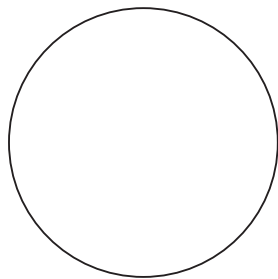
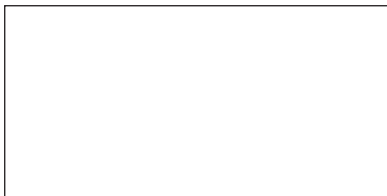


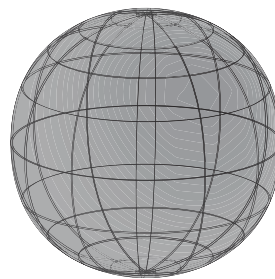
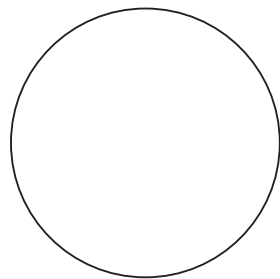
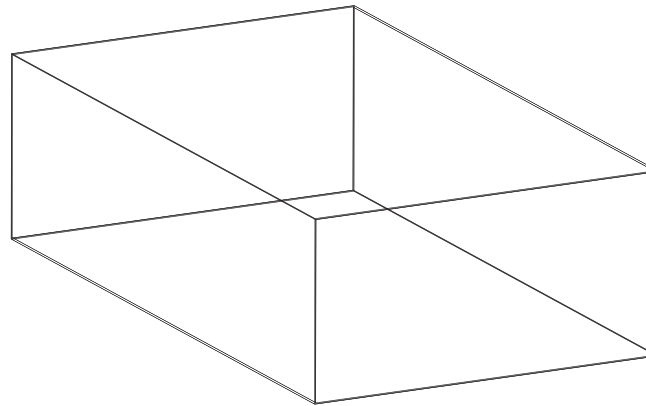
Making the jump from  $\mathbb{R}^2$



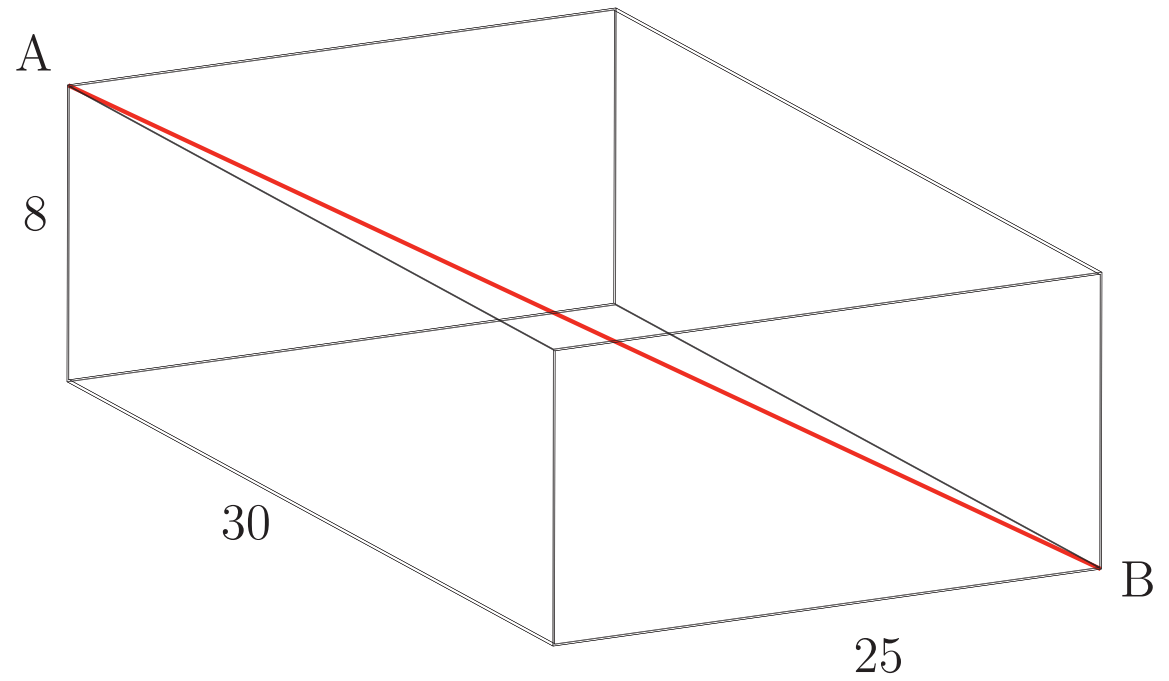
Making the jump from  $\mathbb{R}^2$

to

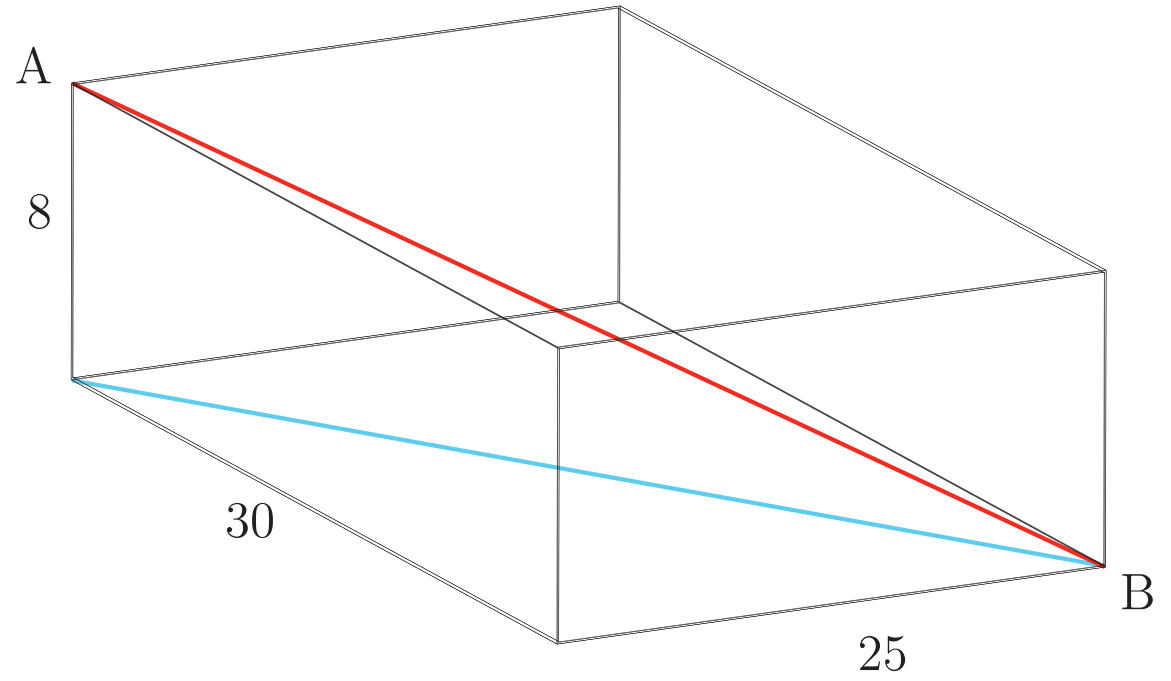
$\mathbb{R}^3$ .



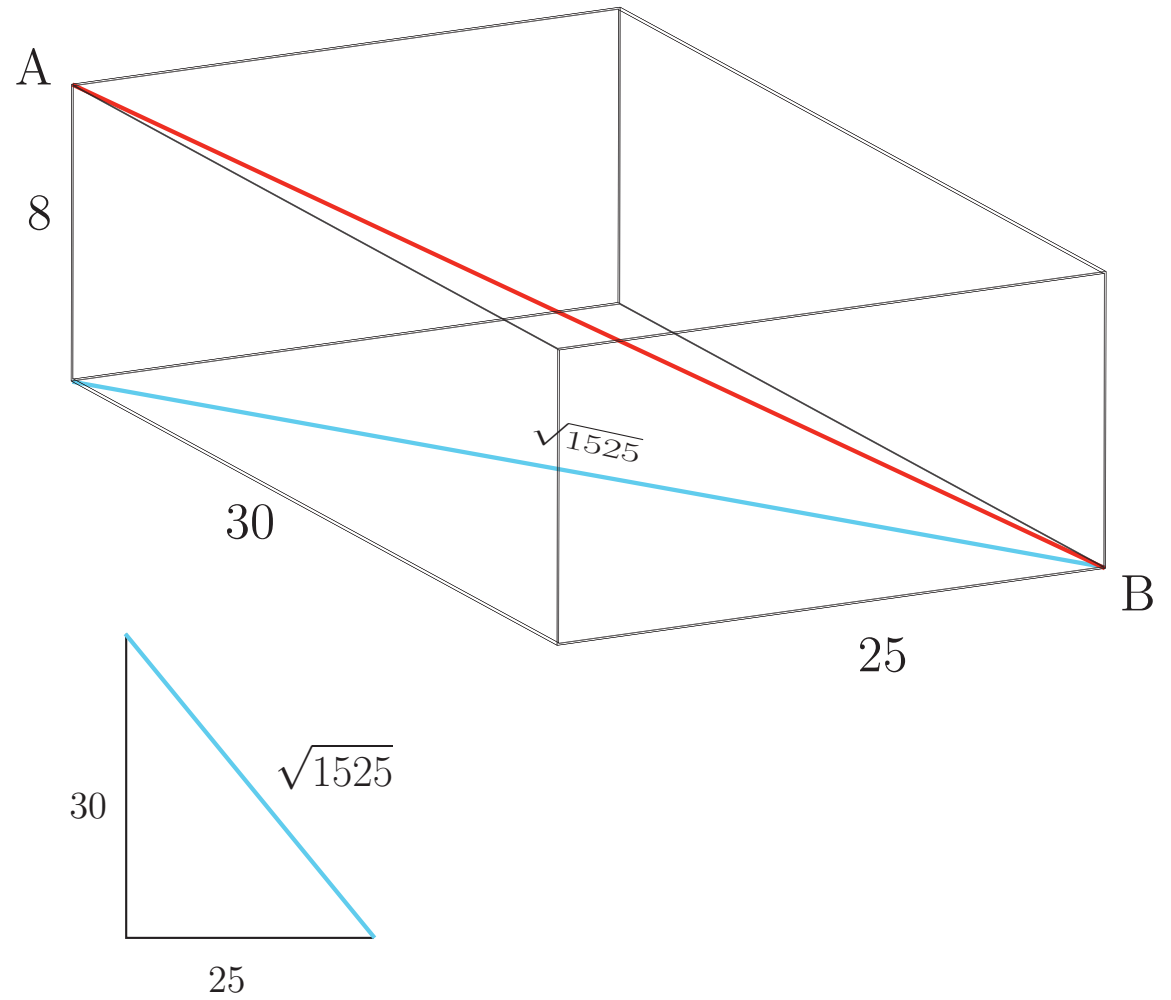
Find the distance from A to B.



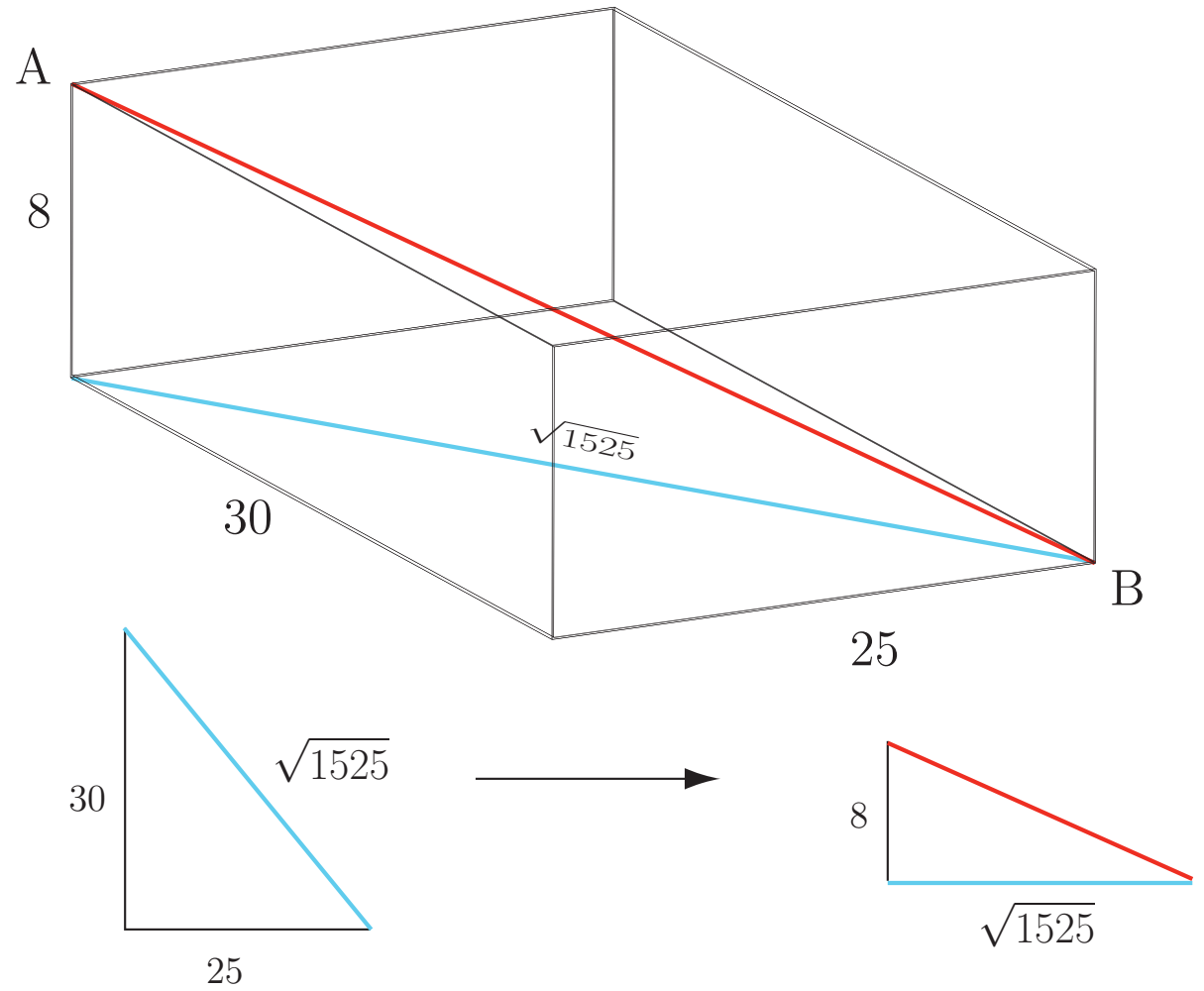
Find the distance from A to B.

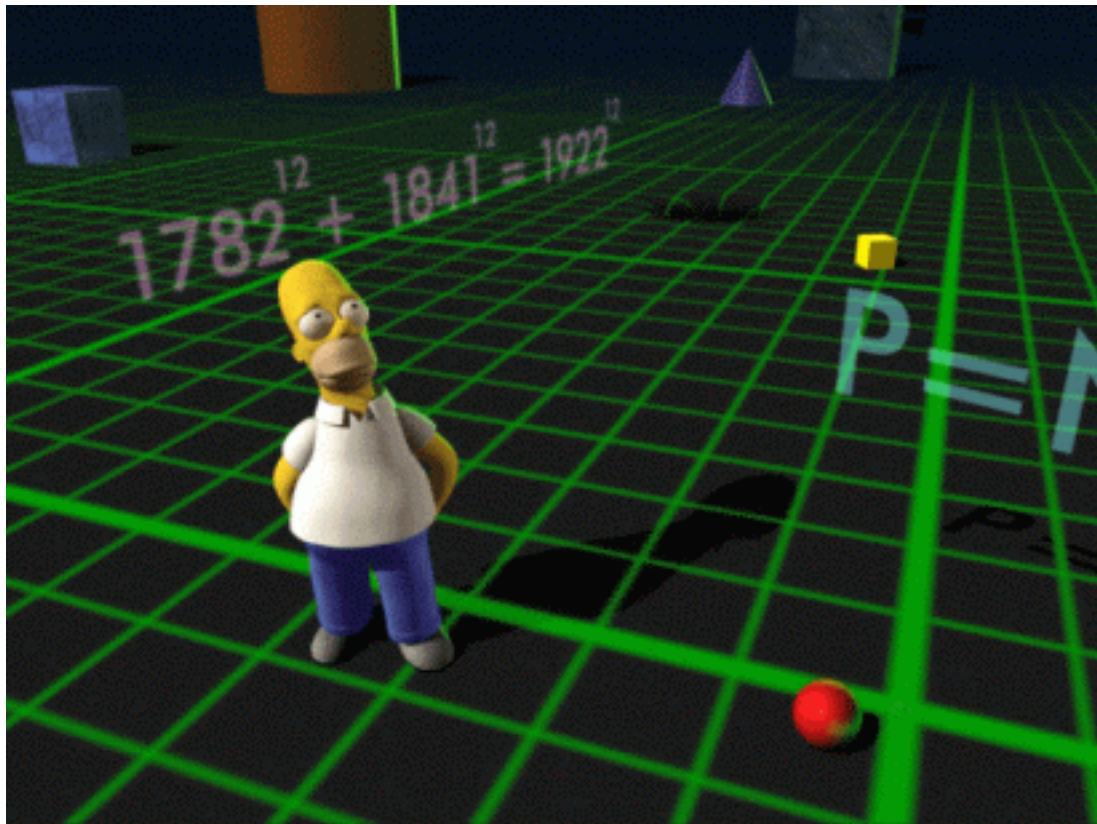


Find the distance from A to B.



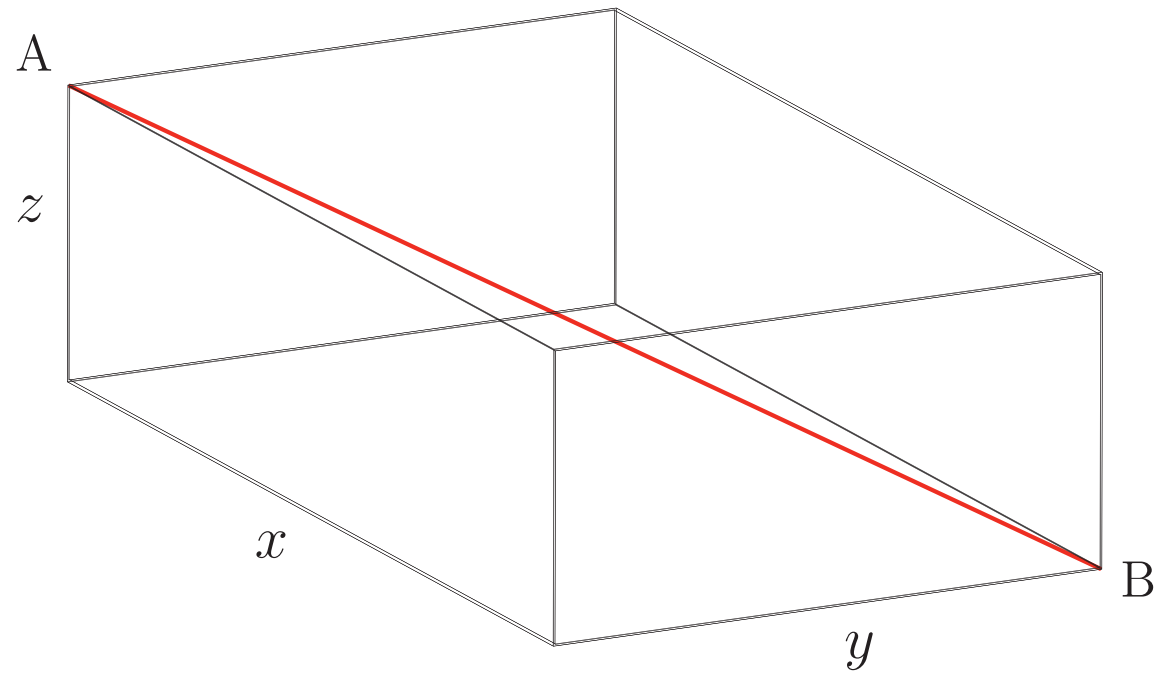
Find the distance from A to B.





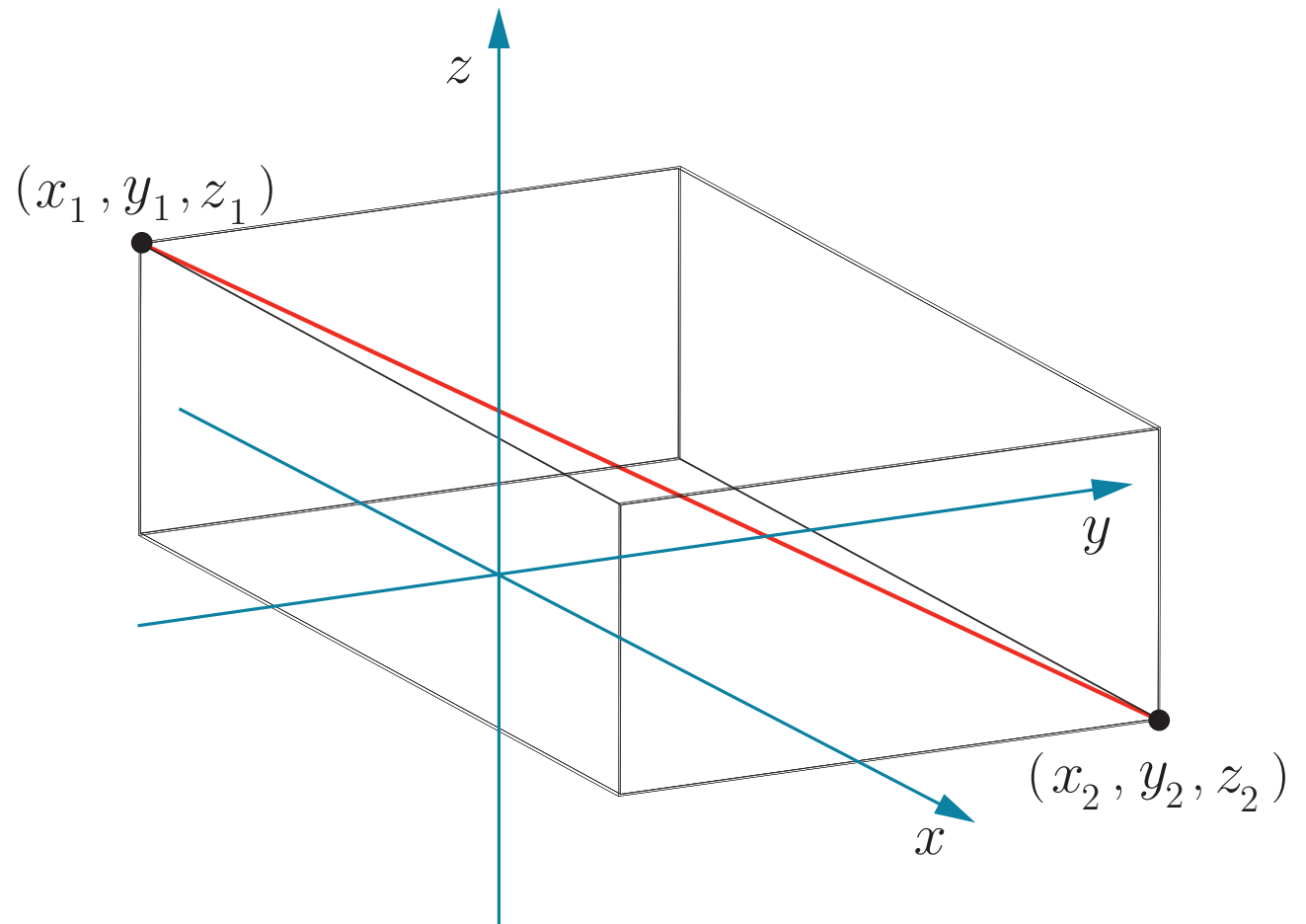
$$1782^{12} + 1841^{12} = 1922^{12}$$

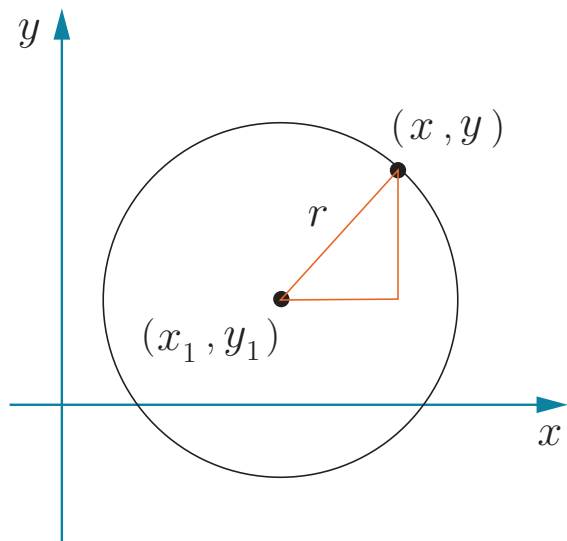
Find the distance from A to B.

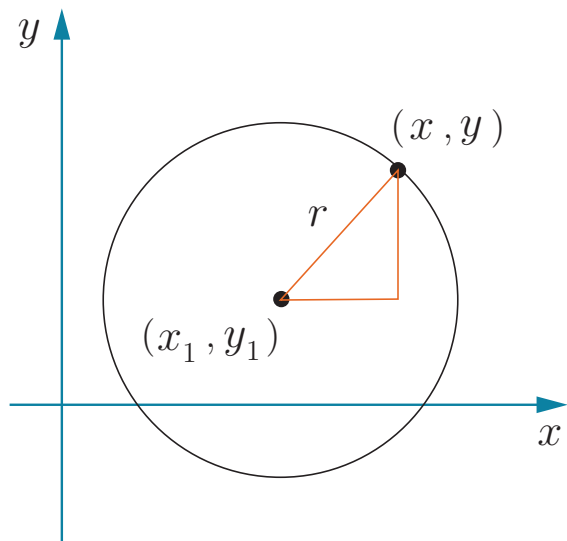




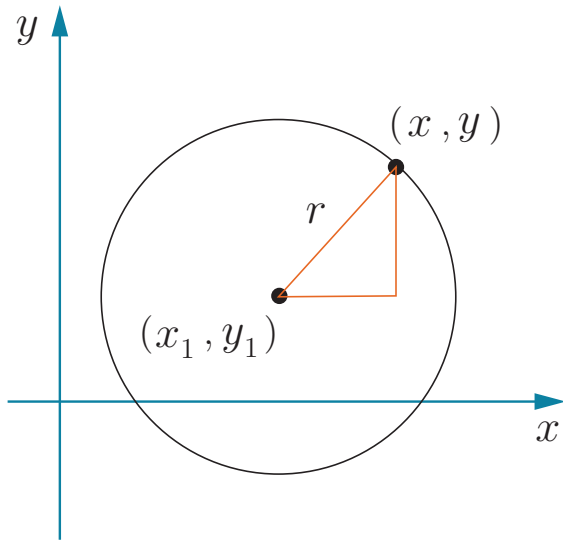
Find the distance from  $(x_1, y_1, z_1)$  to  $(x_2, y_2, z_2)$ .



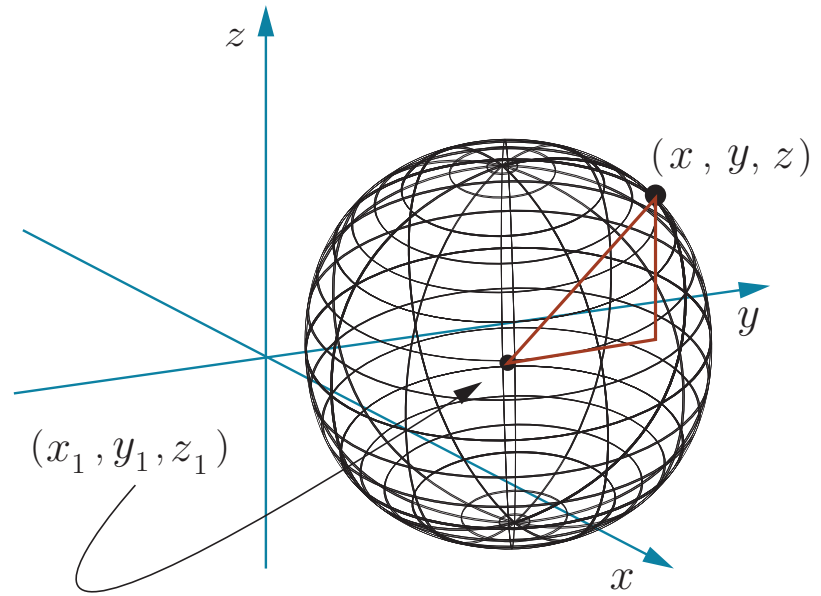




$$(x - x_1)^2 + (y - y_1)^2 = r^2$$



$$(x - x_1)^2 + (y - y_1)^2 = r^2$$



### Example 1

Which of the points  $A = (3, 0, 3)$ ,  $B = (0, 4, 2)$ ,  $C = (2, 4, 1)$ , and  $D = (2, 3, 4)$  lies closest to . . .

- (a) the  $xy$ -plane?
- (b) the origin?
- (c) the  $y$ -axis?
- (d) the point  $(1, 2, 3)$ ?

**Example 2**

Describe the surface given by the equation

$$\sqrt{(x - 1)^2 + (y + 2)^2 + (z + 5)^2} = 5$$

**Example 3**

Sphere A is centered at the origin and the point  $(0, 0, 3)$  lies on it.

Sphere B is given by the equation  $x^2 + y^2 + z^2 = 3$ .

- (a) A encloses B
- (b) B encloses A
- (c) A and B are equal
- (d) None of the above