**Circles and Saguaros**

Exercise 1: Finding the circumference

|  |  |  |
| --- | --- | --- |
| Diameter of a Circle | Radius | Circumference |
| 17 | 8.5 | 52.41 |
| 5 | 2.50 | 15.71 |
| 21 | 10.50 | 65.97 |
| 26 | 13 | 81.68 |
| 12 | 6 | 37.00 |
| 42 | 21 | 131.95 |
| 4 | 2 | 12.57 |
| 9 | 4.50 | 28.27 |
| 6 | 3 | 18.85 |
| 16 | 8 | 50.27 |
| 8 | 4 | 25.13 |
| 14 | 7 | 43.98 |

Use the space provided to show your work.

Use either 2πr or dπ

If r = 7 then,

2 x π x 7 = 43.98

Or

14 x π = 43.98

Exercise 2: Volume and Surface Area

1. A saguaro stands 6 feet tall and has a diameter of 12 inches. Assuming that it is shaped like a perfect cylinder, find its volume. By how much would the volume increase if the saguaro’s height increases by 50%?

Πr2h

3.14 x 62 x 72

V ≈ 8143.01 in3

New height = 9 ft or 108 in

Radius = 6 in

V ≈ 12214.51 in3

12214.51 – 8143.01 = 4,071.5

1. Anna is a Park Ranger who is out on a hike. Near the trail, she sees 3 saguaros close to each other. The first saguaro is 3 meters tall and has a diameter of 18 centimeters, the second saguaro is also 3 meters tall but has a diameter of 20 centimeters, and the third saguaro is 5 meters tall and has a diameter of 10 centimeters. Which of the three saguaros holds the most volume?

The second saguaro holds the most volume.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Saguaro 1 | Saguaro 2 | Saguaro 3  |
| h | 300 cm | 300 cm | 500 cm |
| d | 18 cm | 20 cm | 10 cm |
| r | 9 cm | 10 cm  | 5 cm |
| V  | 76340.7 cm3 | 94247.78 cm3 | 39269.91 cm3 |

1. A square research plot contains one saguaro in each of corner, forming a cube shape. Each saguaro is 4 meters tall and are equally 4 meters apart. Assuming that there is an invisible wall around the research plot, what would be its surface area of the entire cube?

Surface Area of cube = 6a2

6 x 42 = 96 m2

1. There are 12 giant saguaros with varying diameters on a 10 x 10 meter research plot. All of them are 6 meters in height. If all of the water in the saguaros were to be drained out (assuming that each saguaro is completely filled inside with water) how deep would the water be on the plot? The diameters are 20, 15, 14, 19,16, 18, 25, 18, 14, 15, 18, and 20 centimeters. Assume that there is an invisible waterproof wall around the research plot. Show your work.

Total volume of saguaros = 1, 817, 077 cm3

Volume of plot as a cube = 1, 000, 000, 000 cm3

|  |  |
| --- | --- |
| Saguaro  | Volume  |
| 1 | 188,496 |
| 2 | 106,029 |
| 3 | 92,363 |
| 4 | 170,117 |
| 5 | 120,637 |
| 6 | 152,681 |
| 7 | 294,524 |
| 8 | 152,681 |
| 9 | 92,363 |
| 10 | 106,029 |
| 11 | 152,681 |
| 12 | 188,496 |

Total saguaro volume = 10002 x h

h = 1.817077 cm

h = 0.01817077 m