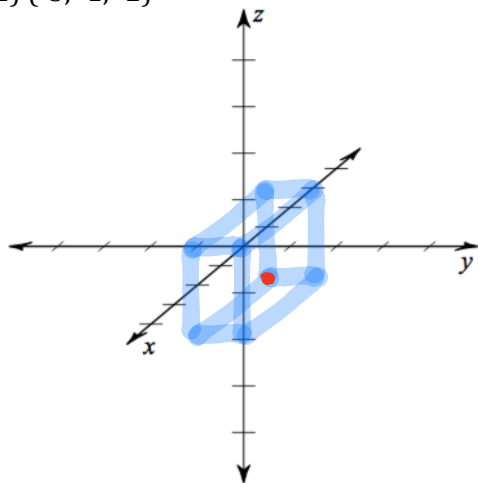


Unit 13 Review: Coordinate Systems

NAME: _____

Directions: Plot each point. Show either box or arrow marks.

1) $(-3, -1, -2)$



Directions: Find the midpoint and distance of each. Round to nearest tenth.

2) $(-1, 10, -5)$ and $(3, 7, -3)$

$$\begin{aligned} \text{Midpoint: } M &= \left(\frac{\sum x}{2}, \frac{\sum y}{2}, \frac{\sum z}{2} \right) \\ &= \left(\frac{-1+3}{2}, \frac{10+7}{2}, \frac{-5+(-3)}{2} \right) \\ &= \left(\frac{2}{2}, \frac{17}{2}, \frac{-8}{2} \right) \\ M &= \left(1, \frac{17}{2}, -4 \right) \end{aligned}$$

Distance:

$$\begin{aligned} d &= \sqrt{[\Delta x]^2 + [\Delta y]^2 + [\Delta z]^2} \\ &= \sqrt{[-1-3]^2 + [10-7]^2 + [-5-(-3)]^2} \\ &= \sqrt{[-4]^2 + [3]^2 + [-2]^2} \\ &= \sqrt{16+9+4} \\ d &= \sqrt{29} \end{aligned}$$

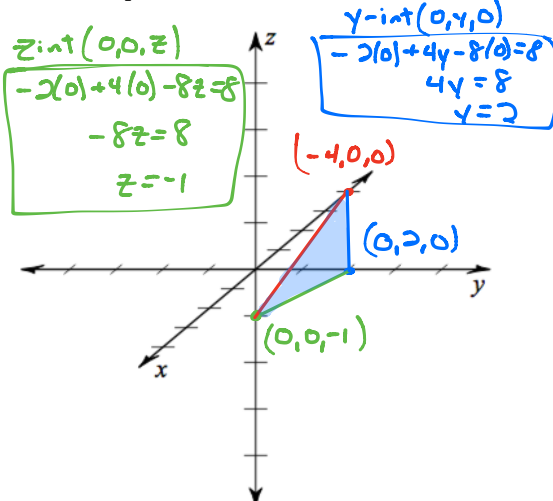
Directions: Find the intercepts and graph the equation.

3) $-2x + 4y - 8z = 8$

x-intercept: -4

y-intercept: 2

z-intercept: -1

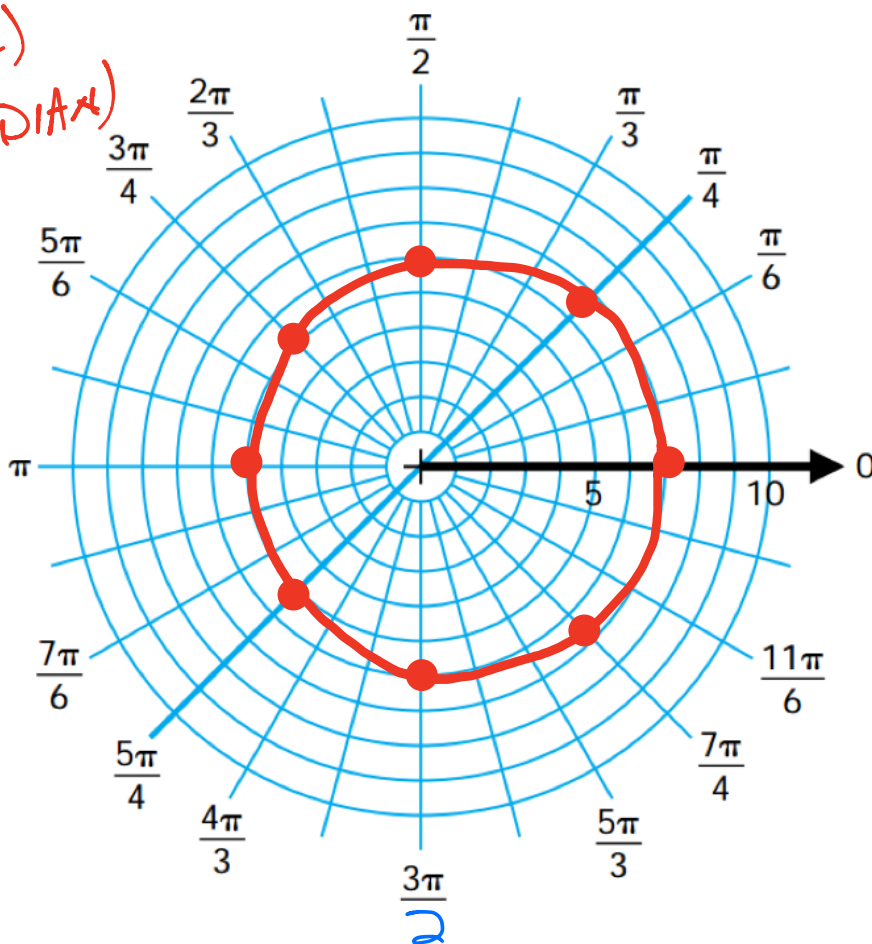


Directions: Complete the table and plot the graph. (round to 2 decimals) (5 pts)

4) $r = 6 + \cos \theta$

θ	r
0	7
$\frac{\pi}{4}$	6.71
$\frac{\pi}{2}$	6
$\frac{3\pi}{4}$	5.29
π	5
$\frac{5\pi}{4}$	5.29
$\frac{3\pi}{2}$	6
$\frac{7\pi}{4}$	6.71

MODE (POL)
MODE (RADIAN)



Directions: Convert the following from Polar to Rectangular (round to 3 decimal places). (3 pts each)

5) $(6, \frac{11\pi}{6})$

$$x = r \cos \theta$$

$$x = 6 \cos \frac{11\pi}{6}$$

$$x = 5.196$$

$$y = r \sin \theta$$

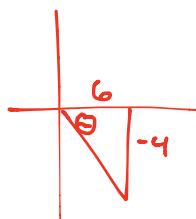
$$y = 6 \sin \frac{11\pi}{6}$$

$$y = -3$$

$(5.196, -3)$

Directions: Convert the following from Rectangular to Polar where $r \geq 0$, and $0^\circ \leq \theta \leq 360^\circ$ (round to nearest tenth of a degree) (3 pts)

6) $(6, -4)$



$$x^2 + y^2 = r^2$$

$$(6)^2 + (-4)^2 = r^2$$

$$36 + 16 = r^2$$

$$52 = r^2$$

$$\pm \sqrt{52} = r$$

$$2\sqrt{13} = r$$

$$\tan \theta = \frac{-4}{6}$$

$$\theta = \tan^{-1}(\frac{-4}{6})$$

$$\theta = 33.7$$

$(2\sqrt{13}, 330.3^\circ)$

Unit 13 Application and Extension

1) Brust (x), Bean (y) and Kelly (z) love going eating wings. They go to their favorite wing restaurant that offers them a deal. If they can eat 60 wings in 10 minutes they will eat for free. Brust can eat 2.5 wings a minute, Bean can eat 1.5 a minute and Kelly can eat 6 a minute.

a) Write an equation in terms of x, y and z for the above situation.

$2.5x + 1.5y + 6z = 60$

b) Write the above equation in terms of the number of minutes Bean eats wings. (Solve for y).

$$1.5y = 60 - 2.5x - 6z$$

$$y = \frac{60 - 2.5x - 6z}{1.5}$$

c) If Kelly only eats for 4 minutes and Brust eats for 8 minutes. How long does Bean need to eat to finish the 60 wings.

$$y = \frac{60 - 2.5(8) - 6(4)}{1.5}$$

$$y = \frac{60 - 20 - 24}{1.5}$$

$$y = \frac{16}{1.5}$$

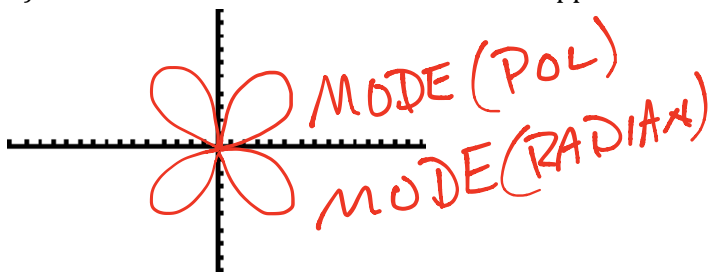
$$y = 10.67 \text{ minutes}$$

Bean needs to eat for about 10.67 minutes.

Directions: Use your graphing calculator to sketch each graph and answer the question. (2pts each)

2) $r = 6 \sin 2\theta$

What happens to the graph when you change the 2 to a 4?



The number of petals doubles