

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

SCORE: ____ / 8 PTS

[a] $(\sqrt[5]{n})^{20} = n^{\frac{20}{5}} = n^4$

[b] $\frac{1}{\sqrt{p^{25}}} = \frac{1}{p^{\frac{25}{2}}} = p^{-\frac{25}{2}}$

[c] $\sqrt[4]{b^{11}} = b^{\frac{11}{4}}$

Translate the following sentence into an absolute value equation or inequality.

SCORE: ____ / 6 PTS

"x is at least 7 away from -5"

DISTANCE BETWEEN x AND -5 IS GREATER THAN OR EQUAL TO 7

$$|x - (-5)| \geq 7 \rightarrow |x + 5| \geq 7$$

Find the equation of the circle with center (9, -1) and radius 4.

SCORE: ____ / 6 PTS

$$(x - 9)^2 + (y - (-1))^2 = 4^2 \rightarrow (x - 9)^2 + (y + 1)^2 = 16$$

Simplify $\sqrt{54r^9a^{16}v^{11}}$. Write your final answer using radicals.

SCORE: ____ / 6 PTS

$$\sqrt{9r^8a^{16}v^{10}} \sqrt{6rv} = 3r^4a^8v^5\sqrt{6rv}$$

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

SCORE: ____ / 14 PTS

[a] $\sqrt{18g^7} \sqrt{30g^9}$

$$2 \cdot 3 \sqrt{3 \cdot 5} \sqrt{g^{16}} \\ 6\sqrt{15}g^8$$

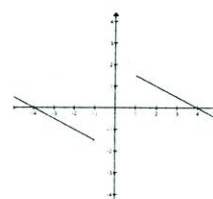
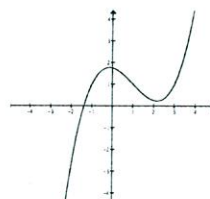
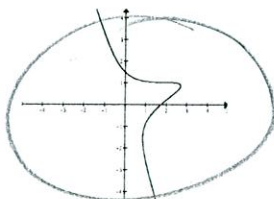
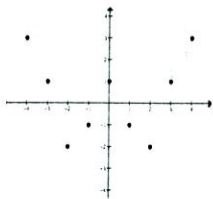
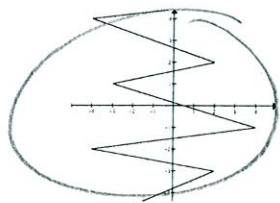
$$\begin{array}{r} 2 \overline{)18} \quad 2 \overline{)30} \\ 3 \overline{)9} \quad 3 \overline{)15} \\ 3 \overline{)3} \quad 5 \overline{)5} \\ 1 \quad 1 \end{array}$$

[b] $(2\sqrt{5} + \sqrt{2})(\sqrt{15} - 4\sqrt{6})$

$$\begin{aligned} & 2\sqrt{75} - 8\sqrt{30} + \sqrt{30} - 4\sqrt{12} \\ & 2(5\sqrt{3}) - 7\sqrt{30} - 4(2\sqrt{3}) \\ & 10\sqrt{3} - 7\sqrt{30} - 8\sqrt{3} \\ & 2\sqrt{3} - 7\sqrt{30} \end{aligned}$$

Circle the **two** graphs below that **DO NOT** represent functions.

SCORE: ____ / 6 PTS



Find the center and radius of the circle $x^2 + y^2 + 12x - 10y + 13 = 0$.

SCORE: ____ / 8 PTS

$$x^2 + 12x + 36 + y^2 - 10y + 25 = -13 + 36 + 25$$

$$(x+6)^2 + (y-5)^2 = 48$$

CENTER $(-6, 5)$

RADIUS $\sqrt{48} = 4\sqrt{3}$

Simplify $\sqrt{686}$.

SCORE: ____ / 6 PTS

$$\begin{array}{r} 2 \overline{) 686} \\ 4 \\ \underline{286} \\ 200 \\ \underline{140} \\ 60 \\ \underline{58} \\ 20 \\ \underline{14} \\ 6 \\ \underline{6} \\ 0 \end{array}$$

$$7\sqrt{14}$$

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

SCORE: ____ / 10 PTS

[a] $\frac{\sqrt[6]{w}}{\sqrt[10]{w}} = \frac{w^{\frac{1}{6}}}{w^{\frac{1}{10}}}$

$$= w^{\frac{1}{6} - \frac{1}{10}}$$

$$= w^{\frac{5-3}{30}}$$

$$= w^{\frac{2}{30}} = w^{\frac{1}{15}}$$

[b] $k^{\frac{2}{3}} k^6 = k^{\frac{2}{3} + 6}$

$$= k^{\frac{20}{3}}$$

Find the distance between the points $(-5, -3)$ and $(3, -7)$. Write your final answer using radicals.

SCORE: ____ / 6 PTS

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

$$= \sqrt{8^2 + (-4)^2}$$

$$= \sqrt{80} = 4\sqrt{5}$$

Solve the equation $17 - 4\sqrt{1-h} = 5$ using algebra. Check your answer(s).

SCORE: ____ / 8 PTS

$$\begin{aligned} -4\sqrt{1-h} &= -12 \\ \sqrt{1-h} &= 3 \\ 1-h &= 9 \\ \boxed{h} &= \boxed{-8} \end{aligned}$$

$$\begin{aligned} 17 - 4\sqrt{1-h} &= 5 \\ &= 17 - 4\sqrt{9} \\ &= 17 - 4(3) \\ &= 17 - 12 \\ &= 5 \quad \checkmark \end{aligned}$$

Rationalize the denominator and simplify.

SCORE: ____ / 12 PTS

[a] $\frac{14}{5\sqrt{21}} \cdot \frac{\sqrt{21}}{\sqrt{21}}$

$$\begin{aligned} &= \frac{14\sqrt{21}}{5(21)} \\ &= \frac{2\sqrt{21}}{15} \end{aligned}$$

[b] $\frac{15}{4+\sqrt{10}} \cdot \frac{4-\sqrt{10}}{4-\sqrt{10}}$

$$\begin{aligned} &= \frac{15(4-\sqrt{10})}{16-10} \\ &= \frac{15(4-\sqrt{10})}{6} = \frac{5(4-\sqrt{10})}{2} \end{aligned}$$

If $f(x) = 2x^2 - 5x - 7$, find $f(a-3)$.

SCORE: ____ / 8 PTS

$$\begin{aligned} &2(a-3)^2 - 5(a-3) - 7 \\ &= 2(a^2 - 6a + 9) - 5a + 15 - 7 \\ &= 2a^2 - 12a + 18 - 5a + 15 - 7 \\ &= 2a^2 - 17a + 26 \end{aligned}$$

The equation $9 - |13 - 5x| = 6$ has two solutions. One solution is $x = 2$. Find the other solution.

SCORE: ____ / 8 PTS

Check your answer.

$$\begin{aligned} -|13 - 5x| &= -3 \\ |13 - 5x| &= 3 \\ 13 - 5x &= 3 \text{ or } 13 - 5x = -3 \\ -5x &= -10 & -5x &= -16 \\ x &= 2 & \boxed{x} &= \boxed{\frac{16}{5}} \end{aligned}$$

$$\begin{aligned} &9 - |13 - 5(\frac{16}{5})| \\ &= 9 - |13 - 16| \\ &= 9 - |-3| \\ &= 9 - 3 \\ &= 6 \quad \checkmark \end{aligned}$$

Divide. Rationalize the denominator and simplify.

SCORE: ____ / 6 PTS

$$\frac{\sqrt{6}}{\sqrt{108}} = \frac{\sqrt{6}}{\sqrt{6} \sqrt{18}} = \frac{1}{\sqrt{18}} = \frac{1}{3\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{\sqrt{2}}{6}$$

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

$$\text{or } \frac{\sqrt{6}}{\sqrt{108}} \cdot \frac{\sqrt{108}}{\sqrt{108}} = \frac{\sqrt{648}}{108} = \frac{18\sqrt{2}}{108} = \frac{\sqrt{2}}{6}$$

$$\begin{array}{r} 2 \overline{) 648} \\ 2 \overline{) 324} \\ 2 \overline{) 162} \\ 3 \overline{) 81} \\ 3 \overline{) 27} \\ 3 \overline{) 9} \\ 3 \overline{) 3} \\ 1 \end{array}$$

Solve the equation $m + \sqrt{26 - 5m} = 4$ using algebra. Check your answer(s).

SCORE: ____ / 12 PTS

$$\sqrt{26 - 5m} = 4 - m$$

$$26 - 5m = (4 - m)^2$$

$$26 - 5m = 16 - 8m + m^2$$

$$0 = m^2 - 3m - 10$$

$$0 = (m - 5)(m + 2)$$

$$m = 5 \text{ or } \boxed{m = -2}$$

$$\begin{aligned} m = 5: & 5 + \sqrt{26 - 5(5)} \\ & = 5 + \sqrt{1} \\ & = 5 + 1 \\ & = 6 \quad \times \end{aligned}$$

$$\begin{aligned} m = -2: & -2 + \sqrt{26 - 5(-2)} \\ & = -2 + \sqrt{36} \\ & = -2 + 6 \\ & = 4 \quad \checkmark \end{aligned}$$

Solve $|8 - 3x| \geq 2$.



SCORE: ____ / 10 PTS

$$8 - 3x \leq -2 \text{ or } 8 - 3x \geq 2$$

$$-3x \leq -10 \text{ or } -3x \geq -6$$

$$x \geq \frac{10}{3} \text{ or } x \leq 2$$

$$x \leq 2 \text{ or } x \geq \frac{10}{3}$$