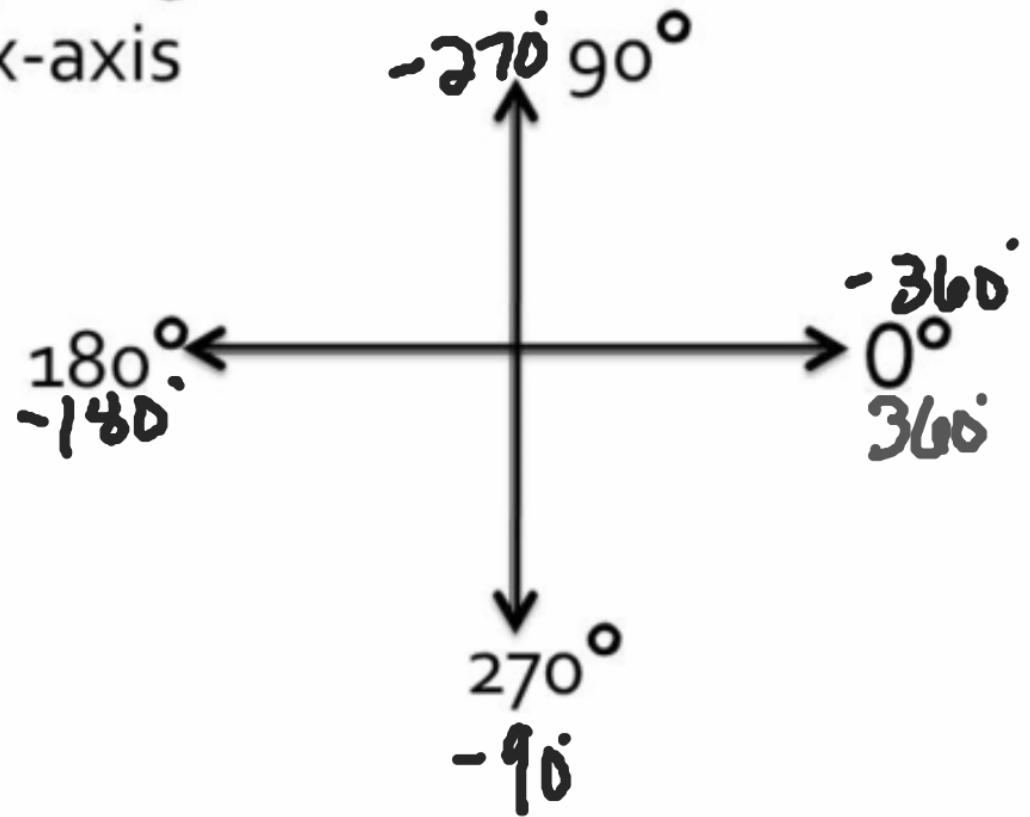
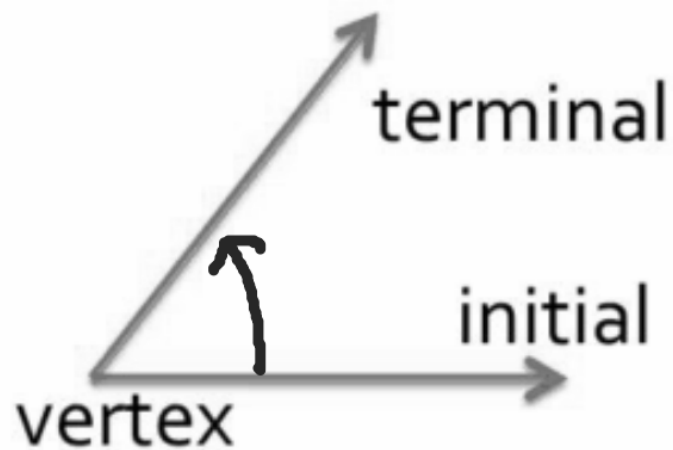


Section 4.1

Radian and Degree Measure

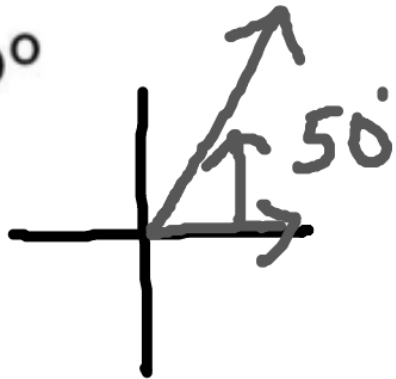
Angles

- Trigonometry: the measurement of angles
- Standard Position: Angles whose initial side is on the positive x-axis

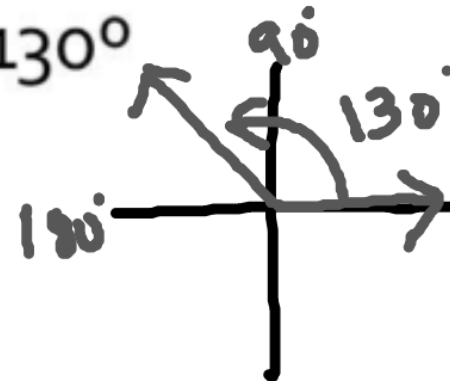


Graphing positive angles

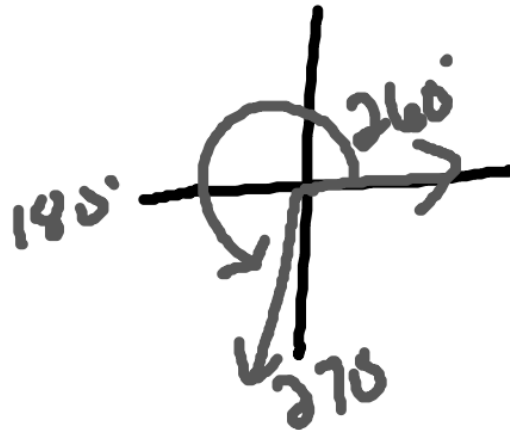
1.) 50°



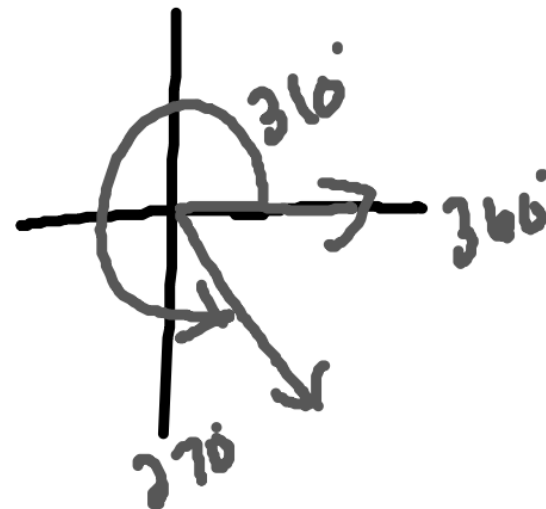
2.) 130°



3.) 260°



4.) 310°



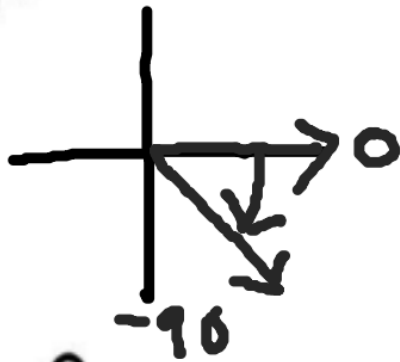
5. 50°



Graphing Negative angles

(go back to graph and write in)

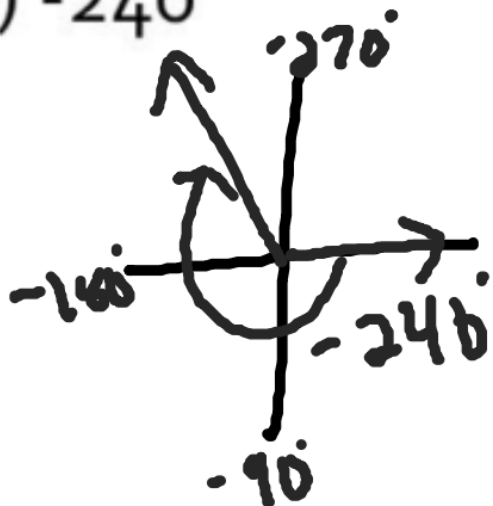
1.) -50°



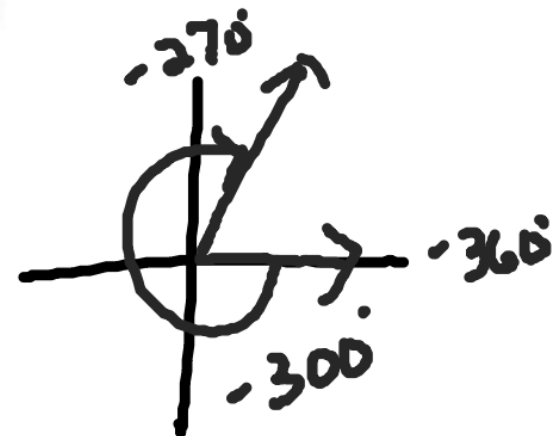
2.) -180°



3.) -240°



4.) -300°



Coterminal angles

- Angles that share the same terminal side
- Differ by 360° (or a multiple of 360 ie. 720)
- Example 4 vs example 1
- To find positive and negative coterminal angles- add and subtract 360°

■ 1.) 210°

$$210^\circ + 360^\circ = 570^\circ$$

$$210^\circ - 360^\circ = -150^\circ$$

2.) -180°

$$-180^\circ + 360^\circ = 180^\circ$$

$$-180^\circ - 360^\circ = -540^\circ$$

3.) 400°

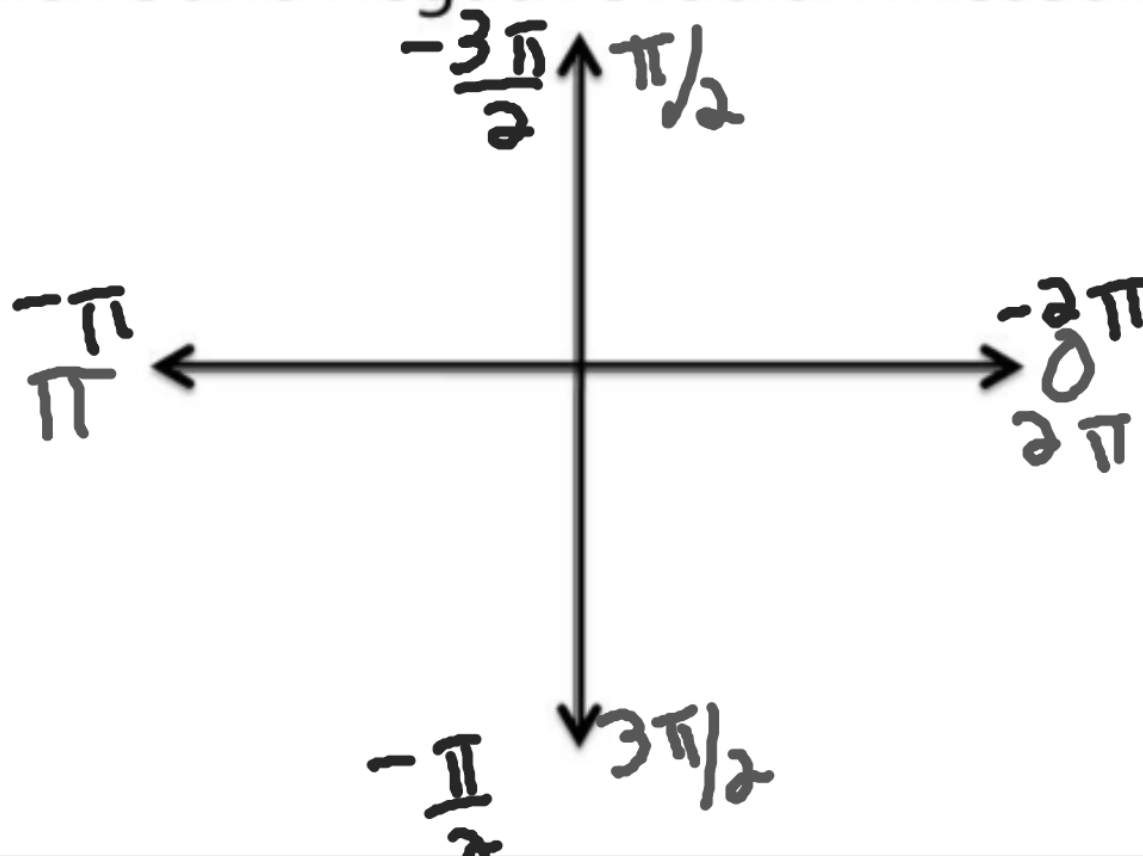
$$400^\circ + 360^\circ = 760^\circ$$

$$400^\circ - 360^\circ = 40^\circ$$

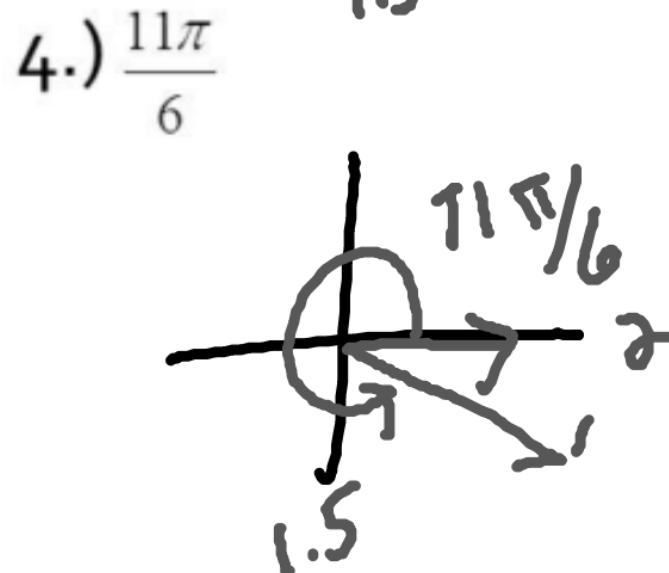
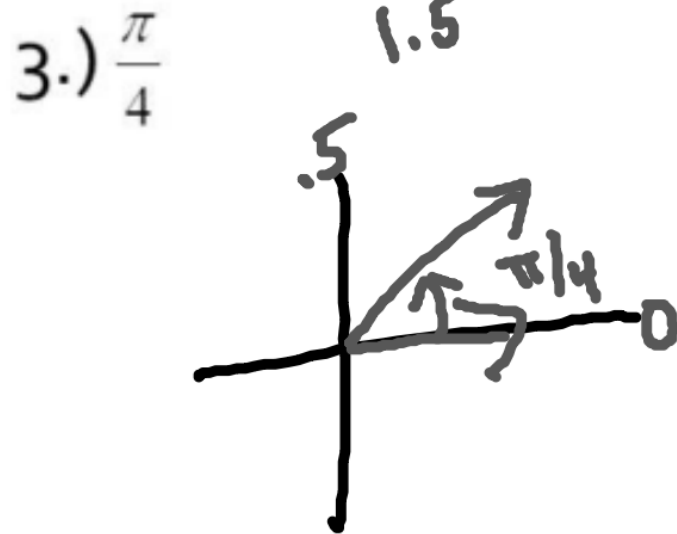
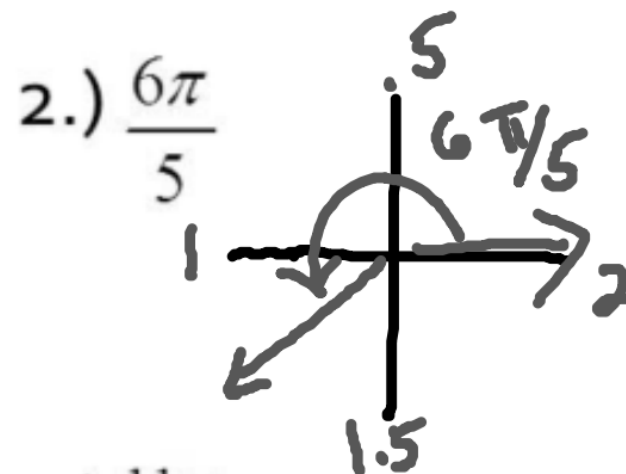
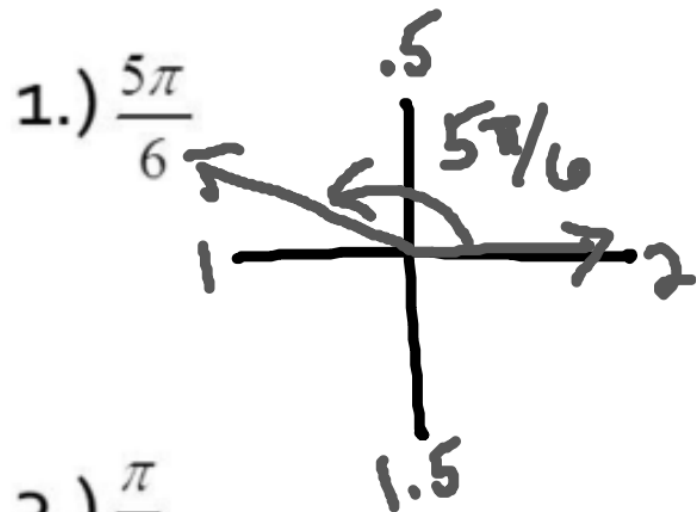
$$-320^\circ$$

Radian Measure

- Radians are a 2nd way to measure an angle
- Positive and negative radian measures:

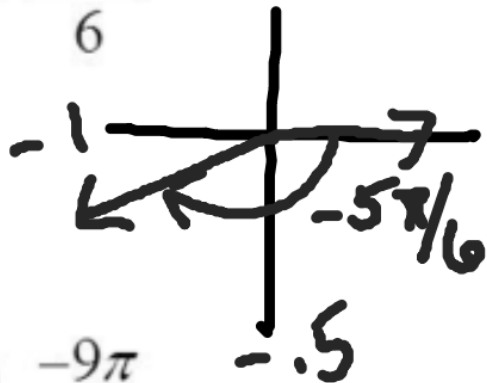


Graphing positive angles

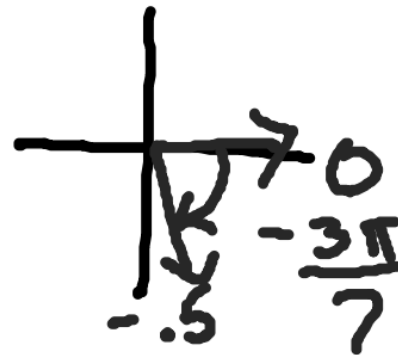


Graphing negative angles

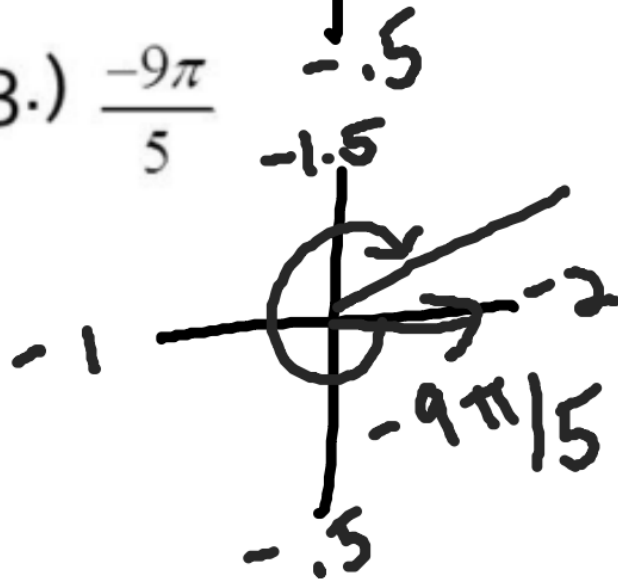
1.) $\frac{-5\pi}{6}$



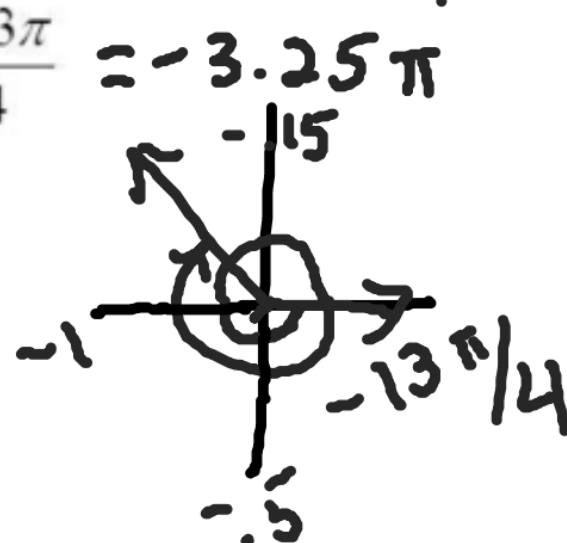
2.) $\frac{-3\pi}{7}$



3.) $\frac{-9\pi}{5}$



4.) $\frac{-13\pi}{4}$



Coterminal angle with radians

- Differ by 2π
- To find a positive and negative coterminal angle, add and subtract 2π

1.) 3π

$$+ 2\pi = 5\pi$$

$$- 2\pi = \pi$$

$$- 2\pi = -\pi$$

2.) $\frac{3\pi}{4} \pm \frac{2\pi \cdot 4}{1 \cdot 4}$

$$\frac{3\pi}{4} + \frac{8\pi}{4} = \frac{11\pi}{4}$$

$$\frac{3\pi}{4} - \frac{8\pi}{4} = \frac{-5\pi}{4}$$

3.) $\frac{-5\pi}{6} \pm \frac{2\pi \cdot 6}{1 \cdot 6}$

$$\frac{-5\pi}{6} + \frac{12\pi}{6} =$$

$$\frac{-5\pi}{6} - \frac{12\pi}{6} = \frac{-17\pi}{6}$$

Conversions

- Degree to radian: Multiply by $\frac{\pi}{180}$

1.) $120^\circ \cdot \frac{\pi}{180} = \boxed{\frac{2\pi}{3}}$ 2.) $-150^\circ \cdot \frac{\pi}{180} = \boxed{-\frac{5\pi}{6}}$ 3.) $180^\circ \cdot \frac{\pi}{180} = \pi$

- Radian to degree: Multiply by $\frac{180}{\pi}$

1.) $\frac{5\pi}{4} \cdot \frac{180}{\pi} = 225^\circ$ 2.) $-\frac{3\pi}{2} \cdot \frac{180}{\pi} = -270^\circ$ 3.) $\frac{16\pi}{3} \cdot \frac{180}{\pi} = 960^\circ$

Special angles

- Complementary angles- angles whose sum = 90
- Supplementary angles- angles whose sum = 180

1.) 45°

comp = 45°
sup = 135°

2.) 61°

comp = 29°
sup = 119°

3.) 100°

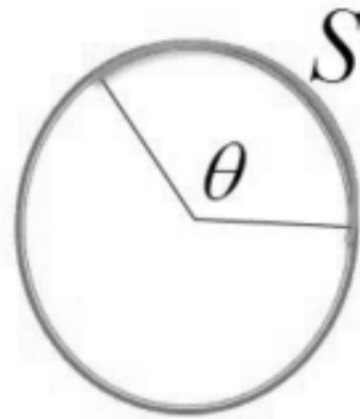
comp = none
sup = 80°

Arc Length

- Arc length- measures a segment (arc) of a circle

$$S = r\theta$$

- θ must be in radians



- 1.) $r = 5, \theta = \frac{3\pi}{4}$

$$S = 5 \cdot \frac{3\pi}{4} = \boxed{\frac{15\pi}{4}}$$

- 2.) $r = 3, \theta = \frac{4\pi}{5}$

$$S = 3 \cdot \frac{4\pi}{5} = \boxed{\frac{12\pi}{5}}$$

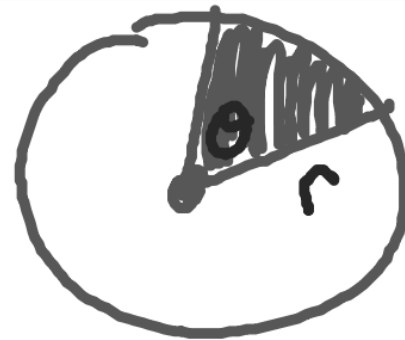
Area of a sector

$$A = \frac{1}{2} r^2 \theta$$

1.) $r = 3, \theta = \frac{2\pi}{3}$

$$A = \frac{1}{2} \cdot 3^2 \cdot \frac{2\pi}{3}$$

$$A = 3\pi$$



2.) $r = 2, \theta = 120^\circ$

$$A = \frac{1}{2} \cdot 2^2 \cdot \frac{2\pi}{3}$$

$$A = \frac{4\pi}{3}$$

$$120 \cdot \frac{\pi}{180}$$



Classwork

■ Pg 291 # 71-78

⑦① DD - 54.75

DMS - 54° 45' 0"
D M S

0 1 11

⑦⑤ 240.6 → 73

DMS →
240° 36'

Homework

- Pg 290-91 # 7-9, 13-19, 31-40, 49-52,
79, 80, 87, 91, 92