

1. (2pts) Solve the equation:
- $2(x - 5) + 7 = 5 - 3x$

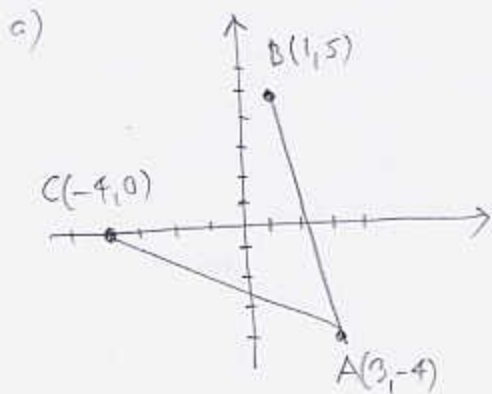
$$\begin{aligned}
 2x - 10 + 7 &= 5 - 3x && | +3x \\
 5x - 3 &= 5 && | +3 \\
 5x &= 8 &&
 \end{aligned}
 \quad x = \frac{8}{5}$$

2. (3pts) Solve for
- x
- :
- $cx - c = dx + d$
- |
- $-dx$

$$\begin{aligned}
 cx - dx - c &= d && | +c \\
 cx - dx &= c + d && \\
 x(c - d) &= c + d && | +c - d
 \end{aligned}
 \quad x = \frac{c+d}{c-d}$$

3. (6pts) The points
- $A(3, -4)$
- ,
- $B(1, 5)$
- ,
- $C(-4, 0)$
- are given.

a) Draw the points in the coordinate system.

b) Which of the points B and C is closer to A ? Make a guess by looking at the picture and then determine algebraically.

$$d(A, B) = \sqrt{(1-3)^2 + (5-(-4))^2} = \sqrt{4+81} = \sqrt{85}$$

$$d(A, C) = \sqrt{(-4-3)^2 + (0-(-4))^2} = \sqrt{49+16} = \sqrt{65}$$

C is really closer, since $d(A, C) < d(A, B)$

C appears closer

4. (7pts) Solve the following equations:

a) $x^2 - 2x = 15$

$$x^2 - 2x - 15 = 0$$

$$(x-5)(x+3) = 0$$

$$x = 5, -3$$

b) $3x^2 = 17x + 28$

$$3x^2 - 17x - 28 = 0 \quad 289 + 336$$

$$x = \frac{17 \pm \sqrt{(-17)^2 - 4 \cdot 3 \cdot (-28)}}{6} = \frac{17 \pm \sqrt{625}}{6}$$

$$= \frac{17 \pm 25}{6} = 7, -\frac{8}{6} = 7, -\frac{4}{3}$$

5. (6pts) The price of a dress was reduced twice: during September its cost was 25% below the original price and during October it was 40% below the original price. If the difference of the September and October prices was \$39, what was the original price?

$x =$ original price

$$0.75x = \text{Sep. price } (x - 0.25x)$$

$$0.6x = \text{Oct. price } (x - 0.4x)$$

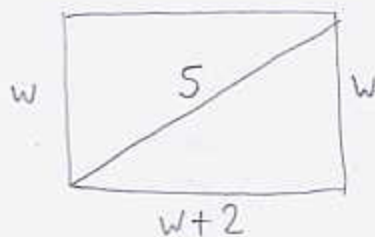
$$0.75x - 0.6x = 39$$

$$0.15x = 39$$

$$x = \frac{39}{0.15}$$

$$x = \$260$$

6. (6pts) Farmer Jerry wishes to enclose a rectangular field with a fence. If the length of the field is to be 2 miles more than the width, and the diagonal is to be 5 miles, what should the dimensions of the field be?



Pythagorean theorem:

$$(w+2)^2 + w^2 = 5^2$$

$$w^2 + 4w + 4 + w^2 = 25 \quad | -25$$

$$2w^2 + 4w - 21 = 0$$

$$w = \frac{-2 \pm \sqrt{46}}{2}$$

$$\boxed{w \approx 2.3912}$$

$$\boxed{l \approx 4.3912}$$

$$w = \frac{-4 \pm \sqrt{4^2 - 4 \cdot 2 \cdot (-21)}}{2 \cdot 2} = \frac{-4 \pm \sqrt{16 + 168}}{4}$$

$-2 - \sqrt{46} < 0$ doesn't fit context
so solution is $\frac{-2 + \sqrt{46}}{2} \approx 2.3912$

$$= \frac{-4 \pm \sqrt{184}}{4} = \frac{-4 \pm \sqrt{4 \cdot 46}}{4} = \frac{-4 \pm 2\sqrt{46}}{4} = \frac{-2 \pm \sqrt{46}}{2}$$