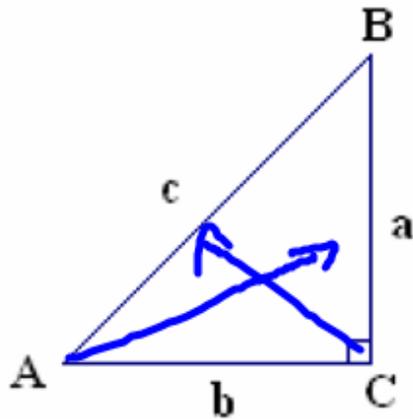


## 08/31 Objectives

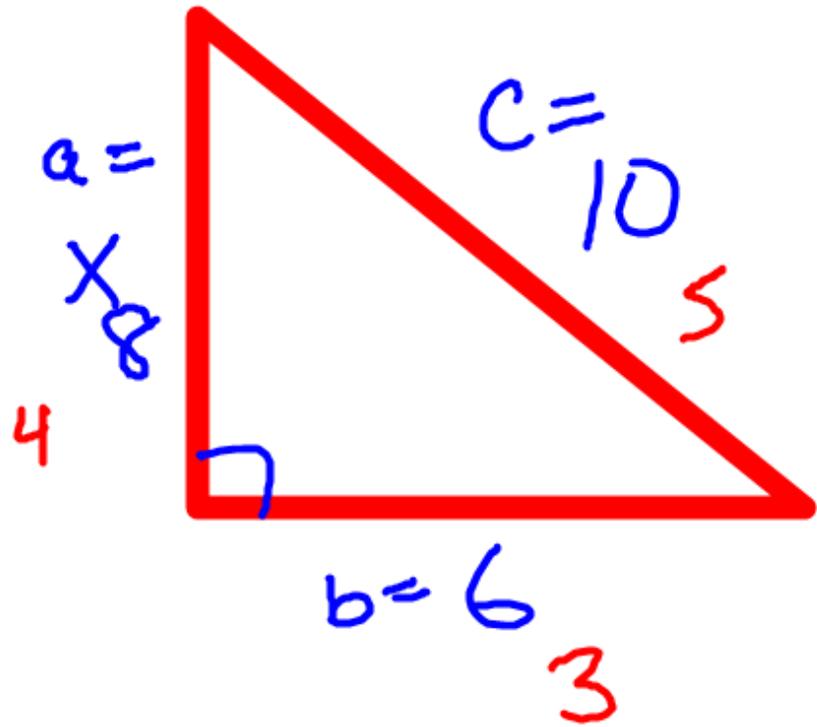
- Review Class Policies and Syllabus
- Trigonometry Worksheet
- Section 6.5 Sums and Differences of Cubes
- Section 6.6 Factoring: A General Strategy
- Section 6.7 Applications of Polynomial Equations
- Homework:
  - Trig Worksheet
  - Concept Review
    - Pg. 470 #1-10
    - Pg. 475 # 1-4
  - Mixed Review
    - Pg. 495-496 # 1-8, #9-49 odd

- THE PYTHAGOREAN THEOREM – APPLIES ONLY TO RIGHT TRIANGLES



- ▶ C is the right angle and measures  $90^\circ$
- ▶ Angles A and B are acute angles. (Acute angles measure less than  $90^\circ$  They are complementary angles and have a sum of  $90^\circ$ )
- ▶ c is the hypotenuse and directly opposite Angle C – the right angle
- ▶ a and b are the legs and directly opposite their respective angles

$$a^2 + b^2 = c^2$$

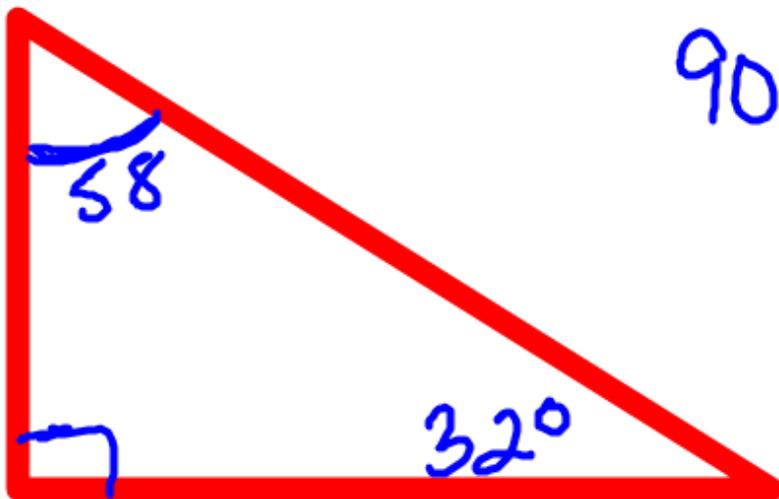


$$a^2 + b^2 = c^2$$
$$x^2 + 6^2 = 10^2$$
$$x^2 + 36 = 100$$
$$\sqrt{x^2} = \sqrt{64}$$
$$x = 8$$

Triples      3, 4, 5  
                 5, 12, 13

Triangles have  $180^\circ$

$$90 - 32 = 58$$



## THE SIX TRIGONOMETRIC FUNCTIONS

sine of angle  $\theta$ :  $\sin\theta = \frac{\textit{opposite leg}}{\textit{hypotenuse}}$

SOH

cosine of angle  $\theta$ :  $\cos\theta = \frac{\textit{adjacent leg}}{\textit{hypotenuse}}$

CAH

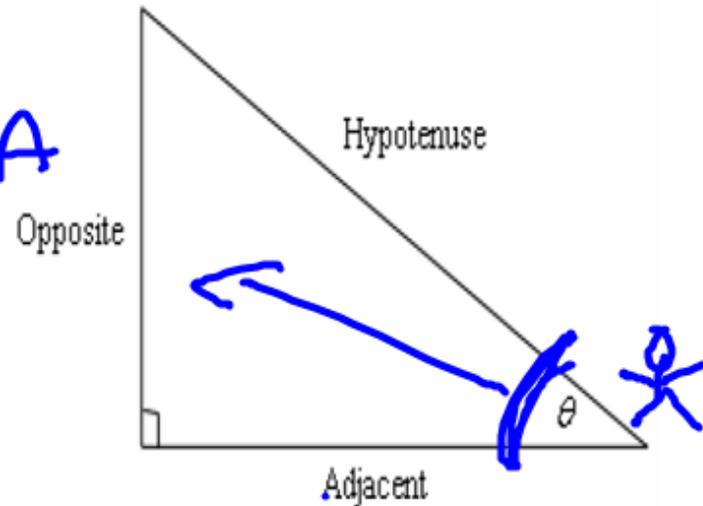
tangent of angle  $\theta$ :  $\tan\theta = \frac{\textit{opposite leg}}{\textit{adjacent leg}}$

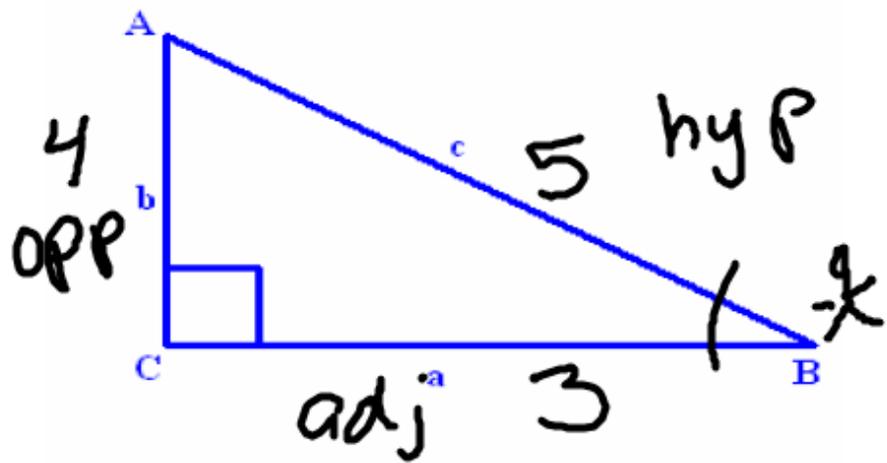
TOA

cosecant of angle  $\theta$ :  $\csc\theta = \frac{\textit{hypotenuse}}{\textit{opposite leg}}$

secant of angle  $\theta$ :  $\sec\theta = \frac{\textit{hypotenuse}}{\textit{adjacent leg}}$

cotangent of angle  $\theta$ :  $\cot\theta = \frac{\textit{adjacent leg}}{\textit{opposite leg}}$





EXAMPLE 3:  $a = 3$ ,  $b = 4$ ,  $c = 5$  (use acute angle B)

$$\sin B = \frac{4}{5}$$

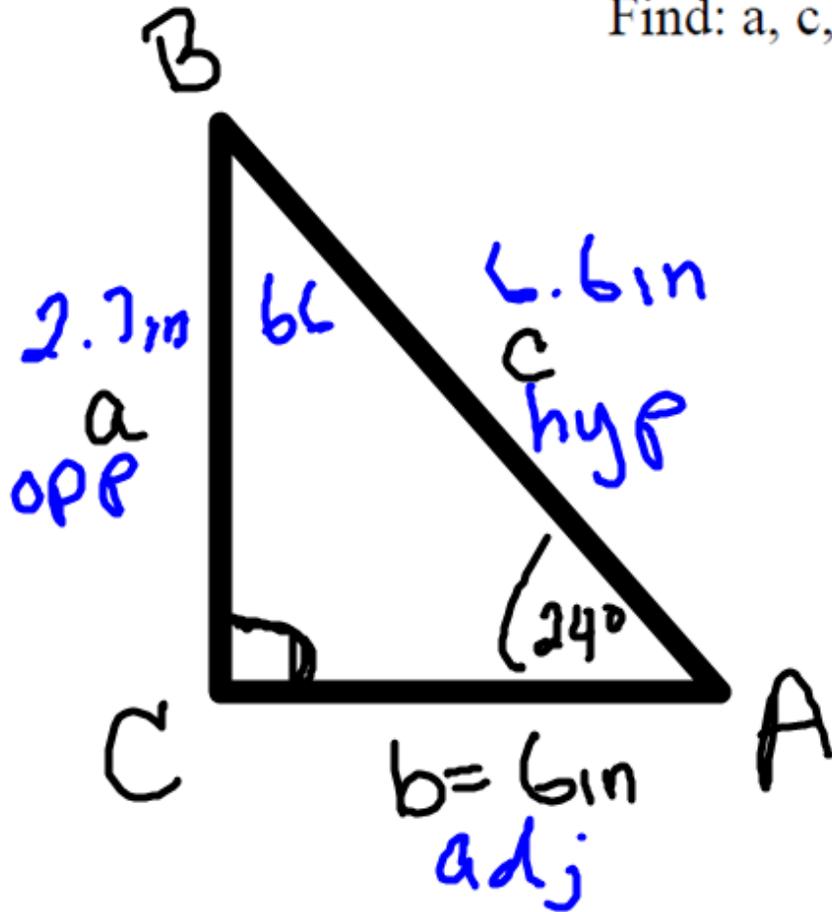
$$\cos B = \frac{3}{5}$$

$$\tan B = \frac{4}{3}$$

EXAMPLE 5:

Given:  $b = 6$  inches;  $A = 24^\circ$  (C is a right angle)

Find:  $a, c, B$



$$90 - 24 = 66$$

$$\tan A = \frac{\text{opp}}{\text{adj}}$$

$$\tan 24^\circ = \frac{a}{6}$$

$$.445 = \frac{a}{6}$$

$$a = 2.7 \text{ in}$$

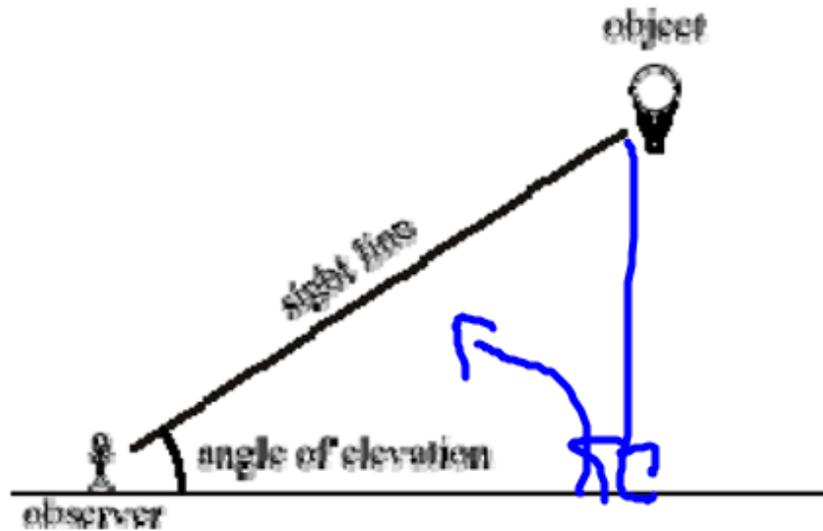
$$\cos 24^\circ = \frac{6}{c}$$

$$c = \frac{6}{\cos 24}$$

$$c = 6.6 \text{ in}$$

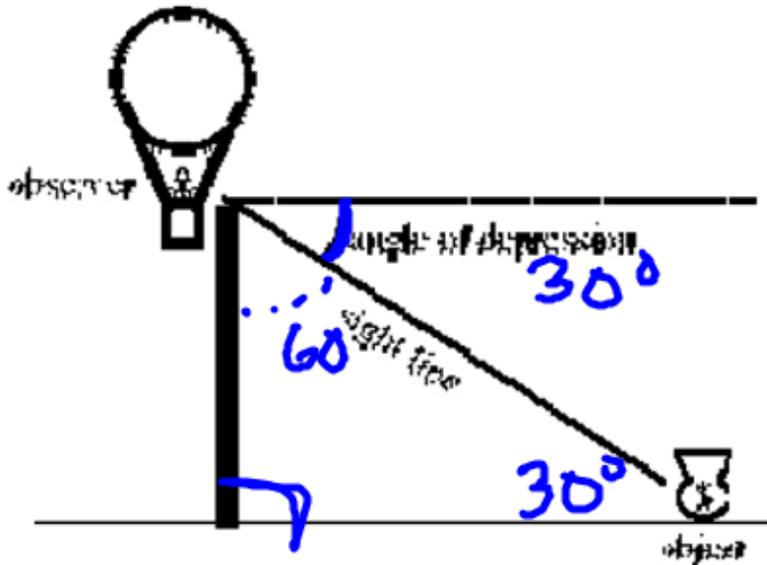
## ANGLE OF ELEVATION

The angle of elevation refers to the angle between a horizontal line and the line of sight to an object, when the object being sighted is above the observer.



## ANGLE OF DEPRESSION

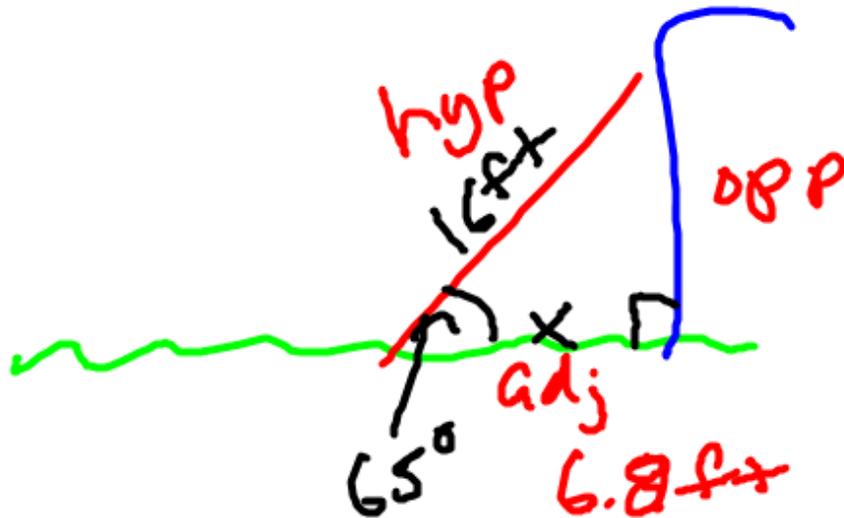
The angle of depression refers to the angle between a horizontal line and the line of sight to an object, when the object being sighted is below the observer.



EXAMPLE 8:

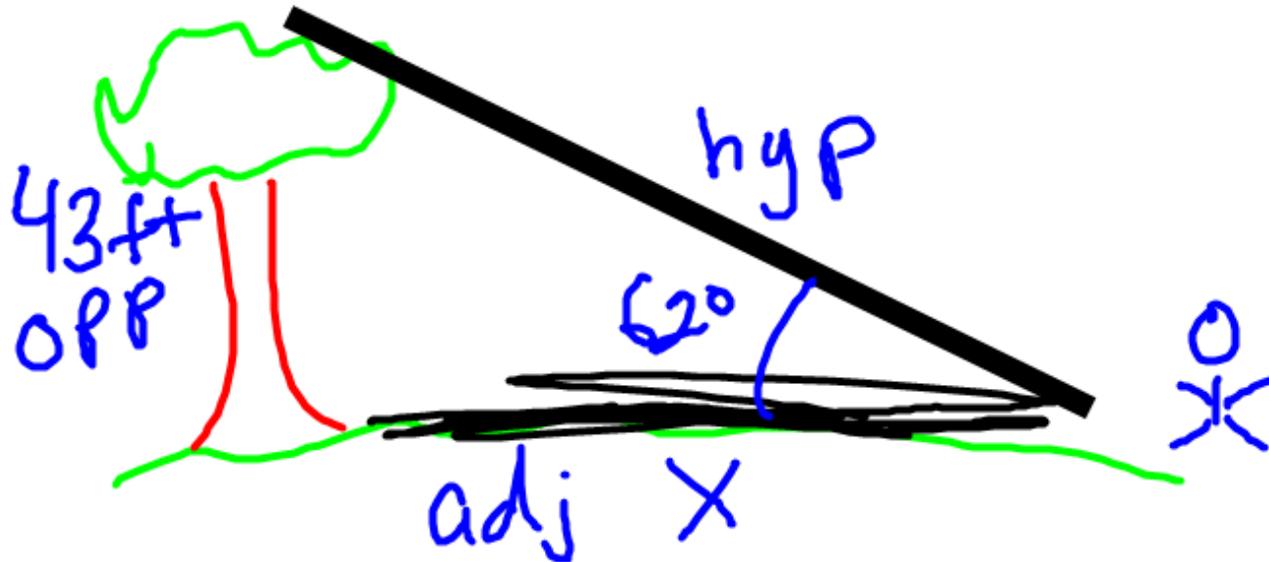
A sixteen foot ladder leans against a building and makes a  $65^\circ$  angle with the ground. How far is the ladder from the base of the building?

$$\cos 65^\circ = \frac{x}{16}$$



EXAMPLE 11:

The angle of elevation to the top of a forty-three foot tree is  $62^\circ$ . Find the length of the tree's shadow.

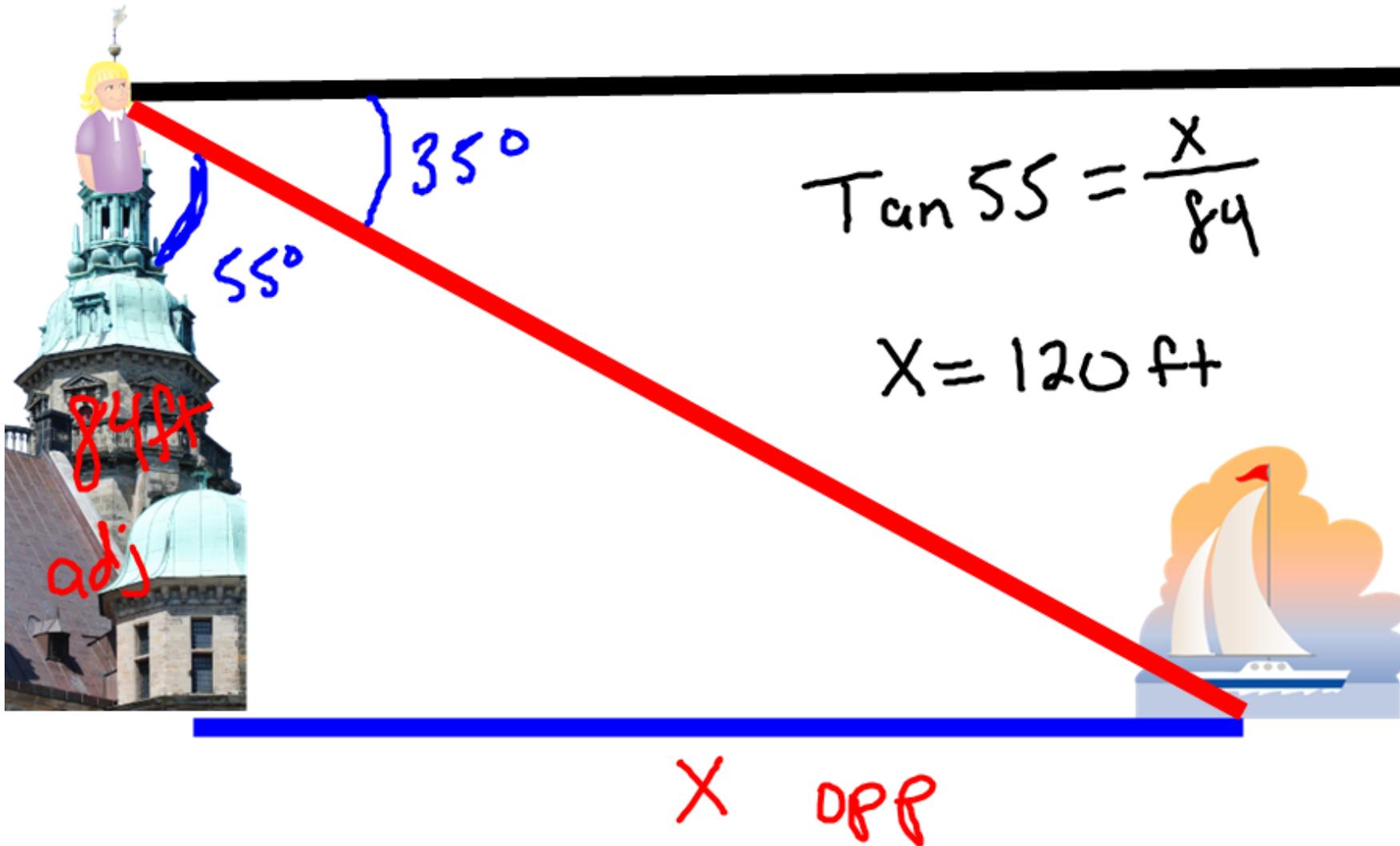


$$\tan 62 = \frac{43}{x}$$

$$x = \frac{43}{\tan 62} = 22.9 \text{ ft}$$

EXAMPLE 12:

The angle of depression from the top of a lighthouse to a cruise ship is  $35^\circ$ . If the height of the lighthouse is 84 feet, how far is the cruise ship from the base of the lighthouse?



## Steps to Factoring

Also on Pg 471

- 1) Two terms - use sum or difference of cubes  
- difference of squares
- 2) Four terms - split the expression up and factor by parts
- 3) Three terms - use reverse foil or grouping

Always look for common terms before factoring

Factoring - Sum and Difference of Cubes  
Page 469 in book

Difference of Squares

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

Sum of cubes

$$x^3 + y^3 = (x + y)(x^2 - xy + y^2)$$

Difference of cubes

$$x^3 - y^3 = (x - y)(x^2 + xy + y^2)$$

ex 1 pg 467

$$x^3 + 27$$

$$(x)^3 + (3)^3$$

$$(x + 3) (x^2 - (3)x + (3)^2)$$

$$(x + 3) (x^2 - 3x + 9)$$

ex 2 a) factor

$$125x^3 - y^3$$

$$(5x)^3 - (y)^3$$

$$(5x - y) \left( (5x)^2 + (5x)(y) + (y)^2 \right)$$

$$(5x - y) (25x^2 + 5xy + y^2) \leftarrow \text{Answer}$$

ex 2c pg 468

$$(x-y)(x^2+xy+y^2)$$

$$128y^7 - 250x^6y$$

$$2y(64y^6 - 125x^6)$$

$$2y((4y^2)^3 - (5x^2)^3)$$

$$2y(4y^2 - 5x^2)((4y^2)^2 + (4y^2)(5x^2) + (5x^2)^2)$$

$$2y(4y^2 - 5x^2)(16y^4 + 20x^2y^2 + 25x^4)$$

ex 1 pg 472)  $5x^4 - 80$

$$5(x^4 - 16)$$

$$5((x^2)^2 - (4)^2)$$

$$5(x^2 - 4)(x^2 + 4)$$

↓

$$((x)^2 - (2)^2)$$

$$5(x-2)(x+2)(x^2+4)$$

format  
 $x^2 - y^2 = (x-y)(x+y)$

$$(x-2)(x+2)$$

$$x^2 + 2x - 2x - 4$$

$$x^2 - 4$$

ex 2 pg 472) factor  $2x^3 + 10x^2 + x + 5$

$$2x^2(x+5) + 1(x+5)$$

$$2x^2y + y$$

$$y(2x^2 + 1)$$

$$(x+5)(2x^2 + 1)$$

ex 7 ) factor  $-25x^2 - 20xy - 4y^2$   
pg 474

$$25 \cdot 4 = 100$$

$$100 = 10 \cdot 10$$

$$10 + 10 = 20$$

$$-1(25x^2 + 20xy + 4y^2)$$

$$(25x^2 + 10xy) + 10xy + 4y^2$$

$$5x(5x + 2y) + 2y(5x + 2y)$$

$$-1(5x + 2y)(5x + 2y)$$

ex 9  
pg 475

$$2x^3 + 12x^2 + 18x - 8xy^2$$
$$2x(x^2 + 6x + 9) - 4y^2$$

$$x^2 + 6x + 9$$
$$(x+3)(x+3)$$
$$(x+3)^2$$

$$2x((x+3)^2 - (2y)^2)$$

$$2x(x+3+2y)(x+3-2y)$$