1. Which equation is represented by the accompanying graph?

   (handwritten: $y = (x+3) + 1$)

   (3,1)

   (1) $y = |x| - 3$ (3) $y = |x + 3| - 1$
   (2) $y = (x-3)^2 + 1$ (4) $y = |x - 3| + 1$

   (handwritten: $x^2 - 6x + 9 + 1$)
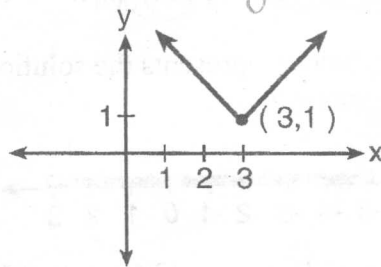
2. The expression $\dfrac{1}{5 - \sqrt{13}}$ is equivalent to

   (1) $\dfrac{5 + \sqrt{13}}{12}$

   (2) $\dfrac{5 + \sqrt{13}}{-12}$

   (3) $\dfrac{5 + \sqrt{13}}{8}$

   (4) $\dfrac{5 + \sqrt{13}}{-8}$

   (handwritten: $\dfrac{1}{5-\sqrt{13}} \cdot \dfrac{(5+\sqrt{13})}{(5+\sqrt{13})} = \dfrac{5+\sqrt{13}}{25-13} = \dfrac{5+\sqrt{13}}{12}$)

3. Which expression is equivalent to $\dfrac{\sqrt{7} + \sqrt{2}}{\sqrt{7} - \sqrt{2}}$?

   (1) $\dfrac{9}{5}$

   (2) -1

   (3) $\dfrac{9 + 2\sqrt{14}}{5}$

   (4) $\dfrac{11 + \sqrt{2}}{14}$

   (handwritten: $\dfrac{\sqrt{7}+\sqrt{2}}{\sqrt{7}-\sqrt{2}} \cdot \dfrac{\sqrt{7}+\sqrt{2}}{\sqrt{7}+\sqrt{2}} = \dfrac{7+\sqrt{14}+\sqrt{14}+2}{7-2} = 7 - 2\sqrt{14}+2 = \dfrac{9+2\sqrt{14}}{5}$)

4. Express in simplest form: $\sqrt{48} - 5\sqrt{27} + 2\sqrt{75}$

   (handwritten: $4\sqrt{3} - 15\sqrt{3} + 10\sqrt{3} = -\sqrt{3} = \sqrt{3\cdot16} - 5\sqrt{3\cdot9} + 2\sqrt{3\cdot25}$)

5. The expression $\sqrt[4]{16a^6 b^4}$ is equivalent to

   (1) $2a^2 b$ (3) $4a^2 b$

   (2) $2a^{\frac{3}{2}} b$ (4) $4a^{\frac{3}{2}} b$

   (handwritten: $2ab\sqrt[4]{a^2}$)

   (handwritten at bottom: Another way of expressing $2ab\sqrt{a^2}$)

6. Solve for the positive value of x:

   (handwritten: $x^2 = 3\sqrt{2} \cdot 3\sqrt{2}$)

   $\dfrac{2x}{3\sqrt{2}} = \dfrac{3\sqrt{2}}{x}$

   (handwritten: (3); $2x^2 = 9\cdot2$; $2x^2 = 18$; $x^2 = 9$; $x = \pm3, 3$)

7. Solve for all values of x:

   (handwritten: $\{-2, 4\}$)

   $\dfrac{x^2 - 2}{2x - 1} = \dfrac{2x + 2}{5}$

   (handwritten: $5(x^2 - 2) = (2x+2)(2x-1)$; $5x^2 - 10 = 4x^2 - 2x + 4x - 2$; $5x^2 - 10 = 4x^2 + 2x - 2$; $x^2 - 2x - 8 = 0$; $(x-4)(x+2) = 0$; $x = 4, -2$)

8. Find the positive root of the equation

   $\dfrac{4}{x-1} = \dfrac{x+1}{12}$

   (handwritten: $48 = (x-1)(x+1)$; $48 = x^2 - 1$; $49 = x^2$; $\{-7, 7\}$)

9. What is the solution set of the equation $|x - 6| + 4 = 10$?

   (1) $\{0, 12\}$ (3) $\{-12, 0\}$
   (2) $\{-8, 12\}$ (4) $\{-12, -8\}$

   (handwritten: $x - 6 = 6$; $x - 6 = 6$ → $x = 12$; $x - 6 = -6$ → $x = 0$)

10. What is the solution set of the inequality $|8 + 4x| \le 3$?

    (1) $\{ x \mid \frac{5}{4} \le x \le \frac{11}{4} \}$
    (2) $\{ x \mid \frac{-11}{4} \le x \le \frac{-5}{4} \}$
    (3) $\{ x \mid x \le \frac{-11}{4} \text{ or } x \ge \frac{-5}{4} \}$
    (4) $\{ x \mid x \le \frac{5}{4} \text{ or } x \ge \frac{11}{4} \}$

    (handwritten: $8 + 4x \le 3$; $4x \le -5$; $x \le -\frac{5}{4}$; $8+4x \ge -3$; $4x \ge -11$; $x \ge -\frac{11}{4}$)

11. What is the solution set for the equation $2x - |x + 3| = 9$?

    (1) $\{12\}$ (3) $\{2, 12\}$
    (2) $\{2\}$ (4) $\{ \}$

    (handwritten: $-|x+3| = 9 - 2x$; $|x+3| = -9 + 2x$; $x + 3 = 9 - 2x$; $3x = 6$; $x = 2$; $x + 3 = -9 + 2x$; $x = -12$)
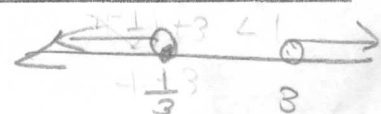
12. If $|2x + 3| < 1$, then the solution set contains

    (1) only negative real numbers
    (2) only positive real numbers
    (3) both positive and negative real numbers
    (4) no real numbers

    (handwritten: This is correct; $|2x+3| < 1$; $2x < -2$; $x < -1$; $2x + 3 > -1$; $2x > -4$; $x > -2$)

13. The solution to $|3x - 4| > 5$ is

    (1) $x > 3$ or $x < -\frac{1}{3}$ (3) $x < 3$ and $x > -\frac{1}{3}$
    (2) $x \ge 3$ or $x \le -\frac{1}{3}$ (4) $x \le 3$ and $x \ge -\frac{1}{3}$

    (handwritten: $3x - 4 > 5$; $3x > 9$; $x > 3$; $3x - 4 < -5$; $3x < -1$; $x < -\frac{1}{3}$)

    (handwritten at bottom: $-\frac{1}{3} < x > 3$)

14. What is the solution set for
$\sqrt{x+11} + 1 = x$?

    (1) {5,−2}   (3) {−2}
    (2) {5}   (4) { }

15. What is the solution set for $\sqrt{3x+1} + 1 = x$? −1

    (1) {0,5}   (3) {5}
    (2) {0}   (4) {5,5}

16. Express in simplest form:

$$\frac{\dfrac{1}{\sqrt{5}} + \dfrac{1}{\sqrt{5}}}{\sqrt{5}} = \frac{\frac{2}{\sqrt{5}}}{\sqrt{5}} = \frac{2}{\sqrt{5}} \cdot \frac{1}{\sqrt{5}}$$

$$= \frac{2}{5}$$

17. For the equation $\sqrt{x+21} = x + 1$, the solution set for x is

    (1) { }   (3) {−5,4}
    (2) {−5}   (4) {4}

18. What is the solution set of the equation below?

    $-3+3 = 1$
    $-2+3 = 1$ ✓
    $-8+3 =$
    $+3 =$

    $x^2 - 3x + 3 = 1 = x^2 - 3x + 2 = 0$
    $(x-2)(x-1)$
    $x = 2, 1$

    $\sqrt{x^2 - 3x + 3} = 1$?

    (1) {1}   (3) {1,2}
    (2) {2}   (4) {3}

    reject
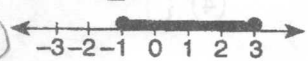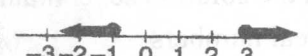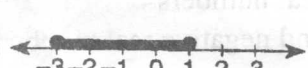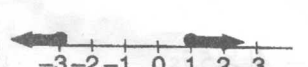
19. The solution set of the equation $\sqrt{x+1} + 5 = 0$ is

    (1) ∅   (3) {−26}
    (2) {24}   (4) {0}

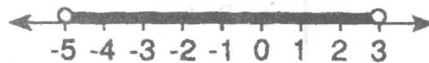20. What is the solution set for the inequality
$x^2 - 2x - 3 \leq 0$?

    (1) −3−2−1 0 1 2 3
    $(x-3)(x+1) \leq 0$
    $3 +−1$

    (2) −3−2−1 0 1 2 3

    (3) −3−2−1 0 1 2 3

    (4) −3−2−1 0 1 2 3

21. What is the solution set of the inequality
$x^2 - 6x - 7 > 0$? $(x-7)(x+1)$ $x = 7, -1$

    (1) $\{x \mid -1 < x < 7\}$ (3) $\{x \mid x < -7 \text{ or } x > 1\}$
    (2) $\{x \mid x = -1 \text{ or } x = 7\}$ (4) $\{x \mid x > 7 \text{ or } x < -1\}$

22. The graph below represents the solution to which inequality?

    −5 −4 −3 −2 −1 0 1 2 3

    (1) $|x + 8| \leq 3$ (3) $|x + 1| \leq 4$
    (2) $|x + 1| < 4$ (4) $|x + 6| > 1$

23. The solution set of the equation $\sqrt{2x+15} = x$ is
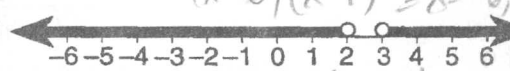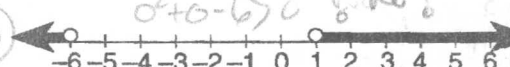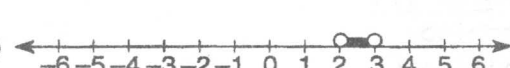
    (1) {5,−3}
    (2) {5}
    (3) {−3}
    (4) There is no solution set

    $2x+15 = x^2$
    $x^2 - 2x - 15$
    $(x-5)(x+3)$
    $x = 5, -3$

24. Find, to the nearest tenth, the positive value of x in the equation below.

    $\left(\sqrt{x^2 + 21} = 2x\right)^2$

    $x^2 + 21 = 4x^2$

    $x^2 + 21 = 4x^2$
    $-x^2 \qquad x^2$
    $\frac{21}{3} = \frac{3x^2}{3}$
    $7 = x^2$
    $\pm\sqrt{7} = x$
    2.6

25. Which graph represents the solution set of
$x^2 + 5x - 6 > 0$? $(x+6)(x-1)$ $x = -6, 1$

    (1) −6−5−4−3−2−1 0 1 2 3 4 5 6

    $0 + 0 - 6 > 0$ No!

    (2) −6−5−4−3−2−1 0 1 2 3 4 5 6

    (3) −6−5−4−3−2−1 0 1 2 3 4 5 6

    (4) −6−5−4−3−2−1 0 1 2 3 4 5 6

26. What is the solution of the equation
$\sqrt{5x-9} - 3 = 1$?

    $\sqrt{5x-9} = 4)^2$
    $5x-9 = 16$
    $5x = 25$
    $x = 5$

    Check
    $\sqrt{25-9} - 3 = 1$
    $\sqrt{16} - 3 = 1$
    $4 - 3 = 1$ ✓

1, $\sqrt{x+11} + 1 = x$ Check

$\sqrt{x+11} = x-1$
$x+11 = (x-1)^2$
$x+11 = x^2 - 2x + 1$

$0 = x^2 - 3x - 10$

$(x-5)(x+2)$
$x = 5, -2$ Reject −2

$\sqrt{16} + 1 = 5$
$4 + 1 = 5$ ✓
$\sqrt{-2+11} + 1 = -3$
$\sqrt{9} + 1 = -2$
$3 + 1 = -2$
$4 \neq -2$

15 $(\sqrt{3x+1} = x-1)^2$

$3x+1 = x^2 - 2x + 1$
$0 = x^2 - 5x$
$x(x-5)$
$x = 0, +5$

Check $\sqrt{0+1} + 1 \neq -1$ $\sqrt{15+1} + 1 = 5$ ✓
$4+1=5$ ✓

19 $\sqrt{x+1} + 5 = 0$
$\sqrt{x+1} = -5$
$x+1 = 25$
$x = 24$ reject