

YOU MUST SHOW LOGICAL, NEAT AND ORGANIZED WORK TO EARN FULL CREDIT

PUT A BOX AROUND YOUR FINAL ANSWER

Write 81,700,000 in scientific notation.

SCORE: ____ / 4 POINTS

$$\boxed{8.17 \times 10^7}$$

Write 1.97×10^{-5} in standard notation.

SCORE: ____ / 4 POINTS

$$\boxed{0.0000197}$$

Write using fractional and/or negative exponents (where applicable).

SCORE: ____ / 12 POINTS

[a] $(\sqrt[4]{n})^5 = \boxed{n^{\frac{5}{4}}}$

[b] $\frac{1}{\sqrt{p^9}} = \boxed{p^{-\frac{9}{2}}}$

[c] $\sqrt[3]{b^{21}} = b^{\frac{21}{3}} = \boxed{b^3}$

Perform the indicated operations and simplify. Write your final answers using fractional exponents.

SCORE: ____ / 20 POINTS

[a] $\frac{w^{\frac{4}{5}}}{w^{\frac{2}{3}}} = w^{\frac{4}{5} - \frac{2}{3}}$
 $= w^{\frac{12-10}{15}}$
 $= \boxed{w^{\frac{2}{15}}}$

[b] $k^5 k^{\frac{3}{4}} = k^{5 + \frac{3}{4}}$
 $= k^{\frac{20+3}{4}}$
 $= \boxed{k^{\frac{23}{4}}}$

[c] $\frac{\sqrt[4]{s}}{\sqrt[10]{s}} = \frac{s^{\frac{1}{4}}}{s^{\frac{1}{10}}}$
 $= s^{\frac{1}{4} - \frac{1}{10}}$
 $= s^{\frac{5-2}{20}}$
 $= \boxed{s^{\frac{3}{20}}}$

Find the center and radius of the circle $x^2 + y^2 - 10x + 12y + 12 = 0$.

SCORE: ___ / 10 POINTS

$$x^2 - 10x + 25 + y^2 + 12y + 36 = -12 + 25 + 36$$
$$(x-5)^2 + (y+6)^2 = 49$$

CENTER: (5, -6)
RADIUS: 7

Divide. Rationalize the denominator and simplify. Write your final answers using radicals.

SCORE: ___ / 8 POINTS

$$\frac{\sqrt{3}}{\sqrt{54}} = \sqrt{\frac{3}{54}}$$
$$= \sqrt{\frac{1}{18}}$$
$$= \frac{\sqrt{1}}{\sqrt{18}}$$
$$= \frac{1}{3\sqrt{2}}$$
$$= \frac{1}{3\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}}$$
$$= \frac{\sqrt{2}}{6}$$

Solve the equation $m - \sqrt{2m-1} = 2$ using algebra. Check your answer(s).

SCORE: ___ / 14 POINTS

$$-\sqrt{2m-1} = 2-m$$
$$(-\sqrt{2m-1})^2 = (2-m)^2$$
$$2m-1 = 4-4m+m^2$$
$$0 = m^2-6m+5$$
$$0 = (m-1)(m-5)$$

~~m=1~~ or $m=5$

CHECK:

$$m=1: 1 - \sqrt{2(1)-1}$$
$$= 1 - \sqrt{1}$$
$$= 1 - 1$$
$$= 0 \quad \text{NO}$$
$$m=5: 5 - \sqrt{2(5)-1}$$
$$= 5 - \sqrt{9}$$
$$= 5 - 3$$
$$= 2 \quad \text{YES}$$

Perform the indicated operations and simplify. Write your final answers using radicals.

SCORE: ___ / 20 POINTS

[a] $\sqrt{48} + \sqrt{75}$
 $= 4\sqrt{3} + 5\sqrt{3}$
 $= \boxed{9\sqrt{3}}$

[b] $(2\sqrt{5} - \sqrt{6})(3\sqrt{3} + \sqrt{10})$
 $= 6\sqrt{15} + 2\sqrt{50} - 3\sqrt{18} - \sqrt{60}$
 $= 6\sqrt{15} + 10\sqrt{2} - 9\sqrt{2} - 2\sqrt{15}$
 $= \boxed{4\sqrt{15} + \sqrt{2}}$

[c] $\sqrt{2h^5} \sqrt{12h^8}$
 $= \sqrt{24h^{13}}$
 $= \boxed{2h^6 \sqrt{6h}}$

Simplify $\sqrt{72r^7a^9v^8}$. Write your final answer using radicals.

SCORE: ___ / 6 POINTS

$\boxed{6r^3a^4v^4\sqrt{2ra}}$

Rationalize the denominator and simplify. Write your final answers using radicals.

SCORE: ___ / 14 POINTS

[a] $\frac{8}{3\sqrt{10}} = \frac{8}{3\sqrt{10}} \frac{\sqrt{10}}{\sqrt{10}}$
 $= \frac{8\sqrt{10}}{3\sqrt{10} \cdot 10}$
 $= \boxed{\frac{4\sqrt{10}}{15}}$

[b] $\frac{10}{4-\sqrt{11}} = \frac{10}{4-\sqrt{11}} \frac{4+\sqrt{11}}{4+\sqrt{11}}$
 $= \frac{10(4+\sqrt{11})}{16-11}$
 $= \frac{10(4+\sqrt{11})}{5}$
 $= 2(4+\sqrt{11})$
 $= \boxed{8+2\sqrt{11}}$

Find the distance between the points $(7, -8)$ and $(-1, -4)$. Write your final answer in simplest radical form. SCORE: ___ / 8 POINTS

$$\begin{aligned} & \sqrt{(7 - (-1))^2 + (-8 - (-4))^2} \\ &= \sqrt{8^2 + 4^2} \\ &= \sqrt{64 + 16} \end{aligned} \quad \begin{aligned} &= \sqrt{80} \\ &= 4\sqrt{5} \end{aligned}$$

Find the equation of the circle with center $(3, -7)$ and radius 9.

SCORE: ___ / 6 POINTS

$$(x - 3)^2 + (y + 7)^2 = 81$$

Solve the equation $14 - 3\sqrt{g} = 2$ using algebra. Check your answer(s).

SCORE: ___ / 10 POINTS

$$-3\sqrt{g} = -12$$

$$\sqrt{g} = 4$$

$$(\sqrt{g})^2 = 4^2$$

$$g = 16$$

$$\begin{aligned} \text{CHECK: } 14 - 3\sqrt{16} & \\ &= 14 - 3(4) \\ &= 14 - 12 \\ &= 2 \quad \text{YES} \end{aligned}$$

Simplify $\sqrt{180}$.

SCORE: ___ / 5 POINTS

$$6\sqrt{5}$$

$$\begin{array}{r} 2 \overline{) 180} \\ \underline{20} \\ 20 \\ \underline{20} \\ 0 \\ 3 \overline{) 45} \\ \underline{30} \\ 15 \\ \underline{15} \\ 0 \end{array}$$