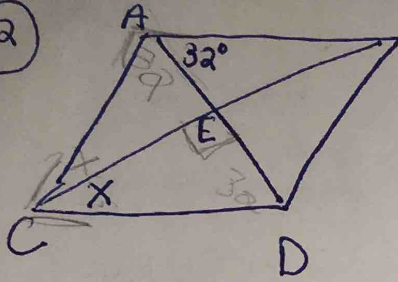
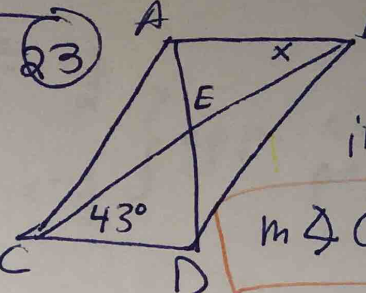
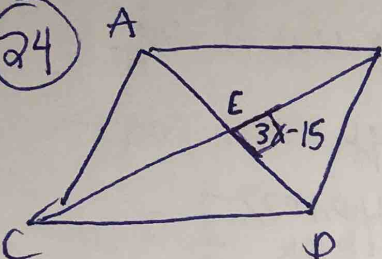
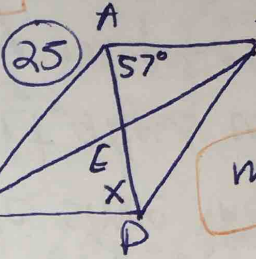


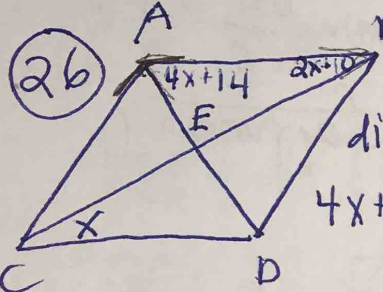
#M3 - Special Parallelograms WS

22  Rhombus \rightarrow diags. bisect \angle s
 $32 + 32 + x + x = 180$
 $2x = 116$
 $m\angle ECD = 58^\circ$

23  alternate interior \angle s
 $m\angle CBA = 43^\circ$

24  in a Rhombus the diagonals are \perp
 $3x - 15 = 90$
 $3x = 105$
 $x = 35$

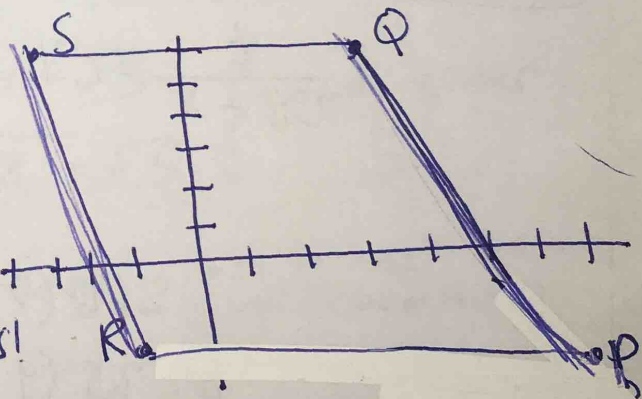
25  alternate interior \angle s
 $m\angle ADC = 57^\circ$

26  in a Rhombus the diagonals are \perp
 $4x + 14 + 2x + 10 + 90 = 180$
 $6x + 114 = 180$
 $6x = 66$
 $x = 11$
 $m\angle ABC = 2(11) + 10 = 32^\circ$
 alternate int. \angle s $m\angle BCD = 32^\circ$

27 DONE IN CLASS

28 $P(7, -1)$ $Q(3, 6)$ $R(-1, -1)$
 $S(-4, 6)$

It doesn't really look like it is a parallelogram... prove its not by finding slopes!



$$\overline{SR}: m = \frac{-1 - 6}{-1 - (-4)} = \frac{-7}{3}$$

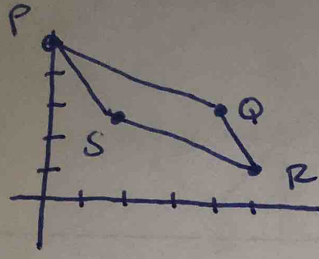
$$\overline{QP}: m = \frac{-1 - 6}{7 - 3} = \frac{-7}{4}$$

opposite slopes are not parallel!

Not a parallelogram

...you don't need to find anything else

29) P(0,5) Q(4,3) R(5,1) S(1,3)



$\overline{PQ} : m = \frac{3-5}{4-0} = \frac{-2}{4} = -\frac{1}{2}$

$\overline{SR} : m = \frac{3-1}{1-5} = \frac{2}{-4} = -\frac{1}{2}$

} opp. sides parallel

$\overline{PS} : m = \frac{3-5}{1-0} = \frac{-2}{1} = -2$

$\overline{QR} : m = \frac{1-3}{5-4} = \frac{-2}{1} = -2$

} opp. sides parallel

$m = -\frac{1}{2}$ and $m = -2$ are not opposite reciprocals

So these are not 90° angles! (*so it can't be a square or rectangle)

$\overline{PQ} : d = \sqrt{(4-0)^2 + (3-5)^2} = \sqrt{16+4} = \sqrt{20} = 2\sqrt{5}$

$\overline{SR} : d = \sqrt{(1-5)^2 + (3-1)^2} = \sqrt{16+4} = \sqrt{20} = 2\sqrt{5}$

} opp. sides \cong

$\overline{QR} : d = \sqrt{(4-5)^2 + (3-1)^2} = \sqrt{1+4} = \sqrt{5}$

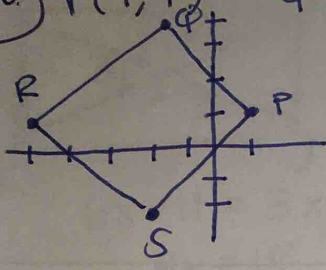
$\overline{PS} : d = \sqrt{(1-0)^2 + (3-5)^2} = \sqrt{1+4} = \sqrt{5}$

} opp. sides \cong

ALL sides are not congruent (*so it can't be a square or rhombus)

* Just a parallelogram!

30. $P(1, 1)$ $Q(-2, 4)$ $R(-5, 1)$ $S(-2, -2)$



\overline{QP} : $m = \frac{1-4}{1-(-2)} = \frac{-3}{3} = -1$

\overline{RS} : $m = \frac{-2-1}{-2-(-5)} = \frac{-3}{3} = -1$

} opp. sides are parallel

\overline{RQ} : $m = \frac{1-4}{-5-(-2)} = \frac{-3}{-3} = 1$

\overline{SP} : $m = \frac{-2-1}{-2-1} = \frac{-3}{-3} = 1$

} opp. sides are parallel

* $m = -1$ and $m = 1$ are opposite reciprocals!
 (So its either a rectangle or a square!)

\overline{QP} : $d = \sqrt{(-2-1)^2 + (4-1)^2} = \sqrt{9+9} = \sqrt{18} = 3\sqrt{2}$

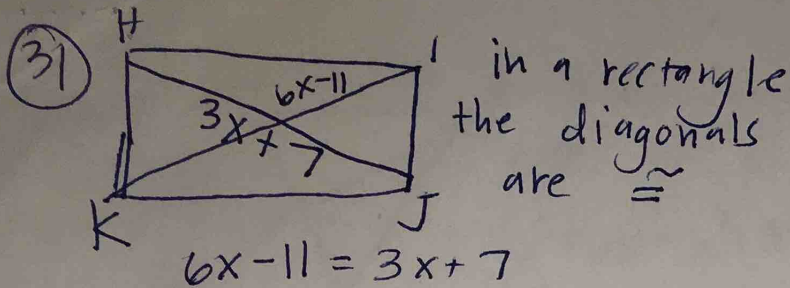
\overline{RS} : $d = \sqrt{(-5-(-2))^2 + (1-(-2))^2} = \sqrt{9+9} = \sqrt{18} = 3\sqrt{2}$

\overline{RQ} : $d = \sqrt{(-5-(-2))^2 + (1-4)^2} = \sqrt{9+9} = \sqrt{18} = 3\sqrt{2}$

\overline{SP} : $d = \sqrt{(1-(-2))^2 + (1-(-2))^2} = \sqrt{9+9} = \sqrt{18} = 3\sqrt{2}$

all sides are \cong !

SQUARE!



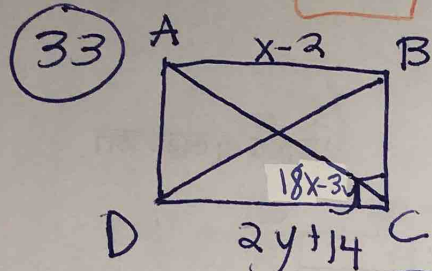
$$6x-11 = 3x+7$$

$$3x = 18$$

$$x = 6$$

$$\rightarrow 3(6)+7$$

$$25$$



$$18x-3y=90$$

$$x-2=2y+14$$

$$\begin{cases} 18x-3y=90 \\ x-2y=16 \end{cases} \rightarrow x=2y+16$$

$$18(2y+16)-3y=90$$

$$36y+288-3y=90$$

$$33y = -198$$

$$y = -6$$

$$x = 2(-6)+16$$

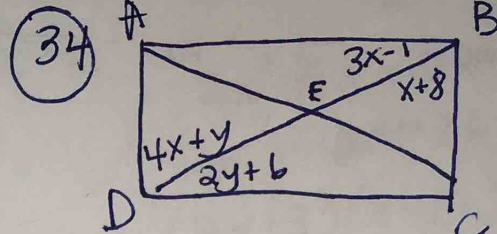
$$x = 4$$

32

$$19+2x = 3x+22$$

$$-3 = x$$

$$19+(2)(-3) = 13$$



$$4x+y+2y+6=90$$

$$3x-1+x+8=90$$

$$4x+3y=84$$

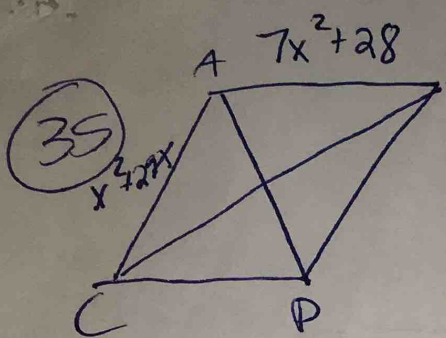
$$4x = 83$$

$$83+3y=84$$

$$3y = 1$$

$$y = \frac{1}{3}$$

$$x \text{ could be } \frac{83}{4}, 7, \frac{22}{9}$$



Rhombus \rightarrow all sides are \cong

$$7x^2 + 28 = x^2 + 29x$$

$$6x^2 - 29x + 28 = 0$$

$$(3x - 4)(2x - 7) = 0$$

$$3x = 4$$

$$x = \frac{4}{3}$$

$$2x = 7$$

$$x = \frac{7}{2}$$

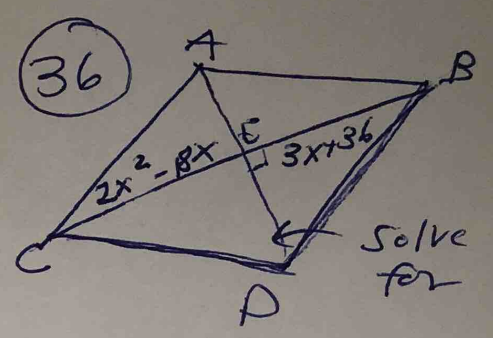
In a Rhombus, diagonals bisect \angle 's

$$3(-\frac{3}{2}) + 36 + 90 + \angle BDE = 180$$

$$121.5 + \angle BDE = 180$$

$$\angle BDE = 58.5$$

$$\angle BDC = 117^\circ$$



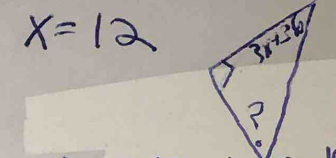
$$2x^2 - 8x = 3x + 36$$

$$2x^2 - 29x + 36 = 0$$

$$(2x + 3)(x - 12) = 0$$

$$2x = -3$$

$$x = -\frac{3}{2}$$



$$3(12) + 36 + 90 + \angle BDE = 180$$

$$162 + \angle BDE = 180$$

$$\angle BDE = 18^\circ$$

$$\angle BDC = 36^\circ$$

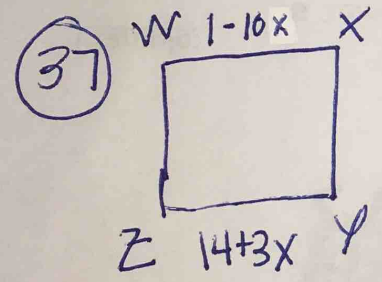
Find \overline{AC} :

$$x = \frac{4}{3}: \left(\frac{4}{3}\right)^2 + 29\left(\frac{4}{3}\right)$$

$$\frac{16}{9} + \frac{116}{3} = \frac{364}{9}$$

$$x = \frac{7}{2}: \left(\frac{7}{2}\right)^2 + 29\left(\frac{7}{2}\right)$$

$$\frac{49}{4} + \frac{203}{2} = \frac{455}{4}$$



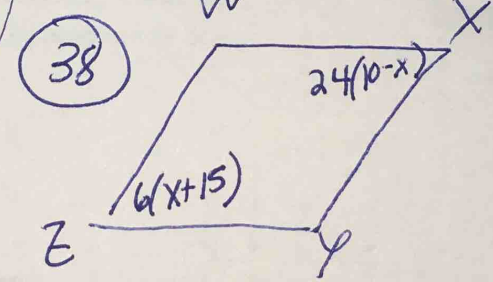
$$1 - 10x = 14 + 3x$$

$$-13 = 13x$$

$$x = -1$$

all sides \cong

$$14 + 3(-1) = 11$$



$$6(x+15) = 24(10-x)$$

$$6x + 90 = 240 - 24x$$

$$30x = 150$$

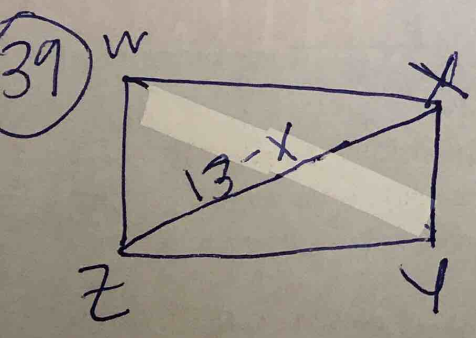
$$x = 5$$

$$m\angle Z = 6(5+15)$$

$$m\angle Z = 120$$

consecutive \angle 's are \cong

$$m\angle Y = 60^\circ$$



$$5x - 1 + 13 - x = 24$$

$$4x + 12 = 24$$

$$4x = 12$$

$$x = 3$$

$$\overline{XZ} = 10$$

In a rectangle, diags. are \cong so

$$\overline{WY} = 10$$