Workbook Examples
Chapter 3
Math 1100

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Outline

Example

Solve

$$2x^2 - x = 3.$$

Solution:

$$\Rightarrow 2x^2 - x - 3 = 0$$

$$\Rightarrow (2x - 3)(x + 1) = 0$$

$$\Rightarrow 2x - 3 = 0, x + 1 = 0$$

$$\Rightarrow x = \frac{3}{2}, x = -1$$

Example

Solve

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

Solution:

$$\Rightarrow 2x^2 = 10$$

$$\Rightarrow x^2 = 5$$

$$\Rightarrow x = \pm\sqrt{5}$$

Example

Solve

$$4x^2 = 12.$$

Solution:

$$\Rightarrow x^2 = \frac{12}{4} = 3$$

$$\Rightarrow x = \pm\sqrt{3}.$$

Example

Find the zeros of

$$f(x) = x^2 - 6x - 10$$

by completing the square.

Solution:

Set $f(x) = 0$, finding

$$x^2 - 6x - 10 = 0$$

$$\Rightarrow x^2 - 6x = 10$$

$$\Rightarrow x^2 - 6x + 9 = 10 + 9 = 19$$

Example (cont.)

$$\Rightarrow (x-3)^2 = 19$$

$$\Rightarrow x - 3 = \pm\sqrt{19}$$

$$\Rightarrow x = 3 \pm \sqrt{19}$$

Example

Find the zeros of

$$f(x) = x^2 - 3x - 3$$

by completing the square.

Solution:

$$\Rightarrow x^2 - 3x - 3 = 0$$

$$\Rightarrow x^2 - 3x = 3$$

$$\Rightarrow x^2 - 3x + \left(-\frac{3}{2}\right)^2 = 3 + \frac{9}{4} = \frac{21}{4}$$

Example (cont.)

$$\Rightarrow \left(x - \frac{3}{2}\right)^2 = \frac{21}{4}$$

$$\Rightarrow x - \frac{3}{2} = \pm\sqrt{\frac{21}{4}}$$

$$\Rightarrow x = \frac{3}{2} \pm \frac{\sqrt{21}}{2}$$

Example

Find the zeros of

$$2x^2 - 3x - 1 = 0$$

by completing the square.

Solution:

$$\Rightarrow 2\left(x^2 - \frac{3}{2}x\right) = 1$$

$$\Rightarrow 2\left(x^2 - \frac{3}{2}x + \frac{9}{16}\right) = 1 + \frac{18}{16}$$

$$\Rightarrow 2\left(x - \frac{3}{4}\right)^2 = \frac{17}{8}$$

Example (cont.)

$$\Rightarrow \left(x - \frac{3}{4}\right)^2 = \frac{17}{16}$$

$$\Rightarrow x - \frac{3}{4} = \pm\sqrt{\frac{17}{16}}$$

$$\Rightarrow x = \frac{3 \pm \sqrt{17}}{4}$$

Example

Solve

$$3x^2 + 2x = 7.$$

Solution:

$$\Rightarrow 3x^2 + 2x - 7 = 0$$

$$\Rightarrow a = 3, b = 2, c = -7$$

$$\Rightarrow x = \frac{-2 \pm \sqrt{2^2 - 4(3)(-7)}}{2(3)}$$

$$\Rightarrow x = \frac{-1 \pm \sqrt{22}}{3}$$

Example

Solve

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

Solution:

$$\Rightarrow a = 2, b = -3, c = -2$$

$$\Rightarrow x = \frac{-(-3) \pm \sqrt{(-3)^2 - 4(2)(-2)}}{2(2)}$$

$$\Rightarrow x = \frac{3 \pm 5}{4}$$

$$\Rightarrow x = -\frac{1}{2}, 2$$

Example

Solve

$$3x^2 + 8x + 3 = 0.$$

Solutoin:

$$\Rightarrow x = \frac{-8 \pm \sqrt{64 - 4(3)(3)}}{2(3)}$$

$$\Rightarrow x = \frac{-8 \pm 2\sqrt{7}}{6}$$

$$\Rightarrow x = \frac{-4 \pm \sqrt{7}}{3}$$

Example

Solve

$$x^2 + 1 = x.$$

Solution:

$$\Rightarrow x^2 - x + 1 = 0$$

$$\Rightarrow x = \frac{1 \pm \sqrt{1 - 4(1)(1)}}{2}$$

$$\Rightarrow x = \frac{1 \pm \sqrt{3}i}{2}$$

Example

Solve

$$x^4 - 5x^2 + 4 = 0.$$

Solution: Let $u = x^2$.

$$\Rightarrow u^2 - 5u + 4 = 0$$

$$\Rightarrow (u-4)(u-1) = 0$$

$$\Rightarrow u = 4, u = 1$$

$$\Rightarrow x^2 = 4, x^2 = 1$$

$$\Rightarrow x = \pm 1, \pm 2$$

Example

Solve

$$x^4 - 3x^2 + 2 = 0.$$

Solution: Let $u = x^2$.

$$\Rightarrow u^2 - 3u + 2 = 0$$

$$\Rightarrow (u-2)(u-1) = 0$$

$$\Rightarrow u = 2, u = 1$$

$$\Rightarrow x^2 = 2, x^2 = 1$$

$$\Rightarrow x = \pm\sqrt{2}, \pm 1$$

Example

Solve

$$4t^3 - 27t = -12t^2.$$

Solution:

$$\Rightarrow 4t^3 + 12t^2 - 27t = 0$$

$$\Rightarrow t(4t^2 + 12t - 27) = 0$$

$$\Rightarrow t(2t - 3)(2t + 9) = 0$$

$$\Rightarrow t = 0, 2t - 3 = 0, 2t + 9 = 0$$

$$\Rightarrow t = 0, \frac{3}{2}, -\frac{9}{2}$$

Example

Solve

$$18x^3 + 15x^2 + 12x + 10 = 0.$$

Solution:

$$\Rightarrow 3x^2(6x+5) + 2(6x+5) = 0$$

$$\Rightarrow (6x+5)(3x^2+2) = 0$$

$$\Rightarrow x = -\frac{5}{6}, \pm\sqrt{\frac{2}{3}}i$$

Example

Solve

$$9x^3 + x^2 - 9x - 1 = 0.$$

Solution:

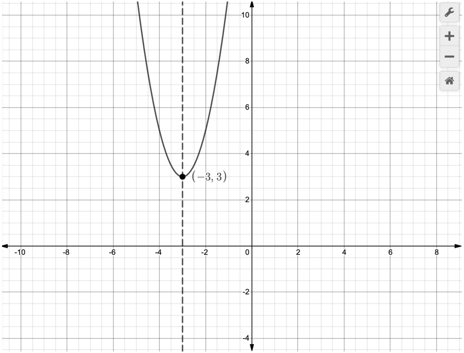
$$\Rightarrow x^2(9x + 1) - (9x + 1) = 0$$

$$\Rightarrow (9x + 1)(x^2 - 1) = 0$$

$$\Rightarrow x = -\frac{1}{9}, \pm 1$$

Example

Given the graph below, a graph of the quadratic function $f(x) = a(x-h)^2 + k$, find the vertex, the axis of symmetry, and the minimum or maximum value of the function.



Example (cont.)

Solution:

The vertex is $V = (-3, 3)$.

The axis of symmetry is $x = -3$.

The function has a minimum of $y = 3$.

Example

Find the vertex, the axis of symmetry, and the maximum or minimum value of

$$f(x) = x^2 + 10x + 28.$$

Solution:

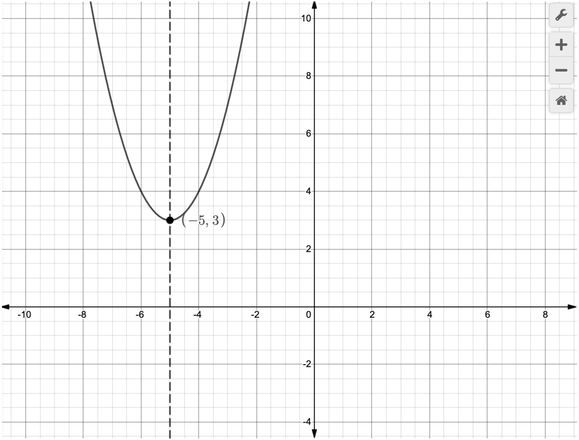
The vertex is $V = \left(-\frac{10}{2(1)}, f\left(-\frac{10}{2(1)}\right)\right) = (-5, 3)$.

The axis of symmetry is $x = -5$.

The function has a minimum of $y = -5$.

Example (cont.)

The graph of the function is



Example

Find the vertex, the axis of symmetry, and the maximum or minimum value of

$$f(x) = -2x^2 - 2x + 3.$$

Solution:

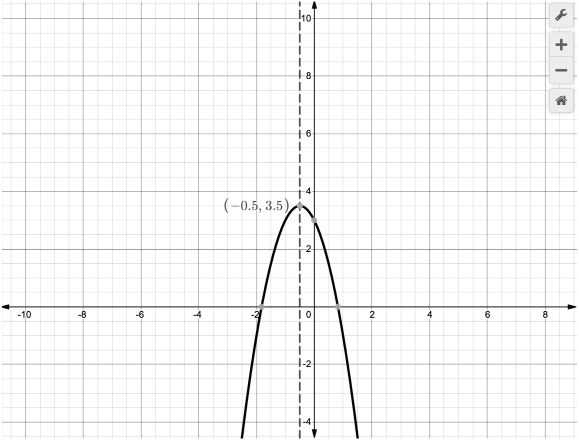
The vertex is $V = \left(-\frac{-2}{2(-2)}, f\left(-\frac{-2}{2(-2))}\right)\right) = \left(-\frac{1}{2}, \frac{7}{2}\right)$.

The axis of symmetry is $x = -\frac{1}{2}$.

The function has a maximum of $y = \frac{7}{2}$.

Example (cont.)

The graph of the function is



Example

Find the vertex, the axis of symmetry, and the maximum or minimum value of

$$g(x) = \frac{x^2}{2} - 4x + 8.$$

Solution:

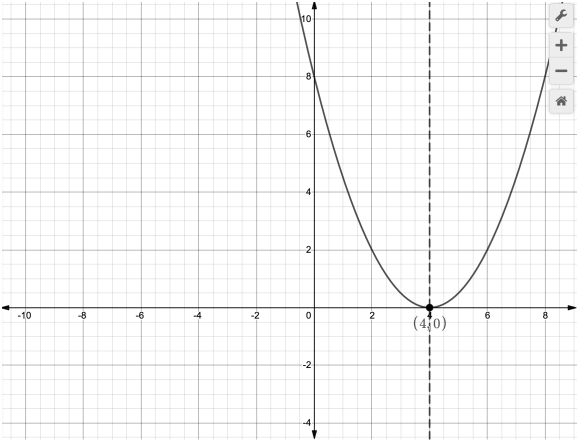
The vertex is $V = \left(-\frac{-4}{2(1/2)}, f\left(-\frac{-4}{2(1/2))}\right)\right) = (4, 0)$.

The axis of symmetry is $x = 4$.

The function has a minimum of $y = 0$.

Example (cont.)

The graph of the function is



Example

Find the vertex, the axis of symmetry, and the maximum or minimum value of

$$f(x) = x^2 - 9x + 18.$$

Solution:

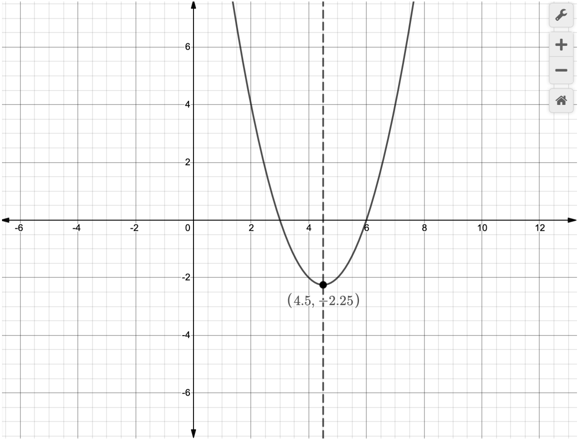
The vertex is $V = \left(-\frac{-9}{2(1)}, f\left(-\frac{-9}{2(1)}\right)\right) = \left(\frac{9}{2}, -\frac{9}{4}\right)$.

The axis of symmetry is $x = \frac{9}{2}$.

The function has a minimum of $y = -\frac{9}{4}$.

Example (cont.)

The graph of the function is



Example

Find the vertex, the axis of symmetry, and the maximum or minimum value of

$$f(x) = -x^2 - 4x - 5.$$

Solution:

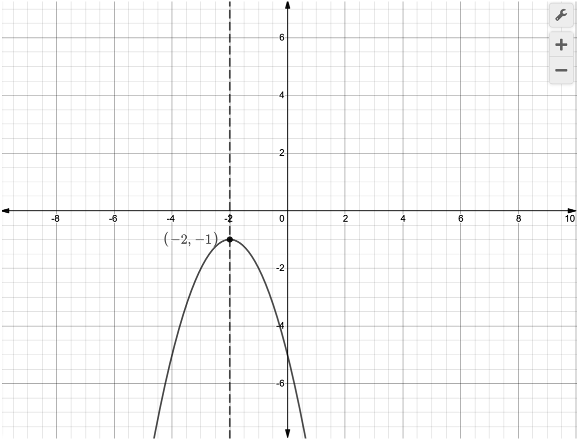
The vertex is $V = \left(-\frac{-4}{2(-1)}, f\left(-\frac{-4}{2(-1))}\right)\right) = (-2, -1)$.

The axis of symmetry is $x = -2$.

The function has a maximum of $y = -1$.

Example (cont.)

The graph of the function is



Example

For the function

$$f(x) = -x^2 + 14x - 47;$$

(a) find the vertex:

Solution:

$$\Rightarrow V = \left(-\frac{14}{2(-1)}, f\left(-\frac{14}{2(-1)}\right)\right)$$

$$\Rightarrow V = (7, 2)$$

Example (cont.)

(b) determine whether there is a maximum or minimum value, and find that value:

Solution:

Given that $a = -1 < 0$, there is a maximum value for $f(x)$.

The value is the $y-$value of the vertex, namely

$$y = 2.$$

Example (cont.)

(c) on what intervals is the function increasing and/or decreasing:

Solution:

$f(x)$ is increasing on

$$(-\infty, 7)\,;$$

$f(x)$ is decreasing on

$$(7, \infty).$$

Example

Graph the function

$$f(x) = -(x-3)^2$$

Solution:

We note that the vertex V is

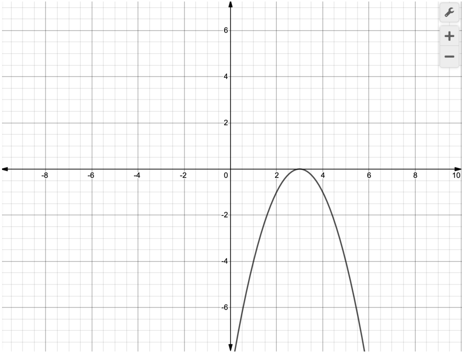
$$V = (3, 0),$$

with $a = -1 < 0$, which implies that the graph opens downwards.

Example (cont.)

The only graph which meets the above criteria is

Figure: D.



Example

Graph the function

$$f(x) = 4(x+9)^2 + 1$$

Solution:

We note that the vertex V is

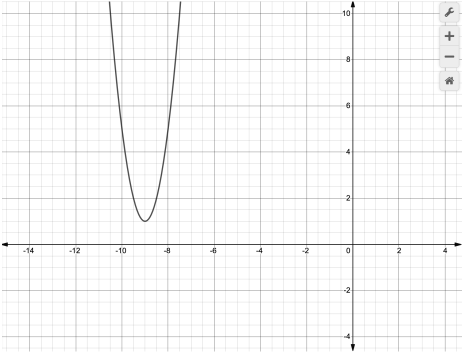
$$V = (-9, 1),$$

with $a = 4 > 0$, which implies that the graph opens upwards.

Example (cont.)

The only graph which meets the above criteria is

Figure: D.



Example

Given the function

$$f(x) = x^2 - 10x + 24$$

(a) find the vertex,

Solution:

$$V = \left(-\frac{-10}{2(1)}, f\left(-\frac{-10}{2(1)}\right)\right)$$

$$\Rightarrow V = (5, -1)$$

(b) determine whether there is a maximum or a minimum value,

Example (cont.)

Solution:

Since $a = 1 > 0$, the graph of $f(x)$ opens upwards, and there is a minimum value, which is the $y-$value of the vertex, namely

$$y = -1.$$

(c) find the range,

Solution:

The range comprises the possible $y-$values of $f(x)$, and so is

$$[-1, \infty).$$

Example (cont.)

(d) find the intervals on which the function is increasing and the intervals on which the function is decreasing,

Solution:

The function $f(x)$ is increasing on the interval

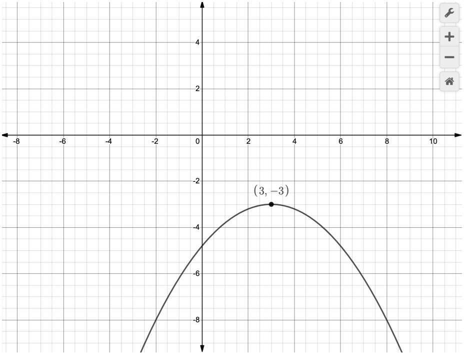
$$(5, \infty),$$

and the function $f(x)$ is decreasing on the interval

$$(-\infty, 5).$$

Example

Use the graph below to find the vertex, the axis of symmetry, and the maximum or minimum of the function.



Example (cont.)

Solution:

The vertex V is

$$V = (3, -3).$$

The axis of symmetry is

$$x = 3.$$

The function has a maximum value of

$$y = -3.$$

Example

Find the vertex of the parabola

$$f(x) = -2x^2 - 20x - 53.$$

Solution:

$$V = \left(-\frac{-20}{2(-2)}, f\left(-\frac{-20}{2(-2)}\right)\right)$$

$$\Rightarrow V = (-5, -3) \quad (B.)$$

Example

Find the vertex of the parabola

$$f(x) = -x^2 + 7x - 5.$$

Solution:

$$V = \left(-\frac{7}{2(-1)}, f\left(-\frac{-7}{2(-1)}\right)\right)$$

$$\Rightarrow V = \left(\frac{7}{2}, \frac{29}{4}\right) \quad (C.)$$

Example

Find the axis of symmetry of the given function

$$f(x) = -3x^2 + 6x.$$

Solution:

We need only find

$$-\frac{b}{2a}.$$

$$\Rightarrow x = -\frac{6}{2(-3)} = 1. \quad (B.)$$

Example

Find the axis of symmetry of the given function

$$f(x) = 4x^2 - 16x + 20$$

Solution:

We need only find

$$-\frac{b}{2a}.$$

$$\Rightarrow x = -\frac{-16}{2(4)} = 2. \quad (C.)$$

Example

Determine whether there is a maximum or minimum value for the given function, and find that value:

$$f(x) = x^2 + 4x - 5.$$

Solution:

Since $a = 1 > 0$, there is a minimum value of $f(x)$.

The minimum value is the $y-$value of the vertex. which is

$$f(x) = -9 \ \ (D.)$$

Example

Determine whether there is a maximum or minimum value for the given function, and find that value:

$$f(x) = -2x^2 - 4x - 8.$$

Solution:

Since $a = -2 < 0$, there is a maximum value of $f(x)$.

The maximum value is the $y-$value of the vertex. which is

$$f(x) = -6 \quad (D.)$$

Example

Solve

$$\frac{x+6}{4} - \frac{x-3}{5} = 3$$

Solution:

$$\text{LCD} = 20 \Rightarrow 20\left(\frac{x+6}{4}\right) - 20\left(\frac{x-3}{5}\right) = 20(3)$$

$$\Rightarrow 5(x+6) - 4(x-3) = 60$$

$$\Rightarrow 5x + 30 - 4x + 12 = 60$$

$$\Rightarrow x + 42 = 60$$

$$\Rightarrow x = 18.$$

Example

Solve

$$\frac{x-8}{3} - \frac{x-3}{2} = 0.$$

Solution:

$$\begin{aligned}
\text{LCD} = 3(2) = 6 &\Rightarrow 6 \cdot \frac{x-8}{3} - 6 \cdot \frac{x-3}{2} = 6 \cdot 0. \\
&\Rightarrow 2(x-8) - 3(x-3) = 0 \\
&\Rightarrow 2x - 16 - 3x + 9 = 0 \\
&\Rightarrow -x - 7 = 0 \\
&\Rightarrow x = -7.
\end{aligned}$$

Example

Solve

$$\frac{2}{x+4} = \frac{4}{x}$$

Solution:

$$\begin{aligned}
\text{LCD} = &\Rightarrow x(x+4)\left(\frac{2}{x+4}\right) = x(x+4)\left(\frac{4}{x}\right)\\
&\Rightarrow 2x = 4(x+4)\\
&\Rightarrow 2x = 4x + 16\\
&\Rightarrow -2x = 16\\
&\Rightarrow x = -8.
\end{aligned}$$

Example

Solve

$$\frac{x^2}{x-3} = \frac{9}{x-3}.$$

Solution:

$$\text{LCD} = x - 3 \Rightarrow (x-3)\left(\frac{x^2}{x-3}\right) = (x-3)\left(\frac{9}{x-3}\right)$$

$$\Rightarrow x^2 = 9$$

$$\Rightarrow x = \pm 3$$

But $x = 3$ gives us $\frac{3^2}{0} = \frac{9}{0}$, which does not exist.

$$\Rightarrow x = -3.$$

Example

Solve

$$\frac{y^2}{y+7} = \frac{49}{y+7}.$$

Solution:

$$\begin{aligned}
\text{LCD} = 7 \Rightarrow y+7\left(\frac{y^2}{y+7}\right) &= (y+7)\left(\frac{49}{y+7}\right) \\
&\Rightarrow y^2 = 49 \\
&\Rightarrow y = \pm 7 \\
&\Rightarrow \cancel{y=-7}, y = 7.
\end{aligned}$$

Example

Solve

$$\frac{x+9}{3} - \frac{x-12}{4} = 3$$

Solution:

$$\begin{aligned} \text{LCD} = 12 \Rightarrow 12\left(\frac{x+9}{3}\right) - 12\left(\frac{x-12}{4}\right) &= 12(3) \\ \Rightarrow 4(x+9) - 3(x-12) &= 36 \\ \Rightarrow 4x - 36 - 3x + 36 &= 36 \\ \Rightarrow x &= -36. \end{aligned}$$

Example

Solve

$$\frac{4}{x+2} = \frac{6}{x}$$

Solution:

$$\begin{aligned} \text{LCD} = x(x+2) &\Rightarrow x(x+2)\left(\frac{4}{x+2}\right) = x(x+2)\left(\frac{6}{x}\right) \\ &\Rightarrow 4x = 6(x+2) \\ &\Rightarrow 4x = 6x + 12 \\ &\Rightarrow -2x = 12 \\ &\Rightarrow x = -6. \end{aligned}$$

Example

Solve

$$\frac{2}{7} + \frac{1}{4} = \frac{1}{x}.$$

Solution:

$$\text{LCD} = 28x \Rightarrow 28x\left(\frac{2}{7}\right) + 28x\left(\frac{1}{4}\right) = 28x\left(\frac{1}{x}\right)$$

$$\Rightarrow 8x + 7x = 28$$

$$\Rightarrow 15x = 28$$

$$\Rightarrow x = \frac{28}{15}.$$

Example

Solve

$$\frac{x+9}{3} - \frac{x-12}{4} = 3.$$

Solution:

$$\text{LCD} = 3(4) = 12 \Rightarrow 12\left(\frac{x+9}{3}\right) - 12\left(\frac{x-12}{4}\right) = 12(3)$$

$$\Rightarrow 4(x+9) - 3(x-12) = 36$$

$$\Rightarrow 4x + 36 - 3x + 36 = 36$$

$$\Rightarrow x = -36.$$

Example

Solve

$$\frac{7}{p} + p = -8.$$

Solution:

$$\text{LCD} = p \Rightarrow p\left(\frac{7}{p}\right) + p(p) = -8p$$

$$\Rightarrow 7 + p^2 = -8p$$

$$\Rightarrow p^2 + 8p + 7 = 0$$

$$\Rightarrow (p+7)(p+1) = 0$$

Example (cont.

$$\Rightarrow p + 7 = 0, p + 1 = 0$$

$$\Rightarrow p = -7, p = -1.$$

Example

Solve for p in

$$\frac{1}{f} = \frac{1}{p} + \frac{1}{s}.$$

Solution:

$$\text{LCD} = fps \Rightarrow fps\left(\frac{1}{f}\right) = fps\left(\frac{1}{p}\right) + fps\left(\frac{1}{s}\right)$$

$$\Rightarrow ps = fs + fp$$

$$\Rightarrow ps - fp = fs$$

Example (cont.)

$$\Rightarrow p(s - f) = fs$$

$$\Rightarrow p = \frac{fs}{s - f}.$$

Example

Solve for x in

$$\frac{1}{x} = \frac{1}{y} + \frac{1}{m}.$$

Solution:

$$\begin{aligned} \text{LCD} = xym \Rightarrow xym\left(\frac{1}{x}\right) &= xym\left(\frac{1}{y}\right) + xym\left(\frac{1}{m}\right) \\ \Rightarrow ym &= xm + xy \\ \Rightarrow ym &= x(m+y) \\ \Rightarrow x &= \frac{my}{m+y}. \end{aligned}$$

Example

Solve for x:

$$\frac{2}{x+1} + \frac{1}{x-1} = \frac{20}{x^2-1}.$$

Solution:

$$x^2 - 1 = (x-1)(x+1) \Rightarrow \text{LCD} = (x-1)(x+1)$$

$$\Rightarrow (x+1)(x-1)\left(\frac{2}{x+1}\right) + (x+1)(x-1)\left(\frac{1}{x-1}\right) = (x^2-1)\frac{20}{x^2-1}$$

Example (cont.)

$$\Rightarrow 2(x-1)+x+1=20$$

$$\Rightarrow 2x-2+x+1=20$$

$$\Rightarrow 3x-1=20$$

$$\Rightarrow 3x=21$$

$$\Rightarrow x=7.$$

Example

Solve for x:

$$\frac{15}{y-15} - \frac{3}{y} = \frac{17y+5}{y^2-25}.$$

Solution:

$$\begin{aligned}
&\text{LCD} = y(y^2-25)(y-15) \\
\Rightarrow & y(y^2-25)(y-15)\left(\frac{15}{y-15}\right) - y(y^2-25)(y-15)\left(\frac{3}{y}\right) \\
= & y(y^2-25)(y-15)\left(\frac{17y+5}{y^2-25}\right) \\
\Rightarrow & 15y(y^2-25) - 3(y-15)(y^2-25) = y(y-15)(17y-5)
\end{aligned}$$

Example (cont.)

$$\begin{aligned}
\Rightarrow & 15y^3 - 375y - 3(y^3 - 15y^2 - 25y + 375) \\
= & 17y^3 - 250y^2 - 75y \\
\Rightarrow & 5y^3 - 295y^2 + 225y + 1125 = 0 \\
\Rightarrow & y \approx -1.5911, 2.4314, 58.160.
\end{aligned}$$

Example

Solve

$$\sqrt{3x+1} = 4.$$

Solution:

$$\Rightarrow 3x + 1 = 16$$
$$\Rightarrow 3x = 15$$
$$\Rightarrow x = 5.$$

Example

Solve

$$5 + \sqrt{x+7} = x.$$

Solution:

$$\Rightarrow \sqrt{x+7} = x - 5$$

$$\Rightarrow x + 7 = x^2 - 10x + 25$$

$$\Rightarrow x^2 - 11x + 18 = 0$$

$$\Rightarrow (x-9)(x-2) = 0$$

$$\Rightarrow x - 9 = 0, x - 2 = 0$$

Example (cont.)

$$\Rightarrow x = 9, x = 2$$

But with $x = 2$:

$$5 + \sqrt{9} = 5 + 3 = 8 \neq 2.$$

$$\Rightarrow x = 9.$$

Example

Solve

$$\sqrt{x+3}+3=0.$$

Solution:

$$\Rightarrow \sqrt{x+3}=-3$$

$$\Rightarrow x+3=9$$

$$\Rightarrow x=6.$$

But

$$\sqrt{6+3}+3=6\neq 0.$$

$$\Rightarrow \emptyset \text{ (no solution).}$$

Example

Solve

$$\sqrt{x+81}+9=x.$$

Solution:

$$\Rightarrow \sqrt{x+81}=x-9$$

$$\Rightarrow x+81=x^2-18x+81$$

$$\Rightarrow x^2-19x=0$$

$$\Rightarrow x(x-19)=0$$

Example (cont.)

$$\Rightarrow x = 0, x = 19.$$

But with $x = 0$:

$$\sqrt{81} + 9 = 18 \neq 0.$$

$$\Rightarrow x = 19.$$

Example

Solve

$$\sqrt{1-2x} = 3.$$

Solution:

$$\begin{aligned} &\Rightarrow 1-2x = 9 \\ &\Rightarrow 8 = 2x \\ &\Rightarrow x = 4 \\ \text{But } \sqrt{1-2(4)} = i\sqrt{7} \neq 3 & \\ &\Rightarrow \emptyset. \end{aligned}$$

Example

Solve

$$\sqrt{5-x} = 1.$$

Solution:

$$\Rightarrow 5 - x = 1$$
$$\Rightarrow x = 4.$$

Example

Solve

$$\sqrt{3a+3} = a+1.$$

Solution:

$$\Rightarrow 3a+3 = (a+1)^2$$

$$\Rightarrow 3a+3 = a^2+2a+1$$

$$\Rightarrow a^2-a-2 = 0$$

$$\Rightarrow (a-2)(a+1) = 0$$

Example (cont.)

$$\Rightarrow a - 2 = 0, a + 1 = 0$$

$$\Rightarrow a = 2, a = -1.$$

Example

Solve

$$\sqrt{b+3} - 2 = 1.$$

Solution:

$$\Rightarrow \sqrt{b+3} = 3$$
$$\Rightarrow b + 3 = 9$$
$$\Rightarrow b = 6.$$

Example

Solve

$$\frac{6}{y+3} - \frac{4}{y-3} = \frac{6}{y^2-9}.$$

Solution:

$$\begin{aligned} &\text{LCD} = y^2 - 9 = (y-3)(y+3) \\ \Rightarrow &6(y-3) - 4(y+3) = 6 \\ \Rightarrow &6y - 18 - 4y - 12 = 6 \\ \Rightarrow &2y - 30 = 6 \\ \Rightarrow &2y = 36 \\ \Rightarrow &y = 18 \quad (A). \end{aligned}$$

Example

Solve for t:

$$\frac{1}{A} = \frac{1}{m} + \frac{1}{t}.$$

Solution:

$$\begin{aligned} \text{LCD} &= Amt \\ \Rightarrow mt &= At + Am \\ \Rightarrow mt - At &= Am \\ \Rightarrow t(m - A) &= Am \\ \Rightarrow t &= \frac{Am}{m - A} \quad (C). \end{aligned}$$