

Section 1.2

2. a) $7 \times 6 + 4 \times (-9) - 6 = 42 - 36 - 6 = 0$

$(6, -9)$ is a solution point

b) $7 \times (-5) + 4 \times 10 - 6 = -1$

$(-5, 10)$ is NOT a solution point

c) $7 \times \frac{1}{2} + 4 \times \frac{5}{8} - 6 = \frac{7}{2} + \frac{5}{2} - 6 = 0$

$(\frac{1}{2}, \frac{5}{8})$ is a solution point

3. a) $1^2 + (-\sqrt{3})^2 = 1 + 3 = 4$

$(1, -\sqrt{3})$ is a solution point

b) $(\frac{1}{2})^2 + (-1)^2 = \frac{5}{4}$

$(\frac{1}{2}, -1)$ is NOT a solution point

c) $(\frac{3}{2})^2 + (\frac{7}{2})^2 = \frac{9}{4} + \frac{49}{4} = 14\frac{1}{2}$

$(\frac{3}{2}, \frac{7}{2})$ is NOT a solution point

6. a) $3 \times (-5) + 2 \times (-5) \times (-7) - (-7)^2$

$= -15 + 70 - 49 = 6$

NO

b) $3 \times 6 + 2 \times (-1) \times 6 - (-1)^2 =$

$= 18 - 12 - 1 = 5$

YES

c) $3 \times \frac{6}{5} + 2 \times 1 \times \frac{6}{5} - 1^2$

$= \frac{18}{5} + \frac{12}{5} - 1 = 5$

YES

$$\underline{7-12} :$$

7 (e)

10 (f)

8 (b)

11 (a)

9 (c)

12 (d)

13. Let $y=0$: $2x-3=0 \Rightarrow x=\frac{3}{2}$

Let $x=0$: $-y-3=0 \Rightarrow y=-3$

So x intercept : $(\frac{3}{2}, 0)$

y intercept : $(0, -3)$

17. Let $y=0$; $0 = x^2 \cdot \sqrt{9-x^2}$

$$\Rightarrow x=0 \text{ or } \sqrt{9-x^2}=0$$

$$\Rightarrow x=0 \text{ or } x=\pm 3$$

So x intercepts : $(0, 0), (3, 0), (-3, 0)$

Let $x=0$: $y = 0 \cdot \sqrt{9-0^2}$

$$\Rightarrow y=0$$

So y intercept : $(0, 0)$

18. Let $y=0$: $0 = x^3 - 4x$

$$\Rightarrow x(x^2 - 4) = 0$$

$$\Rightarrow x=0 \text{ or } x=2 \text{ or } x=-2$$

So x -intercepts : $(0, 0), (2, 0), (-2, 0)$

$$\text{Let } x=0 : y^2=0 \Rightarrow y=0$$

So y -intercept = $(0,0)$

$$20. \text{ Let } y=0 : 0 = \frac{x^2+3x}{(3x+1)^2}$$

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

$$\Rightarrow x=0 \text{ or } x=-3$$

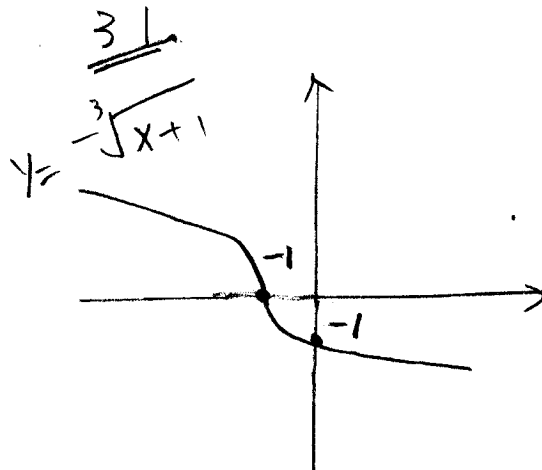
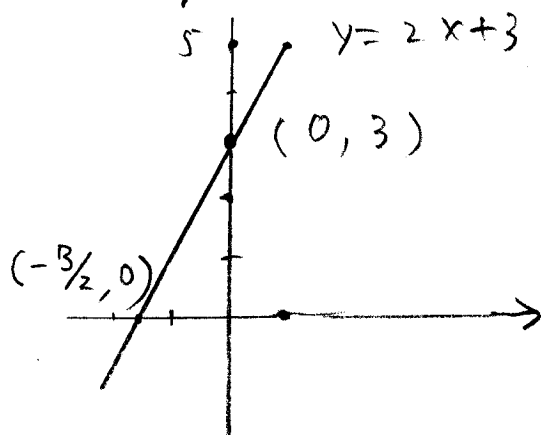
So x -intercepts: $(0,0), (-3,0)$

$$\text{Let } x=0 : y = \frac{0+0}{(0+1)^2}$$

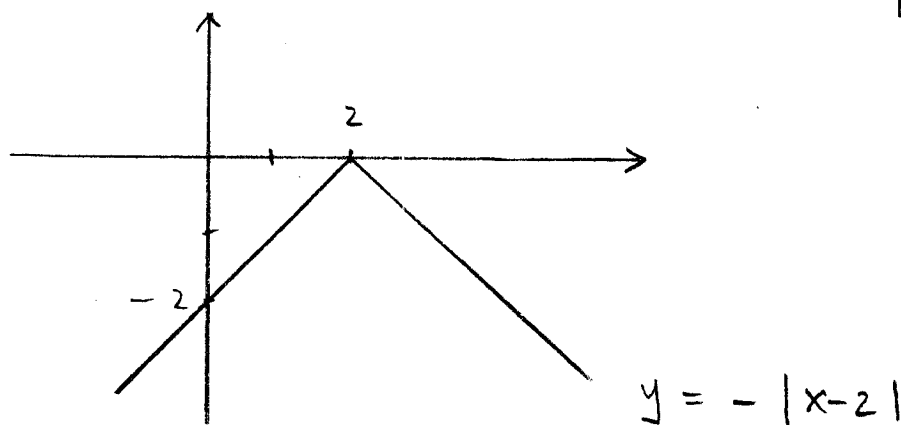
$$\Rightarrow y=0$$

So y -intercept = $(0,0)$

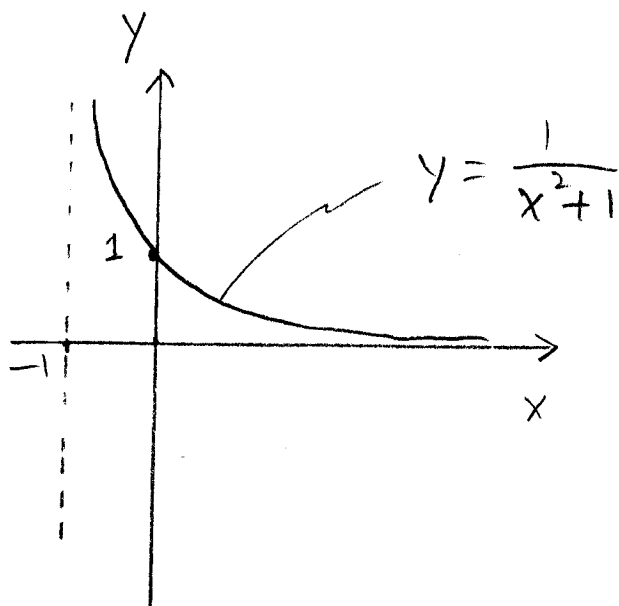
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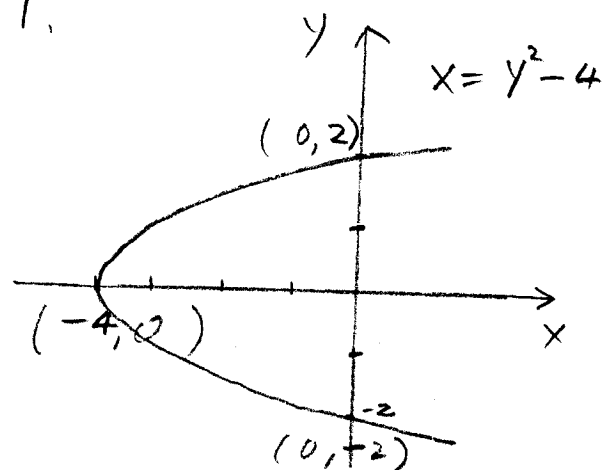
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36.



37.



$$41. (x-2)^2 + (y+1)^2 = 4^2$$

$$\Rightarrow (x-2)^2 + (y+1)^2 = 16$$

$$44. \text{ radius: } r = \sqrt{(3 - (-1))^2 + (-2 - (-1))^2}$$

$$= 5$$

equation:

$$(x-3)^2 + (y+2)^2 = 25$$

46. diameter:

$$d = \sqrt{(-4 - 4)^2 + (-1 - 1)^2} = \sqrt{68} = 2\sqrt{17}$$

$$\text{radius: } r = \frac{d}{2} = \sqrt{17}$$

Center of circle is midpoint of $(-4, -1)$ and $(4, 1)$, which is $(0, 0)$

$$\text{equation: } x^2 + y^2 = 17$$

$$49. (x^2 + 4x) + (y^2 + 6y) - 3 = 0$$

$$\Rightarrow (x^2 + 4x + 4) + (y^2 + 6y + 9) - 3 - 4 - 9 = 0$$

$$\Rightarrow (x+2)^2 + (y+3)^2 = 16$$

$$54. x^2 + y^2 - 2y - \frac{1}{3} = 0$$

$$\Rightarrow x^2 + (y^2 - 2y) - \frac{1}{3} = 0$$

$$\Rightarrow x^2 + (y-1)^2 - \frac{1}{3} - 1 = 0$$

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

55.

$$\left. \begin{array}{l} y = 2 - x \\ y = 2x - 1 \end{array} \right\} \Rightarrow 2 - x = 2x - 1$$

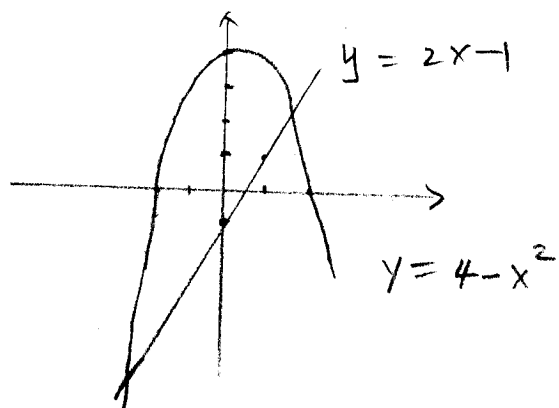
$$\Rightarrow 3 = 3x \Rightarrow x = 1$$

58.

$$\left. \begin{array}{l} y = 4 - x^2 \\ y = 2x - 1 \end{array} \right\} \Rightarrow 4 - x^2 = 2x - 1$$

$$\Rightarrow x^2 + 2x - 5 = 0$$

$$\Rightarrow x_{1,2} = \frac{-2 \pm \sqrt{4 + 20}}{2} = -1 \pm \sqrt{6}$$



points of intersection:

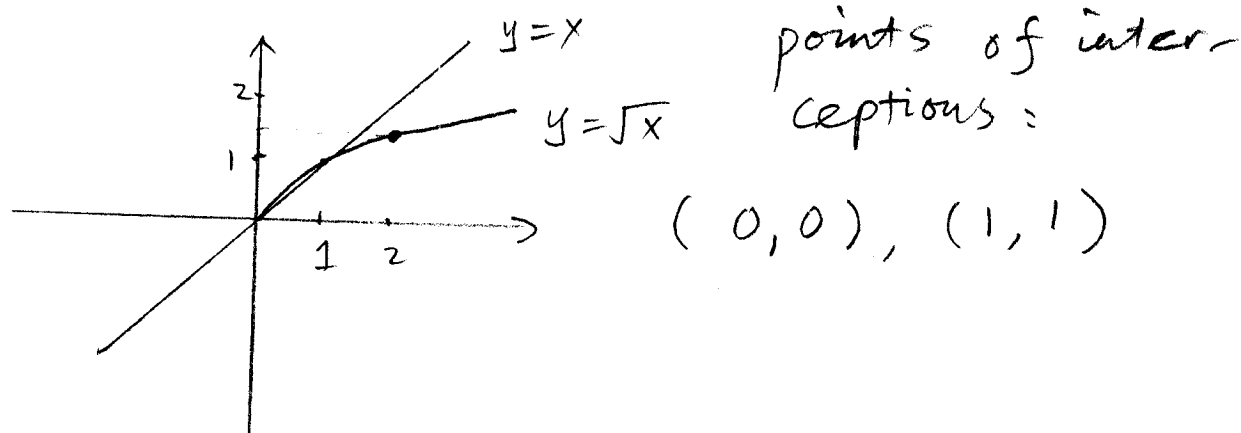
$$(-1 + \sqrt{6}, 2\sqrt{6} - 3)$$

and

$$(-1 - \sqrt{6}, -3 - 2\sqrt{6})$$

$$60. \quad \left. \begin{array}{l} y = \sqrt{x} \\ y = x \end{array} \right\} \Rightarrow \sqrt{x} = x \Rightarrow x = x^2$$

$$\Rightarrow x^2 - x = 0 \Rightarrow x = 0 \text{ or } x = 1$$



$$62. \quad x^3 - 2x^2 + x - 1 = -x^2 + 3x - 1$$

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

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

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

$$\Rightarrow x = 0 \text{ or } x = 2 \text{ or } x = -1$$

points of interceptions:

$(0, -1), (2, 1), \text{ and } (-1, 5)$

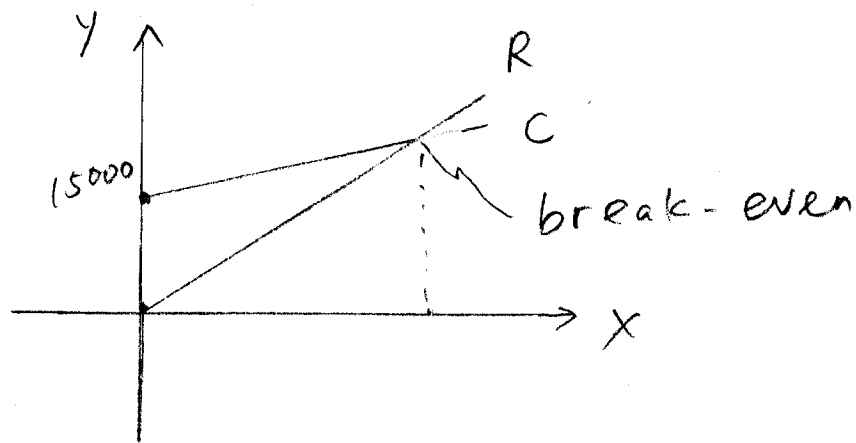
$$63. \quad a) \quad C = 15000 + 11.80x$$

$$R = 19.30x$$

b) $C = R$ gives the break-even point

$$\Rightarrow 15000 + 11.80x = 19.30x$$

$$\Rightarrow x = \frac{15000}{7.50} = 2000 \text{ units.}$$



$$c) \text{ Profit} = R - C = 19.30X - (15000 + 11.8X)$$

$$\text{Let profit} = 1000,$$

$$\Rightarrow 1000 = 19.30X - 15000 - 11.80X$$

$$\Rightarrow 16000 = 7.5X$$

$$\Rightarrow X = 2133.33 \quad \text{or} \quad X \approx 2134 \text{ units}$$

$$65. \quad 0.85X + 35000 = 1.55X$$

$$\Rightarrow 35000 = 0.7X$$

$$\Rightarrow X = 50000$$