

Get out your homework from yesterday and start checking the questions below.

Classwork - Approximating Square Roots

Find each root.

$$1. \sqrt{36} = 6$$

$$2. -\sqrt{144} = -12$$

$$3. \sqrt[3]{\frac{27}{64}} = \frac{3}{4}$$

$$4. \sqrt[3]{2,744} = 14$$

$$5. \pm\sqrt{2.25} = \pm 1.5$$

$$6. \pm\sqrt{\frac{121}{289}} = \pm \frac{11}{17}$$

$$7. \sqrt{\frac{-81}{100}} \text{ No Real Square Roots}$$

$$8. \pm\sqrt{0.0025} = \pm 0.05$$

$$9. -\sqrt{0.49} = -0.7$$

$$10. \sqrt[3]{-27} = -3$$

$$11. -\sqrt{\frac{25}{441}} = -\frac{5}{21}$$

$$12. \pm\sqrt{361} = \pm 19$$

ALGEBRA Solve each equation. Check your solution(s).

$$13. \sqrt{h^2} = \sqrt{121}$$

$$h = \pm 11$$

$$14. \sqrt{324} = \sqrt{a^2}$$

$$\pm 18 = a$$

$$15. \sqrt{x^2} = \sqrt{\frac{81}{169}}$$

$$x = \pm \frac{9}{13}$$

$$16. \sqrt{0.0196} = \sqrt{m^2}$$

$$\pm 0.14 = m$$

$$17. \sqrt{y^2} = 6^2$$

$$y = 36$$

$$18. \sqrt{z} = 8.4$$

$$z = 70.56$$

19. GARDENING Moesha has 196 pepper plants that she wants to plant in square formation. How many pepper plants should she plant in each ^{row?}

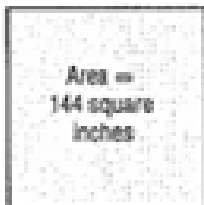
$$\sqrt{s^2} = \sqrt{196} \quad s = 14 \quad 14 \text{ pepper plants}$$

20. RESTAURANTS A new restaurant has ordered 64 tables for its outdoor patio. If the manager arranges the tables in a square formation, how many will be in each row?

$$t^2 = 64 \quad \sqrt{t^2} = \sqrt{64} \quad t = 8 \quad 8 \text{ tables in each row}$$

GEOMETRY The formula for the perimeter of a square is $P = 4s$, where s is the length of a side. Find the perimeter of each square.

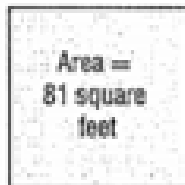
21.



$$\sqrt{144} = 12 \text{ in}$$

$$P = 12 \cdot 4 = 48 \text{ in}$$

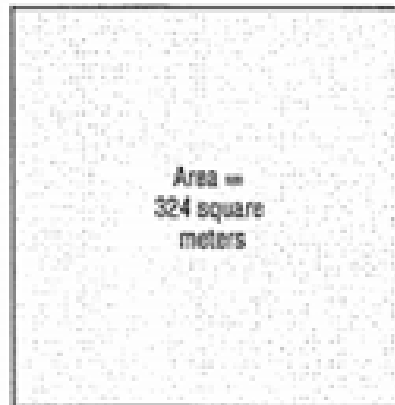
22.



$$\sqrt{81} = 9 \text{ ft}$$

$$P = 9 \cdot 4 = 36 \text{ ft}$$

23.



$$\sqrt{324} = 18 \text{ m}$$

$$P = 18 \cdot 4 = 72 \text{ m}$$

Target: I can find an approximation for square roots and locate them on a number line.

The method below will help you approximate a non perfect square root without a calculator.

Example: Find the fractional approximation of $\sqrt{31}$

Step 1: Identify what 2 perfect squares your square root falls between.

$$\sqrt{25} < \sqrt{31} < \sqrt{36}$$

$5 < \sqrt{31} < 6$ → The mixed number approximation for $\sqrt{31}$ will be $5\frac{6}{11}$

$$\left. \begin{array}{l} 6 \\ 11 \end{array} \right\} \begin{array}{l} 31 - 25 = 6 \\ 36 - 25 = 11 \end{array}$$

Step 2: Find the numbers in the fraction portion of the approximation

Numerator → how far above the lower perfect square $\sqrt{31}$ is

31 is 6 above 25 → numerator of the fraction is 6

Denominator → the total distance between the two perfect squares

The distance from 25 to 36 is 11 → denominator is 11

Step 3: Write the mixed number approximation for the square root

$$\sqrt{31} \text{ is about } 5\frac{6}{11}$$

Step 3: Write the mixed number approximation for the square root

$$\sqrt{31} \text{ is about } 5\frac{6}{11}$$

Step 4: Use long division to find the decimal value of the fraction

#2) Numerator $\rightarrow 19 - 16 = 3$
 Denominator $\rightarrow 25 - 16 = 9$

$$\begin{array}{r} 0.545 \\ 11 \overline{) 6.000} \\ \underline{0} \\ 60 \\ \underline{-55} \\ 50 \\ \underline{-44} \\ 60 \end{array}$$

The approximate value of $\sqrt{31} = 5.\overline{54}$

Step 5: Use your calculator to find the value of the square root.

	Number	Between square roots of what perfect squares	Between two integers	About (fraction)	About (decimal)	Calculator check (to the nearest hundredth)
1.	$\sqrt{31}$	$\sqrt{25}$ and $\sqrt{36}$	5 and 6	$5\frac{6}{11}$	$5.\overline{54}$	5.57
2.	$\sqrt{19}$	$\sqrt{16}$ and $\sqrt{25}$	4 and 5	$4\frac{3}{9} = 4\frac{1}{3}$	$4.\overline{3}$	4.36

3.	$\sqrt{40}$	$\sqrt{36} \text{ \& } \sqrt{49}$	6 and 7	$40 - 36 = 4$ $49 - 36 = 13$ $6 \frac{4}{13}$	6.31	6.32
4.	$\sqrt{137}$	$\sqrt{121} \text{ \& } \sqrt{144}$	11 and 12	$\sqrt{121} - 121 = 16$ $144 - 121 = 23$ $11 \frac{16}{23}$	11.697	11.705
5.	$\sqrt{38}$					
6.	$\sqrt{94}$					