Algebra Questions Set 2: 1/4/13 www.askmath.weebly.com

1. A square's length is increased by 2 in. The width is decreased by 5 in. What percent did the area change?

Let the side equal 10. The percent difference/change formula is:

$$\%change = \frac{final - initial}{initial} \times 100$$

If the initial side is 10, the area would be $10^2 = 100$, the final area is $(10+2)(10-5) = 12 \times 5 = 60$

Plugging in to our equation:

$$\begin{aligned} \%change &= \frac{final - initial}{initial} \times 100 \\ &= \frac{60 - 100}{100} \times 100 \\ &= -40\% \end{aligned}$$

$\boxed{-40\%}$

2. A cylinder of radius 6 ft and height 4 ft is cut in half laying on the curved side , then cut in half again on the flat side. What is the *surface area* of the object after it is finished cut.

Cutting it in half on the curved side will decreasing the height in half. Then cutting the flat side in 2 will cut the circle on the bases in half. The surface area for the bases is

$$\begin{aligned} SA_{bases} &= \pi \cdot r^2 \\ &= \pi \cdot (6)^2 \\ &= 36\pi \end{aligned}$$

Then we need to find the area of the curved side, which is half the circumference times the height. But since we cut it in half, the height is half the original height.

$$\begin{aligned} SA_{curvedside} &= \frac{1}{2}\text{circumference} \times \frac{1}{2}\text{height} \\ &= \frac{1}{2} \cdot 2 \cdot \pi \cdot r \cdot \frac{1}{2} \cdot 4 \\ &= 2\pi r \\ &= 2\pi 6 \\ &= 12\pi \end{aligned}$$

Then find the area of the straight side. which is diameter times height.

$$\begin{aligned} SA_{straightside} &= \text{diameter} \times \frac{1}{2}\text{height} \\ &= 12 \cdot 2 \\ &= 24 \end{aligned}$$

$$\begin{aligned} SA_{Total} &= SA_{bases} + SA_{curvedside} + SA_{straightside} \\ &= 36\pi + 12\pi + 24 \\ &= 48\pi + 24 \end{aligned}$$

$\boxed{48\pi + 24\ ft^2 \approx 174.796\ ft^2}$

3. Mike takes 20 min to get to the store. Mike Jr. takes 34 min to get to the store. If Mike Jr. takes 3 hr to get to Walmart, how long will it take Mike to get to Walmart?

Use rates to solve.

$$\begin{aligned}
\frac{Store_{mike}}{Store_{mike\ jr.}} &= \frac{Walmart_{mike}}{Walmart_{mike\ jr.}} \\
\frac{20}{34} &= \frac{t}{180} \\
180 \cdot \left(\frac{20}{34}\right) &= t \\
t &= \frac{1800}{17}
\end{aligned}$$

$\boxed{\frac{1800}{17}\ min \approx 105.882\ min}$

4. A sphere is being painted with exactly 600 in^3 of red paint. What is the radius of the sphere in yards?

$$\begin{aligned}
\text{Surface area of sphere} &= 4\pi r^2 \\
600 &= 4\pi r^2 \\
\frac{600}{4\pi} &= r^2 \\
r &= \sqrt{\frac{600}{4\pi}} \\
r &\approx 6.909
\end{aligned}$$

However, r is in inches. The question asks us to find r in yards.

$$\frac{6.909\ in}{1} \times \frac{1\ yd}{36\ in} \approx 0.1919\ yd$$

$\boxed{.1919\ yd}$

5. A circular disk has a diameter of 13 in. If Ross were to stack the disks on top of each other, how many disks will be on the stack if he wants them to have a volume of 1646 in^3 assuming the disks have a height of .26 in?

$V_{cylinder} = \pi \cdot r^2 \cdot h$

$$\begin{aligned}
\text{Volume of 1 disk} &= \pi \cdot (6.5)^2 \cdot .26 \\
&= 10.985\pi
\end{aligned}$$

$$\begin{aligned}
10.985x &= 1646 \\
x &= \frac{1646}{10.985} \\
x &\approx 149.841
\end{aligned}$$

You can't have 0.8 of a disk so $\boxed{150\ disks}$