

BE - Geometry I TUESDAY 2-15-11

ACT
PRACTICE

① Two triangles are similar. The shortest side of the smaller triangle is 7 inches long, and the shortest side of the larger triangle is 12 inches long. The perimeter of the smaller triangle is 42 inches. What is the perimeter of the larger triangle?

② What is 10% of 10% of 8?

Ans ① The perimeter of $\sim \Delta$'s is proportional to their sides

$$\frac{7}{12} = \frac{42}{p} \quad \therefore \frac{7p}{7} = \frac{12 \cdot 42}{7}$$

$$\boxed{p = 72 \text{ in}}$$

② $10\% \text{ of } 8 = .8$

$$\therefore 10\% \text{ of } .8 = \boxed{.08}$$

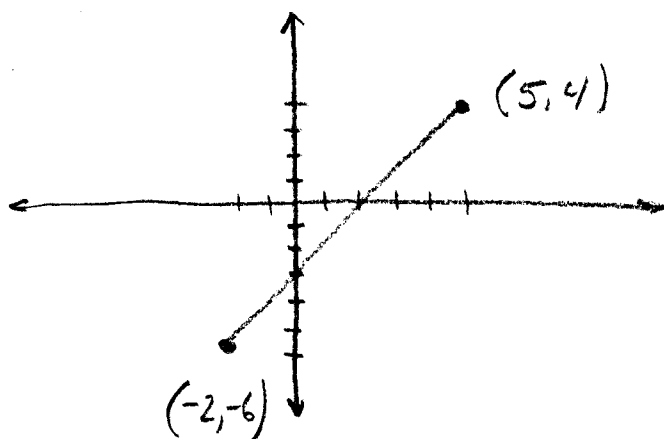
Recall the "center-radius" form
of the equation of a circle which
is also called the standard form:

$$(x-h)^2 + (y-k)^2 = r^2$$

$$C = (h, k), \quad r = \sqrt{r^2}$$

Any problem where you can
determine the coordinates of the
center and the measure of the
radius can be easily put into
this form.

EX Find the equation of the circle if the endpoints of a diameter are $(5, 4)$, $(-2, -6)$



Need center point (x, y) and radius.

diameter $\Rightarrow$ distance formula

$$\Rightarrow \sqrt{(4+6)^2 + (5+2)^2} = \sqrt{100 + 49}$$

$$\therefore \text{radius} \Rightarrow \frac{\sqrt{149}}{2} \quad \therefore r^2 = \frac{149}{4}$$

Center $\Rightarrow$ midpoint formula

$$\Rightarrow \left[\frac{(5-2)}{2}, \frac{4-6}{2} \right] = \left(\frac{3}{2}, -1 \right)$$

x, y

$$\therefore \boxed{\left(x - \frac{3}{2}\right)^2 + (y + 1)^2 = \frac{149}{4}}$$

GENERAL Form of Equation of Circle

$$\underline{a}x^2 + \underline{a}y^2 + bx + cy + d = 0$$

The coefficient of the x^2 and y^2 term must be the same and these terms must be separated by a plus.

If there is no y^2 term $\Rightarrow$ parabola

If no x^2 or y^2 terms $\Rightarrow$ line

If the coefficient of the x^2 and y^2 terms is not the same, or if these terms are separated by a minus, you will get one of the two remaining "conic sections" (After circle, parabola) which are the ellipse and hyperbola.



You can SWITCH from the general form to standard form of the (center-radius).

Equation of circle by completing the square on both the

x^2, x terms and y^2, y terms.

Remember to divide by a to get a coefficient of 1 for both x^2 and y^2 before completing the square. This will always work if you really have the equation of a circle since both the x^2 and y^2 coefficients must be the same.

$$\frac{ax^2}{a} + \frac{ay^2}{a} + \frac{bx}{a} + \frac{cy}{a} + \frac{d}{a} = 0$$

(Ex) WRITE the center-radius form, find the center and radius of the circle.

$$3x^2 + 3y^2 - 36x + 24y + 48 = 0$$

$$\frac{3x^2 - 36x}{3} + \frac{3y^2 + 24y}{3} = \frac{-48}{3}$$

ADD $\left(\frac{b}{2}\right)^2$ → $x^2 - 12x + \text{ } + y^2 + 8y + \text{ } = -16 + \text{ } + \text{ }$

HALF THE
b term
then
square it

$$x^2 - 12x + 6^2 + y^2 + 8y + 4^2 = -16 + 36 + 16$$

↓ ↓ ↓ ↓

$$(x - 6)^2 + (y + 4)^2 = 36$$

$$C(6, -4), r = 6$$

• Practice ~ Worksheet (14 problems)

Finish for homework.

Practice Writing The Equations of a Circle

Use the information provided to write the standard form equation of each circle.

NAME THE center (x,y)
AND RADIUS.

1) $x^2 + y^2 + 12x - 10y - 3 = 0$

2) $x^2 + y^2 + 18x - 28y + 268 = 0$

3) $x^2 + y^2 + 6x + 8y - 39 = 0$

4) $x^2 + y^2 - 2x + 28y + 172 = 0$

5) $x^2 + y^2 - 2x + 12y + 1 = 0$

6) $x^2 + y^2 - 20x - 30y + 316 = 0$

7) $x^2 + y^2 + 16x - 12y + 84 = 0$

8) $x^2 + y^2 - 30x + 30y + 446 = 0$

9) $x^2 + y^2 - 12x + 8y + 16 = 0$

10) $x^2 + y^2 + 6x - 16y + 37 = 0$

11) $x^2 + y^2 + 26x + 26y + 322 = 0$

12) $x^2 + y^2 - 24x + 4y + 139 = 0$

13) $x^2 + y^2 - 4x - 22y + 116 = 0$

14) $x^2 + y^2 + 14x + 22y + 154 = 0$

Answers to Practice Writing The Equations of a Circle (ID: 1)

1) $(x + 6)^2 + (y - 5)^2 = 64$

4) $(x - 1)^2 + (y + 14)^2 = 25$

7) $(x + 8)^2 + (y - 6)^2 = 16$

10) $(x + 3)^2 + (y - 8)^2 = 36$

13) $(x - 2)^2 + (y - 11)^2 = 9$

2) $(x + 9)^2 + (y - 14)^2 = 9$

5) $(x - 1)^2 + (y + 6)^2 = 36$

8) $(x - 15)^2 + (y + 15)^2 = 4$

11) $(x + 13)^2 + (y + 13)^2 = 16$

14) $(x + 7)^2 + (y + 11)^2 = 16$

3) $(x + 3)^2 + (y + 4)^2 = 64$

6) $(x - 10)^2 + (y - 15)^2 = 9$

9) $(x - 6)^2 + (y + 4)^2 = 36$

12) $(x - 12)^2 + (y + 2)^2 = 9$