vmatrix} = (8 \cdot -2) - (3 \cdot 5) = -31$ C

⑧ $8x + 3y = 41$
 $6x + 5y = 39$
 $24x + 9y = 123$
 $-24x - 20y = -156$
 $-11y = -33$
 $y = 3$
 $x = 4$
 $4 + 3 = 7$ B

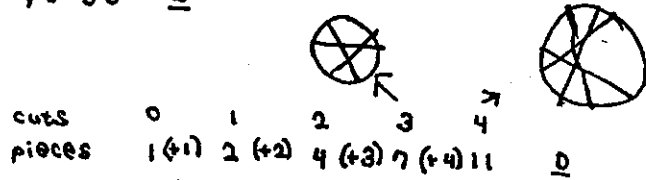
⑨ $2(x^2 - 1) + 3 = 4x^2 + 12x + 9 - 1$
 $0 = 2x^2 + 12x + 7$
 $x = \frac{-12 \pm \sqrt{144 - 4(2)(7)}}{2(2)}$
 $= \frac{-12 \pm \sqrt{88}}{4}$
 $= \frac{-6 \pm \sqrt{22}}{2}$ C

⑩ $4k + -k + 24 - 3k - -8k - 4 = 0$
 $8k + 20 = 0$
 $8k = -20$
 $k = -\frac{5}{2}$
D $= -2.5$

⑪ $(0, 0), (2, 32), (10, 0)$

$y = ax^2 + bx + c$
 $0 = 4a + 2b$
 $32 = 100a + 10b$
 $a = -2, b = 20$
 $y = -2x^2 + 20x$
 $x = \frac{-20}{2(-2)} = 5$
 $y = 50$ D

⑫



⑬ $7^{2x} = 7^{4/5} \Rightarrow 2x = \frac{4}{5} \Rightarrow x = \frac{2}{5}$ D

⑭ $\frac{2}{3} + 30 - (5 \cdot 3) + 20 = 12$
 $\frac{2}{3} + 30 - 15 + 1 = 16\frac{2}{3}$ D

⑮ $f(f^{-1}(x)) = x, \therefore f(f^{-1}(22)) = 22$ B

⑯ $A = Pe^{rt}$ rate = 0.04688... (5)
 $= (3000)e^{(0.04688...)(5)}$ $3144 = 3000e^r$
 $= 53792.52$ B $1.048 = e^r$
 $\ln 1.048 = 0.0468835...$

⑰ $f(x) = \frac{x-3}{(x-3)(x+1)}$ $x+1=0$
 $x=-1$ A

⑱ $(2)^4 + (2)^2 - 7(2)^2 - 2(2) + 11 = 3$ C

⑲ $b = 49, a = 343 \Rightarrow 343 + 49 = 392$ A

⑳ $\frac{x}{x+2} + \frac{7}{x-5} = \frac{14}{(x-5)(x+2)}$
 $x(x-5) + 7(x+2) = 14$
 $x^2 - 5x + 7x + 14 = 14$
 $x^2 + 2x = 0$
 $x(x+2) = 0$
 $x = 0, -2 \leftarrow$ excluded value $\{0\}$ B

㉑ $18.75 = \frac{k(10,000)}{24^2}$ Priscilla = $\frac{(1.087)(90)}{0.5^2}$
 $1.08 = k$ $= 398.9$ D

㉒ $\frac{57}{5\sqrt{3} - 3\sqrt{2}} \cdot \frac{5\sqrt{3} + 3\sqrt{2}}{5\sqrt{3} + 3\sqrt{2}} = \frac{57(5\sqrt{3} + 3\sqrt{2})}{75 - 18} = \frac{57}{57} (5\sqrt{3} + 3\sqrt{2})$ B

㉓ $x = \sqrt{12+x}$
 $x^2 = 12+x$
 $x^2 - x - 12 = 0$
 $(x-4)(x+3) = 0$
 $x = 4, -3$ C

SOLUTIONS

$$\begin{aligned} \textcircled{24} \quad \frac{\frac{y}{x} - \frac{x}{y}}{x^2 - y^2} &= \frac{\frac{y^2}{xy} - \frac{x^2}{xy}}{x^2 - y^2} \\ &= \frac{\frac{y^2 - x^2}{xy}}{xy(x^2 - y^2)} = \frac{y^2 - x^2}{xy(x^2 - y^2)} \\ &= \frac{-(x^2 - y^2)}{xy(x^2 - y^2)} = \frac{-1}{xy} \quad \underline{B} \end{aligned}$$

$\textcircled{25}$ $P(x)$ 4 sign changes
 $P(-x) = -x^5 - 2x^4 - 3x^3 - 2x^2 - 5x + 6$
 1 sign change
 I, II, and IV are possible D

$$\begin{aligned} \textcircled{26} \quad x &= \frac{-4 \pm \sqrt{16 - 4(2)(8)}}{2(2)} \\ &= \frac{-4 \pm \sqrt{-80}}{4} \\ &= \frac{-4 \pm 4i\sqrt{5}}{4} \\ &= \frac{-2 \pm 2i\sqrt{5}}{2} \quad \underline{A} \end{aligned}$$

$\textcircled{27} (500)(1001) = 500,500 \quad \underline{D}$

$$\begin{aligned} \textcircled{28} \quad x^2 + 10x + 4y^2 + 24y &= -45 \\ x^2 + 10x + 25 + 4(y^2 + 6y + 9) &= -45 + 25 + 36 \\ \frac{(x+5)^2}{16} + \frac{4(y+3)^2}{16} &= \frac{16}{16} \\ \frac{(x+5)^2}{16} + \frac{(y+3)^2}{4} &= 1 \\ x\text{-rad.} &= 4, \quad y\text{-rad.} = 2 \\ 2 - 4 &= -2 \quad \underline{C} \end{aligned}$$

$$\begin{aligned} \textcircled{29} \quad \left(\frac{1}{40} - \frac{1}{50}\right)t &= 1 \\ \frac{1}{200}t &= 1 \\ t &= 200 \text{ minutes} \\ &= 3 \text{ hours } 20 \text{ minutes} \quad \underline{C} \end{aligned}$$

$$\begin{aligned} \textcircled{30} \quad \frac{{}_7C_2 \cdot {}_6C_3}{{}_{13}C_5} &= 0.32634 \\ &\approx 0.33 \quad \underline{D} \end{aligned}$$