1. False

2. Two solutions— some combination of real and or imaginary numbers.

3. Parabola

4. Real and imaginary ex. $5 + 8i$

Real ↗ ↖ imaginary

5. $2x^2 + 3x - 5 = 0$

6. 33, discriminant is positive, the equation has 2 real roots/solutions.

$$6x^2 - 3x - 1 = 0$$

$$a = 6 \quad b = -3 \quad c = -1$$

$$\text{Discriminant} = b^2 - 4ac$$

$$(-3)^2 - 4(6)(-1)$$

$$9 + 24 = 33$$

7. $x = -4 \pm \sqrt{6}$

$$x^2 + 8x = -10$$

$$x^2 + 8x + \left(\frac{8}{2}\right)^2 = -10 + \left(\frac{8}{2}\right)^2$$

$$x^2 + 8x + 16 = -10 + 16$$

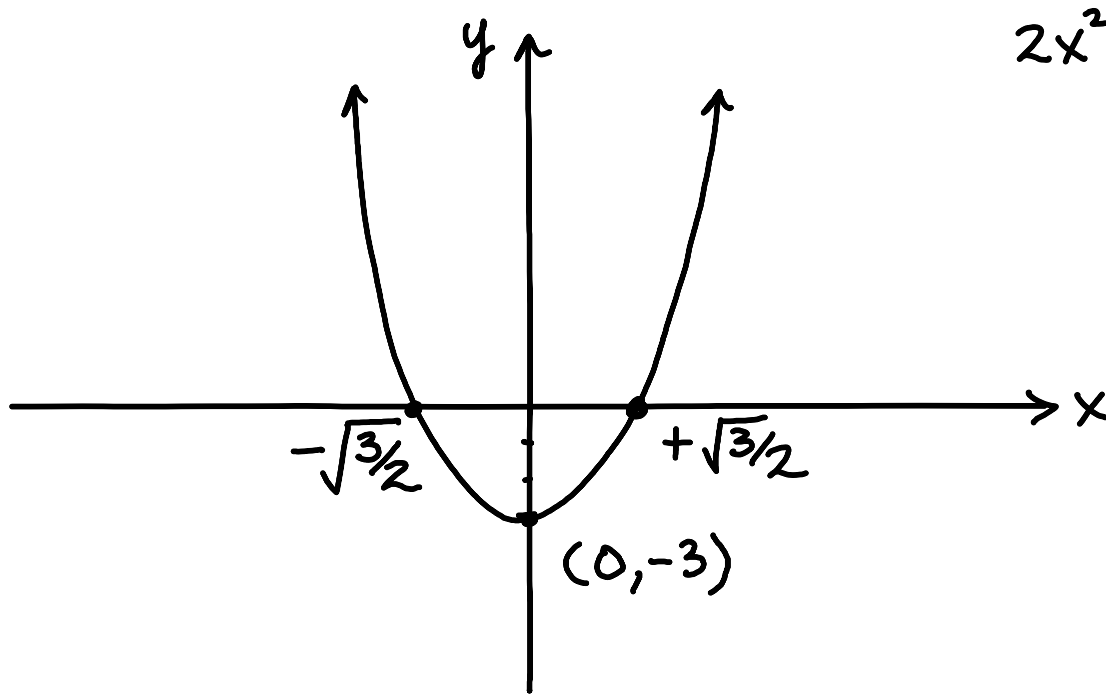
$$(x+4)^2 = 6$$

$$\sqrt{(x+4)^2} = \sqrt{6}$$

$$x + 4 = \pm\sqrt{6}$$

$$x = -4 \pm \sqrt{6}$$

8. Graph $f(x) = 2x^2 - 3$



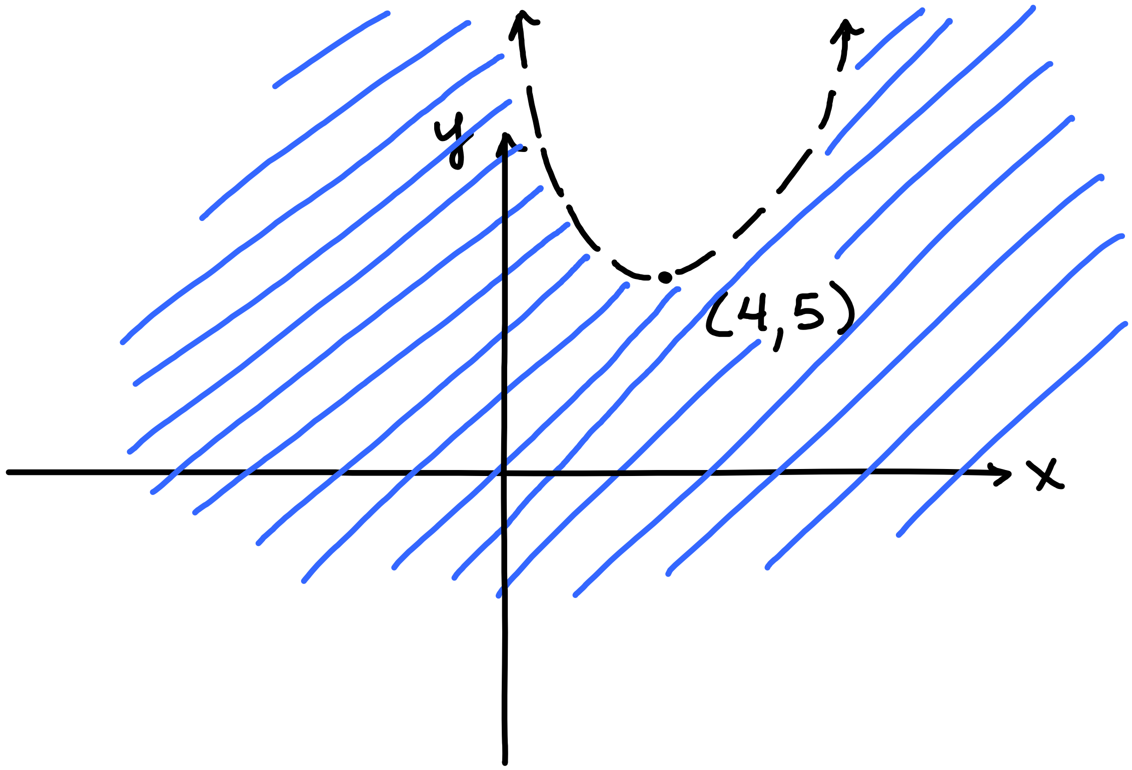
$$2x^2 - 3 = 0$$

$$2x^2 = 3$$

$$x^2 = 3/2$$

$$x = \pm\sqrt{3/2}$$

9. Graph $f(x) < (x-4)^2 + 5$



10. $x = \pm 5$ (must indicate ± 5 not just 5)

$$x^2 = 25$$
$$x = \sqrt{25}$$
$$x = \pm 5$$

11. $x = \pm 3$

$$4x^2 - 1 = 35$$
$$4x^2 = 36$$
$$x^2 = 9$$
$$x = \sqrt{9} = \pm 3$$

12. $x = \pm 4$

$$3(x^2 - 4) + 4x^2 = 20 + 5x^2$$
$$3x^2 - 12 + 4x^2 = 20 + 5x^2$$
$$7x^2 - 12 = 20 + 5x^2$$
$$2x^2 = 32$$
$$x^2 = 16$$
$$x = \sqrt{16} = \pm 4$$

13. $x_1 = 0, \; x_2 = -3$

$$4x^2 + 12x = 0$$
$$4x(x + 3) = 0$$

$4x = 0$ $\quad$ $x + 3 = 0$

$x_1 = 0$ $\quad$ $x_2 = -3$

14. $x_1 = 4, \; x_2 = -9$

$$(x - 4)(x + 9) = 0$$

$x - 4 = 0$ $\quad$ $x + 9 = 0$

$x_1 = 4$ $\quad$ $x_2 = -9$

15. $x_1 = -1$, $x_2 = -5$

$$\frac{25(x+3)^2}{25} = \frac{100}{25}$$

$$(x+3)^2 = 4$$

$$\sqrt{(x+3)^2} = \sqrt{4}$$

$$x + 3 = \pm 2$$

$$x = -3 \pm 2$$

$$x_1 = -3 + 2$$
$$= -1$$
$$x_2 = -3 - 2$$
$$= -5$$

16. $x_1 = 6$ $\quad$ $x_2 = -2$

$$5x^2 = 20x + 60$$

$$5x^2 - 20x - 60 = 0$$

$$\frac{5(x^2 - 4x - 12)}{5} = \frac{0}{5}$$

$$x^2 - 4x - 12 = 0$$

$$(x-6)(x+2) = 0$$

$$x - 6 = 0 \qquad x + 2 = 0$$

$$x_1 = 6 \qquad x_2 = -2$$

17. $x = \dfrac{-3 \pm \sqrt{13}}{2}$

$$4x^2 + 12x - 4 = 0$$
$$4(x^2 + 3x - 1) = 0$$
$$x^2 + 3x - 1 = 0$$
$$a = 1 \quad b = 3 \quad c = -1$$
$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$
$$x = \frac{-(3) \pm \sqrt{(3)^2 - 4(1)(-1)}}{2(1)}$$
$$x = \frac{-3 \pm \sqrt{9+4}}{2}$$
$$x = \frac{-3 \pm \sqrt{13}}{2}$$

18. $x_1 = -1/4$ $x_2 = -3$

$$4w^2 + 13w = -3$$
$$4w^2 + 13w + 3 = 0$$

$a = 4$ $b = 13$ $c = 3$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{-(13) \pm \sqrt{(13)^2 - 4(4)(3)}}{2(4)}$$

$$x = \frac{-13 \pm \sqrt{169 - 48}}{8}$$

$$x = \frac{-13 \pm \sqrt{121}}{8}$$

$$x = \frac{-13 \pm 11}{8}$$

$$x_1 = \frac{-13 + 11}{8} \qquad x_2 = \frac{-13 - 11}{8}$$

$$x_1 = -\frac{2}{8} = -\frac{1}{4} \qquad x_2 = -\frac{24}{8} = -3$$

19. $y = i, -i$ or $y = \pm i$

$$3 - 7y^2 = 10$$

$$-7y^2 = 7$$

$$\frac{-7y^2}{-7} = \frac{7}{-7}$$

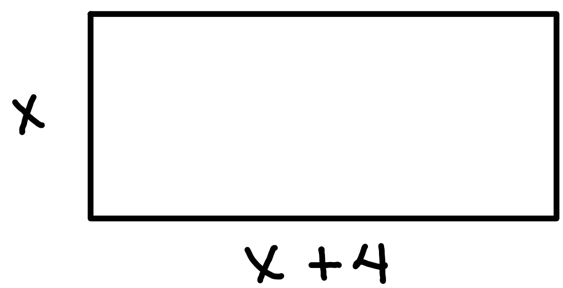
$$y^2 = -1$$

$$y = \pm\sqrt{-1}$$

complex solutions $i = \sqrt{-1}$

$$y = \pm\sqrt{-1} \rightarrow y = \pm i$$

20. $w = 6''$ $\quad l = 10''$



$$\text{area} = l \cdot w = (x+4)x$$

Solve

$$x(x+4) = 60$$
$$x^2 + 4x - 60 = 0$$
$$(x-6)(x+10) = 0$$
$$x - 6 = 0 \qquad x + 10 = 0$$
$$x = 6 \qquad \cancel{x = -10}$$

(solution)

distance can't be negative

$\underline{w = 6''}$ $\quad l = 6'' + 4'' = 10''$

21. $8+5i$

$$(2-7i)+(6+12i) = (2+6)+(-7i+12i)$$
$$= 8+5i$$

22. $14-5i$

$(4+i)(3-2i)$ use F.O.I.L.

$$(4+i)(3-2i) = 12 + -8i + 3i - 2i^2$$
$$= 12 - 5i - 2i^2$$

$i = \sqrt{-1}$

$i^2 = -1$

$$= 12 - 5i - 2(-1)$$
$$= 14 - 5i$$

23. $\dfrac{10+12i}{61}$

$$\frac{2}{5-6i}\cdot\frac{5+6i}{5+6i}=\frac{2(5+6i)}{(5-6i)(5+6i)}$$

$$(5-6i)(5+6i)=25+30i-30i-36i^2$$
$$=25-36(-1)$$
$$=25+36$$
$$=61$$

$$=\frac{10+12i}{61}$$

24.