MARTIAN DARTS

NO CALC ALLOWED!

1. Find x. $\dfrac{-6x}{x-7} = \dfrac{6x+5}{6}$

   $(6x+5)(x-7) = -36x$

   $6x^2 - 37x - 35 = -36x$

   $6x^2 - x - 35 = 0$

   $(2x-5)(3x+7) = 0$

   $\boxed{x = \frac{5}{2} \quad x = \frac{-7}{3}}$

2. Find the 4th term or 4th proportional of 5, $\dfrac{1}{2}$, and 3. →

   $\dfrac{5}{\frac{1}{2}} = \dfrac{3}{x}$

   $5x = \dfrac{3}{2}$

   $\boxed{x = \frac{3}{10}}$

3. Find the mean proportional of 14 and 8.

   $\dfrac{14}{x} = \dfrac{x}{8}$

   $x^2 = 112$

   $x = \pm\sqrt{16\cdot 7}$

   $x = \pm 4\sqrt{7}$

4. Find the arithmetic mean of 16 and 12

   $\dfrac{16+12}{2} = \dfrac{28}{2} = \boxed{14}$

5. Find the ratio of x to y: $ax - by + cx = px + hy - 3by$

   $ax + cx - px = hy - 2by$

   $x(a+c-p) = y(h-2b)$

   $\dfrac{x}{y} = \dfrac{h-2b}{a+c-p}$

6. Solve for k: $\dfrac{2x-5}{x} = \dfrac{6}{x-3} + 2$

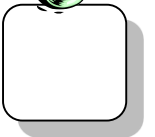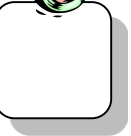 $\dfrac{2x-5}{x} = \dfrac{6}{x-3} + \dfrac{2(x-3)}{(x-3)}$

   $\dfrac{2x-5}{x} = \dfrac{6+2(x-3)}{x-3}$
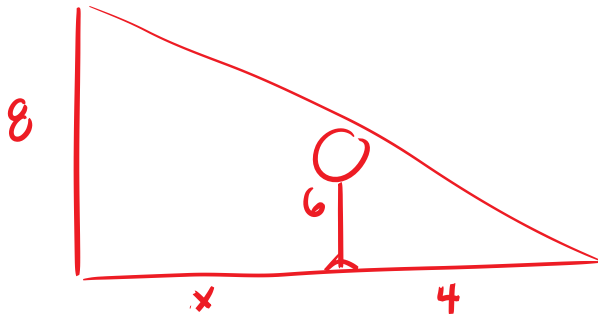
   $\dfrac{2x-5}{x} = \dfrac{2x}{x-3}$

   $2x^2 - 11x + 15 = 2x^2$

   $-11x = -15$

   $\boxed{x = \dfrac{15}{11}}$

7. A lamppost causes Mr. Cool to cast a 4 ft shadow. Mr. Cool is 6 ft tall and the lamppost is 8 ft tall. How far from the lamppost is he standing?

$$\frac{8}{6} = \frac{4+x}{4}$$

$$6(4+x) = 32$$
$$24 + 6x = 32$$
$$6x = 8$$
$$\boxed{x = 1\frac{1}{3}}$$

8. Given that Δ DCB ~ Δ TSR,

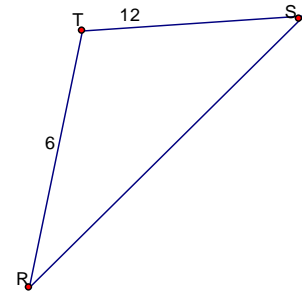a. Find DC and RS $\frac{2}{6} = \boxed{\frac{1}{3}}$

$$\frac{1}{3} = \frac{DC}{12}$$
$$3DC = 12$$
$$\boxed{DC = 4}$$

$$\frac{1}{3} = \frac{5}{RS}$$
$$\boxed{RS = 15}$$

b. What is the ratio of the perimeters of Δ DCB to Δ TSR? $\boxed{\frac{1}{3}}$

c. What is the ratio of the areas of Δ DCB to Δ TSR
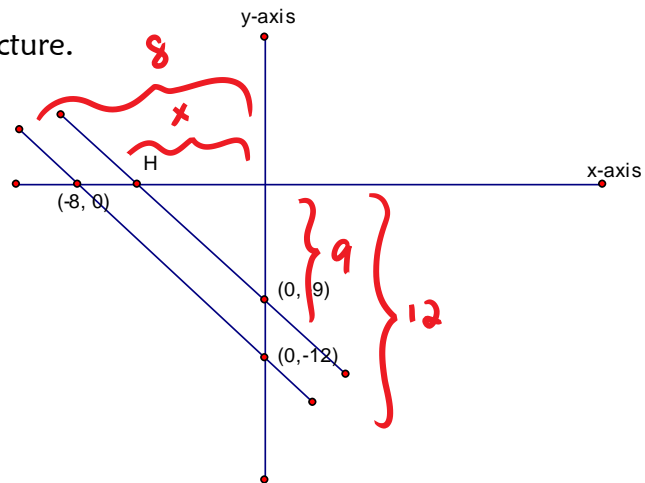
$$\frac{1^2}{3^2} = \boxed{\frac{1}{9}}$$

9. Find the coordinates of point H in the picture. *(assume the two lines are parallel)*
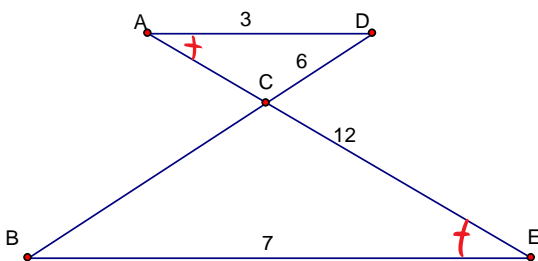
$$\frac{9}{12} = \frac{x}{8}$$

$$12x = 72$$
$$x = 6 \qquad \boxed{(-6,0)}$$

y-axis

8

x

H

(-8, 0)

x-axis

(0, 9)

(0,-12)

} 9

} 12

10. Given the following: AD ∥ BE, AD = 3, BE = 7, CD = 6, and CE = 12, find AC and BC.

A 3 D
  C 6
B 7 E
  12

$$\frac{3}{7} = \frac{6}{BC}$$

$$3BC = 42$$
$$BC = 14$$

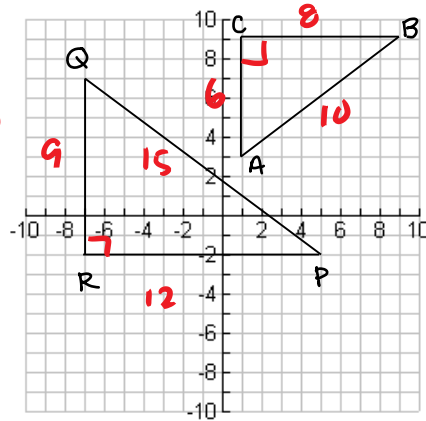$$\frac{3}{7} = \frac{AC}{12}$$

$$7AC = 36$$
$$AC = \frac{36}{7}$$

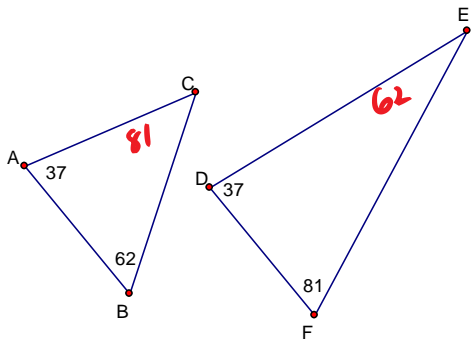11. Fill in the following blanks and draw a diagram:
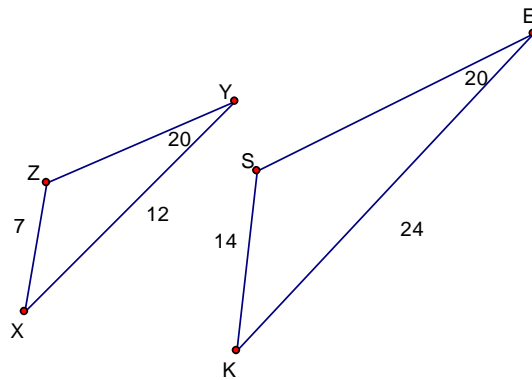
Δ ABC ~ Δ **QPR** by **SSS~ or SAS~**

(Graph with points Q, C, B, A, R, P plotted; red annotations: 8, 6, 10, 9, 15, 7, 12)

12. Is the pairs of triangles similar? If so, which triangles are similar and why are they similar?

a.

(Triangle ABC with angles A 37, marked 81, angle 62, B; Triangle DEF with D 37, marked 62, 81, F, E)

b.

(Triangle XYZ with Z 7, Y 20, 12; Triangle SEK with S, E 20, 14, 24, K)

13. Indicate whether the statement is true **Always, Sometimes, or Never:**

S a. Two similar isosceles triangles are congruent.

S b. Two right triangles are similar.

S c. Two equilateral polygons are similar.

S d. If two triangles are similar then they are congruent.

a e. If two triangles are congruent then they are similar.

a f. Two isosceles triangles are similar if a base angle of one is congruent to a base angle of the other.

a g. Two isosceles triangles are similar if the vertex angle of one is congruent to the vertex angle of another.
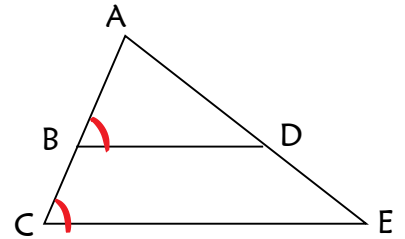
If you finish your dart questions:

Practice this Proof:

17. Given: BDEC is a trapezoid with bases BD and CE

Prove: AB * CE = AC * BD

1. G	1. Given
2. $\overline{BD} \parallel \overline{CE}$	2. if trap → bases $\parallel$
3. $\angle ABD \cong \angle C$	3. If $\parallel$ lines → corr. $\angle$'s $\cong$
4. $\angle A \cong \angle A$	4. Reflexive
5. $\triangle ABD \sim \triangle ACE$	5. AA~
6. $\dfrac{AB}{AC} = \dfrac{BD}{CE}$	6. CSSTP
7. $AB \cdot CE = AC \cdot BD$	7. Means Extremes Th~