

BASIC ALGEBRA TEST 54 NAME: _____

SHOW ALL WORK ON THIS TEST. REDUCE ALL ANSWERS COMPLETELY. CIRCLE ANSWERS.

1) $\sqrt{100} =$

2) $\sqrt{\frac{49}{121}} =$

3) $\sqrt{x^{10}} =$

4) $\sqrt{36x^{16}} =$

5) $\sqrt{45} =$

6) $\sqrt{75} =$

7) $\sqrt{288} =$

8) $\sqrt{72x^7} =$

9) $\sqrt{98x^8} =$

10) $\sqrt{80x^7y^{12}} =$

11) $\sqrt[3]{80} =$

12) $\sqrt{250} =$

13) $\sqrt[3]{x^{10}} =$

ADD OR SUBTRACT. SIMPLIFY

14) $\sqrt{28} + \sqrt{63} =$

15) $\sqrt{75} + 2\sqrt{27} - 3\sqrt{48}$

MULTIPLY AND SIMPLIFY.

$$16) (4\sqrt{5})(7\sqrt{10}) =$$

$$17) (6\sqrt{15})(2\sqrt{5}) =$$

$$18) \sqrt{\frac{8}{15}} \cdot \sqrt{\frac{1}{2}} =$$

$$19) \sqrt{3}(\sqrt{5} - 7)$$

$$20) (\sqrt{3} - \sqrt{5})(\sqrt{3} + \sqrt{5}) =$$

$$21) (\sqrt{2} - 3)^2$$

$$22) (3\sqrt{7} + 4\sqrt{5})^2$$

SIMPLIFY COMPLETELY. MAKE SURE NO RADICALS REMAIN IN DENOMINATORS AND NO FRACTIONS IN RADICALS.

$$23) \frac{\sqrt{x^3 y} \sqrt{x}}{\sqrt{y}} =$$

$$24) \frac{\sqrt{24x} \sqrt{5}}{\sqrt{6}} =$$

$$25) \frac{2}{\sqrt{10}} =$$

$$26) \frac{4}{\sqrt{18}} =$$

$$27) \sqrt{\frac{3a}{x}} =$$

$$28) \frac{3x \sqrt{6y}}{\sqrt{18x}} =$$

$$29) \sqrt{\frac{7x}{98}} =$$

$$30) \frac{\sqrt{50} \sqrt{x}}{\sqrt{5x}} =$$

BONUS: SIMPLIFY $\sqrt[3]{375x^4y^4z^6}$

SHOW ALL WORK ON THIS TEST. REDUCE ALL ANSWERS COMPLETELY. CIRCLE ANSWERS.

1) $\sqrt{100} =$
 $\textcircled{10}$

2) $\sqrt{\frac{49}{121}} =$
 $\textcircled{\frac{7}{11}}$

3) $\sqrt{x^{10}} =$
 $\textcircled{x^5}$

4) $\sqrt{36x^{16}} =$
 $\textcircled{6x^8}$

5) $\sqrt{45} = \sqrt{9 \cdot 5}$
 $\textcircled{3\sqrt{5}}$

6) $\sqrt{75} = \sqrt{25 \cdot 3}$
 $\textcircled{5\sqrt{3}}$

7) $\sqrt{288} =$
 $\frac{\sqrt{144 \cdot 2}}{12\sqrt{2}}$
 $\textcircled{12\sqrt{2}}$

8) $\sqrt{72x^7} = \sqrt{36x^6} \sqrt{2x}$
 $\textcircled{6x^3 \sqrt{2x}}$

9) $\sqrt{98x^8} =$
 $\frac{\sqrt{49x^8} \cdot \sqrt{2}}{7x^4 \sqrt{2}}$
 $\textcircled{7x^4 \sqrt{2}}$

10) $\sqrt{80x^7y^{12}} =$
 $\frac{\sqrt{16x^6y^{12}} \cdot \sqrt{5x}}{4x^3y^6 \sqrt{5x}}$
 $\textcircled{4x^3y^6 \sqrt{5x}}$

11) $\sqrt[3]{80} = \sqrt[3]{8} \cdot \sqrt[3]{10}$
 $= \textcircled{2 \sqrt[3]{10}}$

12) $\sqrt{250} = \sqrt{25 \cdot 10}$
 $= \textcircled{5\sqrt{10}}$

13) $\sqrt[3]{x^{10}} = \sqrt[3]{x^9 \cdot x}$
 $= \textcircled{x^3 \sqrt[3]{x}}$

ADD OR SUBTRACT. SIMPLIFY

14) $\sqrt{28} + \sqrt{63} =$
 $= \sqrt{4 \cdot 7} + \sqrt{9 \cdot 7}$
 $= 2\sqrt{7} + 3\sqrt{7}$
 $= \textcircled{5\sqrt{7}}$

15) $\sqrt{75} + 2\sqrt{27} - 3\sqrt{48}$
 $= \sqrt{25 \cdot 3} + 2\sqrt{9 \cdot 3} - 3\sqrt{16 \cdot 3}$
 $= 5\sqrt{3} + 6\sqrt{3} - 12\sqrt{3}$
 $= \textcircled{-\sqrt{3}}$

MULTIPLY AND SIMPLIFY.

$$\begin{aligned} 16) (4\sqrt{5})(7\sqrt{10}) &= \\ 28\sqrt{50} &= 28 \cdot 5\sqrt{2} \\ &= \boxed{140\sqrt{2}} \end{aligned}$$

$$\begin{aligned} 17) (6\sqrt{15})(2\sqrt{5}) &= \\ 12\sqrt{75} &= 12 \cdot 5\sqrt{3} \\ &= \boxed{60\sqrt{3}} \end{aligned}$$

$$\begin{aligned} 18) \sqrt{\frac{8}{15}} \cdot \sqrt{\frac{1}{2}} &= \\ \sqrt{\frac{4}{15}} &= \frac{2\sqrt{5}}{\sqrt{15}\sqrt{5}} \\ &= \boxed{\frac{2\sqrt{5}}{15}} \end{aligned}$$

$$\begin{aligned} 19) \sqrt{3}(\sqrt{5} - 7) &= \\ \boxed{\sqrt{15} - 7\sqrt{3}} \end{aligned}$$

$$\begin{aligned} 20) (\sqrt{3} - \sqrt{5})(\sqrt{3} + \sqrt{5}) &= \\ = 3 - \sqrt{15} + \sqrt{15} - 5 &= \\ = \boxed{-2} \end{aligned}$$

$$\begin{aligned} 21) (\sqrt{2} - 3)^2 &= \\ (\sqrt{2} - 3)(\sqrt{2} - 3) &= \\ = 2 - 3\sqrt{2} - 3\sqrt{2} + 9 &= \\ = \boxed{11 - 6\sqrt{2}} \end{aligned}$$

$$\begin{aligned} 22) (3\sqrt{7} + 4\sqrt{5})^2 &= \\ (3\sqrt{7} + 4\sqrt{5})(3\sqrt{7} + 4\sqrt{5}) &= \\ = 9 \cdot 7 + 12\sqrt{35} + 12\sqrt{35} + 16 \cdot 5 &= \\ = 63 + 24\sqrt{35} + 80 &= \\ = \boxed{143 + 24\sqrt{35}} \end{aligned}$$

SIMPLIFY COMPLETELY. MAKE SURE NO RADICALS REMAIN IN DENOMINATORS AND NO FRACTIONS IN RADICALS.

$$23) \frac{\sqrt{x^3 y} \sqrt{x}}{\sqrt{y}} = \frac{\sqrt{x^4 y}}{\sqrt{y}} = \sqrt{x^4} = x^2$$

$$24) \frac{\sqrt{24x} \sqrt{5}}{\sqrt{6}} = \frac{\sqrt{24x \cdot 5}}{\sqrt{6}} = 2\sqrt{5x}$$

$$25) \frac{2\sqrt{10}}{\sqrt{10}\sqrt{10}} = \frac{2\sqrt{10}}{10} = \frac{\sqrt{10}}{5}$$

$$26) \frac{4}{\sqrt{18}} = \frac{4\sqrt{2}}{3\sqrt{2}\sqrt{2}} = \frac{4\sqrt{2}}{6} = \frac{2\sqrt{2}}{3}$$

$$27) \sqrt{\frac{3a}{x}} = \frac{\sqrt{3a}\sqrt{x}}{\sqrt{x}\sqrt{x}} = \frac{\sqrt{3ax}}{x}$$

$$28) \frac{3x\sqrt{6y}}{\sqrt{18x}} = \frac{3x\sqrt{6y}\sqrt{x}}{3\sqrt{2x}\sqrt{x}} = \frac{x\sqrt{12xy}}{2x} = \frac{x \cdot 2\sqrt{3xy}}{2x} = \sqrt{3xy}$$

$$29) \sqrt{\frac{7x}{98}} = \frac{\sqrt{7x}}{\sqrt{98}} = \frac{\sqrt{7x}\sqrt{2}}{\sqrt{49 \cdot 2}\sqrt{2}} = \frac{\sqrt{14x}}{7 \cdot 2} = \frac{\sqrt{14x}}{14}$$

$$30) \frac{\sqrt{50}\sqrt{x}}{\sqrt{5x}} = \frac{5\sqrt{2x}\sqrt{x}}{\sqrt{5x}\sqrt{5x}} = \frac{5\sqrt{10x^2}}{5x} = \frac{5x\sqrt{10}}{5x} = \sqrt{10}$$

BONUS: SIMPLIFY $\sqrt[3]{375x^4y^4z^6} = \sqrt[3]{125x^3y^3z^6} = 5x\sqrt[3]{4y^2z^6} = 5x\sqrt[3]{4y^2}z^2$