

1) $(-\frac{3}{4})^2(-\frac{1}{6})$ LP1
 $= \frac{9}{16} \cdot (-\frac{1}{6}) = -\frac{3}{32}$ (B)

2) $\frac{-25-7}{4^2-8} \div (3-5)$
 $= \frac{-25-7}{16-8} \div (3-5)$
 $= \frac{-32}{8} \div (3-5)$
 $= -4 \div (-2)$ (A)
 $= 2$

3) $\frac{16}{25} = x\%$
 $\frac{16}{25} \times 100\% = x\%$
 $64\% = x\%$ (A)

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

5) $4x - 8$ (A)

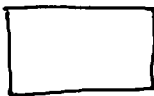
6) $2x^2 + 3y$; $x = -3$
 $y = 2$
 $\rightarrow 2(-3)^2 + 3(2)$
 $= 2 \cdot 9 + 3 \cdot 2$
 $= 18 + 6 = 24$ (B)

7) $5x - (8x - 7) = 10$
 $5x - 8x + 7 = 10$
 $-3x + 7 = 10$
 $-3x = 3$ (B)
 $x = -1$

8) $-\frac{8}{15}x = 16$
 $x = \frac{2}{1}(-\frac{15}{8})$
 $x = -30$ (B)

9) $3(3-x) < 5(x+5)$
 $9-3x < 5x+25$
 $9-25 < 5x+3x$
 $-16 < 8x$
 $-2 < x$ (A)

10) $x \rightarrow \text{dime}$
 $y \rightarrow \text{nickel}$
 $y = 25 - x \rightarrow \text{nickel}$
 $10x + 5(25 - x) = 165$
 $10x + 125 - 5x = 165$
 $5x + 125 = 165$
 $5x = 40$
 $x = 8$ (A)

11)  $w = l - 4$
 $P = 2l + 2w$
 $36 = 2l + 2(l - 4)$
 $36 = 2l + 2l - 8$
 $36 = 4l - 8$
 $44 = 4l$
 $11 = l \rightarrow w = 7$ (A)

12) $S = R(1 - r)$
 $40 = 50(1 - r)$
 $\frac{40}{50} = 1 - r$
 $0.8 = 1 - r$
 $0.8 - 1 = -r$
 $-0.2 = -r$
 $r = 0.2 = 20\%$

Or $S = R(1 - r)$
 $S = R - rR$
 $40 = 50 - 50r$
 $40 - 50 = -50r$
 $-10 = -50r$
 $\frac{-10}{-50} = r$
 $\frac{1}{5} \times 100\% = r$
 $20\% = r$ (B)

13) let x be the amount invested in the second account

	Investment	Rate	Interest
1st	3000	0.09	270
2nd	x	0.1	$0.1x$

$520 = 270 + 0.1x$
 $250 = 0.1x$
 $\frac{250}{0.1} = x \rightarrow 2500 = x$ (C)

14) let x be the concentration of the resulting mixture

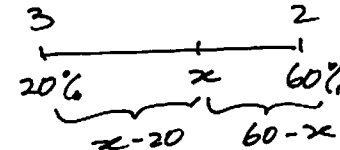
	Amount	Conc	Acid
60% acid	2	0.6	1.2
20% acid	3	0.2	0.6
	5	x	$1.8 = 5x$

$1.8 = 5x$

$\frac{1.8}{5} = x$

$0.36 = x$

$36\% = x$ (B)

Or 
 $20\% \quad x \quad 60\%$
 $x - 20 \quad 60 - x$

$3(x - 20) = 2(60 - x)$

$3x - 60 = 120 - 2x$

$3x + 2x = 120 + 60$

$5x = 180$

$x = 36$

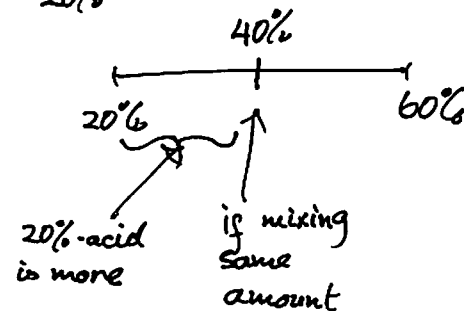
NOTE: You are mixing 60% and 20% acid

then the concentration of the resulting mixture must be between 20% and 60%

(eliminate A and D)

IF the amount of them were the same (i.e., both 3L or both 2L), THEN the concentration of the resulting mixture must be the middle of 20% and 60% which is 40%.

But since 20%-acid is more than 60%-acid, then the result must tilt toward 20%.



15) let t be the time for 55 mph. Then the time for 40 mph is $7-t$.

$$\text{So, } 40(7-t) + 55t = 295$$

$$280 - 40t + 55t = 295$$

$$280 + 15t = 295$$

$$15t = 15$$

$$\textcircled{D} \quad t = 1$$

16) $(-2, -6), (7, -3)$
 $m = \frac{-3 - (-6)}{7 - (-2)} = \frac{-3 + 6}{7 + 2} = \frac{3}{9} = \frac{1}{3}$
 $\textcircled{C}$

17) $y = \frac{2}{3}x - 1$
 $y\text{-int } (0, -1)$
 $m = \frac{2}{3}$ $\textcircled{C}$

Note: Be careful when you read the graph.

18) $2x - 3y \geq 6$
Boundary: $2x - 3y = 6$
 $x\text{-int: } (3, 0)$
 $y\text{-int: } (0, -2)$ $\textcircled{B}$
Test $(0, 0)$ $2(0) - 3(0) \geq 6?$
 $0 \geq 6 \times$
 So, shade the region NOT containing $(0, 0)$.

19) $\begin{cases} y = x - 9 \\ 2x + 5y = 10 \end{cases}$
 $\textcircled{1} \Rightarrow \textcircled{2}: 2x + 5y = 10$
 $2x + 5(x - 9) = 10$
 $2x + 5x - 45 = 10$
 $7x - 45 = 10$
 $7x = 55$
 $\textcircled{A} \quad x = \frac{55}{7}$

20) $\begin{cases} 3x + 9y = 13 \\ 3x + 18y = 17 \end{cases}$
 $-9y = -4$
 $y = \frac{4}{9}$ $\textcircled{B}$

21) let b = boat's speed in calm air
 c = current

$$\begin{cases} \text{with current: } 3(b+c) = 75 \\ \text{against: } 3(b-c) = 33 \end{cases}$$

$$\begin{cases} b+c = 25 \\ b-c = 11 \end{cases}$$

$$2c = 14$$

$$c = 7$$
 $\textcircled{C}$

22) $(2x+3)(-x^2+4x-3)$
 $= -2x^3 + 8x^2 - 6x - 3x^2 + 12x - 9$
 $= -2x^3 + 5x^2 + 6x - 9$ $\textcircled{D}$

23) $(x^2 - 2x - 5) \div (x+3)$
 $\begin{array}{r} x-5 \\ x+3 \overline{) x^2 - 2x - 5} \\ \underline{x^2 + 3x} \\ -5x - 5 \\ \underline{-5x - 15} \\ 10 \end{array}$

$$2x - 5 + \frac{10}{x+3}$$
 $\textcircled{D}$

24) $(-5u^3)(u^{-3})^2$
 $= -5u^3 \cdot u^{-6}$
 $= -5u^{-3}$
 $= -\frac{5}{u^3}$ $\textcircled{D}$

OR $(-5u^3)(u^{-3})^2$
 $= -5u^3 \cdot \left(\frac{1}{u^3}\right)^2$
 $= -5u^3 \cdot \frac{1}{u^6}$
 $= -\frac{5}{u^3}$

25) $\underbrace{ax - 3bx}_{x(a-3b)} - \underbrace{ay + 3by}_{y(a-3b)}$
 $= x(a-3b) - y(a-3b)$
 $= (a-3b)(x-y)$ $\textcircled{C}$

26) $8a^2 + 26a - 7$
 $(8a + 7)(a - 1)$
 $(4a + 1)(2a - 7)$

Try each:

$$(4a-1)(2a+7)$$
 $\textcircled{A}$

27) $6c^2 - 24$
 $= 6(c^2 - 4)$
 $= 6(c+2)(c-2)$ $\textcircled{A}$

28) $x(x+5) = 14$
 $x^2 + 5x = 14$
 $x^2 + 5x - 14 = 0$
 $(x+7)(x-2) = 0$
 $x+7=0$ or $x-2=0$
 $x_1 = -7$ $x_2 = 2$
 $\textcircled{D}$

29) $\frac{7x-7}{4x+8} \div \frac{x^2-2x+1}{x^2-4}$
 $= \frac{7x-7}{4x+8} \cdot \frac{x^2-4}{x^2-2x+1}$
 $= \frac{7(\cancel{x}-1)}{4(\cancel{x}+2)} \cdot \frac{(x+2)(x-2)}{(x-1)(x-1)}$
 $= \frac{7(x-2)}{4(x-1)}$ $\textcircled{C}$

30) $T = fm + gm; g$
 $T - fm = gm$
 $\frac{T - fm}{m} = g$ $\textcircled{A}$

31) $1 - \frac{3}{x} - \frac{4}{x^2} \cdot \frac{x^2}{x^2}$
 $1 + \frac{3}{x} + \frac{2}{x^2}$
 $= \frac{x^2 - 3x - 4}{x^2 + 3x + 2}$ $\textcircled{B}$
 $= \frac{(x-4)(x+1)}{(x+2)(x+1)} = \frac{x-4}{x+2}$

$$\begin{aligned}
 32) \quad & \frac{r}{r^2-9} + \frac{3}{r-3} \\
 &= \frac{r}{(r+3)(r-3)} + \frac{3(r+3)}{(r-3)(r+3)} \\
 &= \frac{r+3(r+3)}{(r+3)(r-3)} = \frac{r+3r+9}{(r+3)(r-3)} \\
 &= \frac{4r+9}{(r+3)(r-3)} \quad \textcircled{D}
 \end{aligned}$$

$$\begin{aligned}
 33) \quad & y + \frac{2y-2}{y-1} = 2 \\
 & \quad \quad \quad \times (y-1) \\
 & y(y-1) + 2y-2 = 2(y-1) \\
 & y^2 - y + 2y - 2 = 2y - 2 \\
 & y^2 + y - 2 = 2y - 2 \\
 & y^2 - y = 0 \\
 & y(y-1) = 0 \\
 & y=0 \text{ or } y-1=0 \quad \swarrow \text{N/A} \\
 & \quad \quad \quad y=1 \quad \swarrow \text{N/A} \\
 & \text{So, } y=0 \quad \textcircled{D}
 \end{aligned}$$

$$\begin{aligned}
 34) \quad & \text{Let } t \text{ be the time if both are on.} \\
 & \frac{t}{10} + \frac{t}{15} = 1 \\
 & \quad \quad \quad \times 30 \\
 & 3t + 2t = 30 \\
 & 5t = 30 \\
 & t = 6 \quad \textcircled{C}
 \end{aligned}$$

$$35) \quad \sqrt{36x^4y^7} = \sqrt{36x^4y^6 \cdot y} = 6x^2y^3\sqrt{y} \quad \textcircled{D}$$

$$\begin{aligned}
 36) \quad & \frac{\sqrt{125x^3}}{\sqrt{5x^9}} = \sqrt{\frac{125x^3}{5x^9}} = \sqrt{\frac{25}{x^6}} \\
 &= \frac{5}{x^3} \quad \textcircled{B}
 \end{aligned}$$

$$\begin{aligned}
 37) \quad & \sqrt{4x+7} = 5 \\
 & 4x+7 = 5^2 \\
 & 4x+7 = 25 \\
 & 4x = 18 \\
 & \quad \quad \quad \rightarrow x = \frac{18}{4} \\
 & \quad \quad \quad x = \frac{9}{2} \quad \textcircled{B}
 \end{aligned}$$

$$\begin{aligned}
 38) \quad & x^2 + 6x + 4 = 0 \\
 & x^2 + 6x = -4 \\
 & x^2 + 6x + 9 = -4 + 9 \\
 & (x+3)^2 = 5 \\
 & x+3 = \pm\sqrt{5} \quad \textcircled{C} \\
 & x = -3 \pm \sqrt{5}
 \end{aligned}$$

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

$$\begin{aligned}
 40) \quad & y = -x^2 + 3x + 1 \\
 & y\text{-int: } (0,1) \text{ eliminate A,B,D} \quad \textcircled{C}
 \end{aligned}$$

Note: To fully do #40, create table to get the ordered pairs that satisfy the equation

x	y	(x,y)
-1	-1-3+1=-3	(-1,-3)
0	0+0+1=1	(0,1)
1	-1+3+1=3	(1,3)
2	-4+6+1=3	(2,3)

$\textcircled{C}$