

$$1) \left(-\frac{3}{4}\right)^2 \left(-\frac{1}{6}\right) \\ = \frac{9}{16} \left(-\frac{1}{6}\right) \\ = -\frac{3}{32} \quad (B)$$

$$2) \frac{-9-7}{5^2-17} \div (3-5) \\ = \frac{-9-7}{25-17} \div (3-5) \\ = \frac{-16}{8} \div (-2) \\ = -2 \div (-2) \\ = 1 \quad (A)$$

$$3) \frac{18}{25} = \frac{72}{100} = 72\% \quad (B)$$

$$4) 5x - 3(2x+7) \\ = 5x - 6x - 21 \\ = -x - 21 \quad (C)$$

$$5) \frac{x}{4} - 8 \quad (A)$$

$$6) 2x^2 + 3y; x = -2, y = 3 \\ \Rightarrow 2(-2)^2 + 3 \cdot 3 \\ = 2 \cdot 4 + 3 \cdot 3 \\ = 8 + 9 \\ = 17 \quad (B)$$

$$7) 5x \div (2x-7) = 10 \\ 5x - 2x + 7 = 10 \\ 3x + 7 = 10 \\ 3x = 3 \\ x = 1 \quad (D)$$

$$8) -\frac{13}{15}x = 39 \\ x = 39 \left(-\frac{15}{13}\right) \\ x = -45 \quad (B)$$

$$9) 3(3-x) < 5(x+5) \\ 9-3x < 5x+25 \\ 9-25 < 5x+3x \\ -16 < 8x \\ -\frac{16}{8} < x \quad (A) \\ -2 < x$$

$$10) 1) \text{ let } x \text{ be the number of nickel}$$

$$2) 5x + (25-x)10 = 165 \\ 5x + 250 - 10x = 165 \\ 250 - 5x = 165 \\ -5x = -85 \\ x = 17 \quad (C)$$

$$11) 1) \text{ let } l \text{ be the length} \\ w = l - 6$$

$$2) 36 = 2l + 2(l-6) \\ 36 = 2l + 2l - 12 \\ 48 = 4l \\ l = 12 \quad (A) \\ w = 6$$

$$12) 46.80 = 65 - 65r \\ 65r = 65 - 46.80 \\ 65r = 18.20 \\ r = \frac{18.20}{65} \\ r = 0.28 \\ r = 28\% \quad (C)$$

$$65 \overline{) 18.20} \\ \underline{130} \\ 520 \\ \underline{520} \\ 0$$

$$13) 1) \text{ let } x \text{ be the amount for the second investment}$$

$$2) 0.09 \times 3000 \pm 0.108x \\ 270 = 0.108x \\ \frac{270}{0.108} = x \\ \frac{270000}{108} = x \quad \frac{2500}{108} = \frac{216}{540} \\ 2500 = x \quad (C)$$

$$14) \text{ let } x \text{ be the amount of pure water}$$

$$0.1x + 0.35 \cdot 80 \\ = 0.14(x+80) \\ 28 = 0.14x + 11.2 \\ 16.8 = 0.14x \\ \frac{16.8}{0.14} = x \quad (A) \\ 120 = x$$

$$15) \text{ let } t \text{ be the time for 55 mph.}$$

$$55t + 40(7-t) = 295 \\ 55t + 280 - 40t = 295 \\ 15t = 15 \\ t = 1 \quad (D)$$

$$16) m = \frac{-3-(-6)}{1-(-2)} \\ = \frac{-3+6}{1+2} = \frac{3}{3} \\ = 1 \quad (C)$$

$$17) y = \frac{1}{3}x + 2$$

$$\rightarrow y\text{-int } (0, 2)$$

$$m = \frac{1}{3} \quad \text{(A)}$$

$$18) 3x + y \leq -3$$

① Boundary

$$3x + y = -3$$

$$x\text{-int } (-1, 0)$$

$$y\text{-int } (0, -3)$$

② Test (0, 0)

$$0 + 0 \leq -3?$$

$$0 \leq -3 \times$$

(0, 0) is not a solution.

(A)

$$19) \begin{cases} y = x - 9 \\ 5x + 2y = 10 \end{cases}$$

① $\Rightarrow$ ②: $5x + 2y = 10$

$$5x + 2(x - 9) = 10$$

$$5x + 2x - 18 = 10$$

$$7x - 18 = 10$$

$$7x = 28$$

$$x = 4$$

② $\rightarrow y = 4 - 9$

$$y = -5 \quad \text{(D)}$$

$$20) \begin{cases} 9x + 3y = 18 \\ 18x + 3y = 18 \end{cases}$$

$$18x + 3y = 18$$

$$-9x = -4$$

$$x = \frac{-4}{-9} = \frac{4}{9}$$

(B)

21) Let b be the rate of the boat in calm water and c of the current.

$$\begin{cases} 3(b+c) = 75 \\ 3(b-c) = 33 \end{cases} \rightarrow \begin{cases} b+c = 25 \\ b-c = 11 \end{cases}$$

(D)

$$2b = 36$$

$$b = 18$$

$$22) (2x+3)(-x^2+4x-3)$$

$$= -2x^3 + 8x^2 - 6x - 3x^2 + 12x - 9$$

$$= -2x^3 + 5x^2 + 6x - 9 \quad \text{(D)}$$

$$23) \frac{x^2 - 2x + 25}{x+3}$$

$$\begin{array}{r} x-5 \\ x+3 \overline{) x^2 - 2x + 25} \\ \underline{x^2 + 3x} \\ -5x + 25 \\ \underline{-5x - 15} \\ 40 \end{array}$$

(B)

$$24) (-4u^2)(u^{-3})^2$$

$$= -4u^2 u^{-6}$$

$$= -4u^{-4}$$

$$= -\frac{4}{u^4} \quad \text{(A)}$$

$$25) ax - 3bx - ay + 3by$$

$$= x(a-3b) - y(a-3b)$$

$$= (a-3b)(x-y) \quad \text{(C)}$$

$$26) 8a^2 - 26a - 7$$

$$= (4a+1)(2a-7)$$

(B)

$$27) 5c^2 - 20 = 5(c^2 - 4)$$

$$\text{(A)} = 5(c+2)(c-2)$$

$$28) x(x-5) = 14$$

$$x^2 - 5x = 14$$

$$x^2 - 5x - 14 = 0$$

$$(x-7)(x+2) = 0$$

$$x = 7 \quad x = -2 \quad \text{(C)}$$

29)

$$\frac{7x+7}{4x+8} \div \frac{x^2+2x+1}{x^2-4}$$

$$= \frac{7x+7}{4x+8} \cdot \frac{x^2-4}{x^2+2x+1}$$

$$= \frac{7(x+1)}{4(x+2)} \cdot \frac{(x+2)(x-2)}{(x+1)^2} = \frac{7(x-2)}{4(x+1)} \quad \text{(A)}$$

$$30) \frac{1 + \frac{3}{x} - \frac{4}{x^2}}{1 + \frac{1}{x} + \frac{12}{x^2}} \cdot \frac{x^2}{x^2} \quad \text{(2)}$$

$$= \frac{x^2 + 3x - 4}{x^2 + 7x + 12} = \frac{(x+4)(x-1)}{(x+4)(x+3)}$$

$$= \frac{x-1}{x+3} \quad \text{(A)}$$

$$31) T = fm - gm$$

$$gm = fm - T$$

$$g = \frac{fm - T}{m} \quad \text{(B)}$$

$$32) \frac{r}{r^2 - 9} + \frac{3}{r+3}$$

$$= \frac{r}{(r+3)(r-3)} + \frac{3(r-3)}{(r+3)(r-3)} \quad \text{(C)}$$

$$= \frac{r + 3r - 9}{(r+3)(r-3)} = \frac{4r-9}{(r+3)(r-3)}$$

$$33) y + \frac{2y-4}{y-2} = 3$$

$$y(y-2) + 2y - 4 = 3(y-2)$$

$$y^2 - 2y + 2y - 4 = 3y - 6$$

$$y^2 - 3y + 2 = 0$$

$$(y-2)(y-1) = 0 \quad \text{(D)}$$

$$y = 2 \quad y = 1$$

$$34) \text{ Let } t \text{ be the time}$$

$$\frac{t}{10} + \frac{t}{15} = 1$$

$$\frac{3t}{30} + \frac{2t}{30} = 30 \quad \times 30$$

$$3t + 2t = 30$$

$$5t = 30$$

$$t = 6 \quad \text{(C)}$$

$$35) \sqrt[3]{81x^3y^7} = \sqrt[3]{81x^3y^6y} = 9x^2y^3\sqrt[3]{y} \quad \text{(D)}$$

$$\begin{aligned}
 36) \quad & \frac{\sqrt{175x^3}}{\sqrt{5x^9}} \\
 &= \sqrt{\frac{175x^3}{5x^9}} \\
 &= \sqrt{\frac{35}{x^6}} \\
 &= \frac{\sqrt{35}}{x^3} \quad \textcircled{B}
 \end{aligned}$$

$$\begin{aligned}
 37) \quad & \sqrt{4x-7} = 5 \\
 & 4x-7 = 25 \\
 & 4x = 32 \\
 & x = 8 \quad \textcircled{A}
 \end{aligned}$$

$$\begin{aligned}
 38) \quad & x^2 + 6x - 4 = 0 \\
 & x^2 + 6x = 4 \\
 & x^2 + 6x + 9 = 4 + 9 \\
 & (x+3)^2 = 13 \\
 & x+3 = \pm\sqrt{13} \\
 & x = -3 \pm \sqrt{13} \quad \textcircled{B}
 \end{aligned}$$

$$\begin{aligned}
 39) \quad & (x+1)^2 = 9 \\
 & x+1 = \pm 3 \\
 & x = -1 \pm 3 \\
 & x_1 = -1+3 = 2 \\
 & x_2 = -1-3 = -4 \quad \textcircled{C}
 \end{aligned}$$

$$\begin{aligned}
 40) \quad & y = x^2 + 2x + 3 \\
 & x=0: \rightarrow y = 3 \quad (0, 3) \\
 & x=1: \rightarrow y = 1+2+3 = 6 \quad (1, 6) \\
 & \quad \quad \quad \textcircled{C}
 \end{aligned}$$