Name you asked to be called: _____

SCORE: _____ / 140 POINTS

➡ **YOU MUST SHOW LOGICAL, NEAT AND ORGANIZED WORK TO EARN FULL CREDIT (NO GUESS & CHECK)**
➡ **IT MUST BE CLEAR HOW YOU ARRIVED AT YOUR ANSWER**
➡ **PUT A BOX AROUND YOUR FINAL ANSWER**
➡ **ALL FINAL ANSWERS WHICH ARE RADICALS MUST BE SIMPLIFIED**
➡ **ALL FRACTIONS MUST BE IN SIMPLEST FORM**

Write using fractional and/or negative exponents (where applicable).   **SCORE: ___ / 8 POINTS**

[a] $(\sqrt[6]{n})^{24} = n^4$

[b] $\sqrt[5]{b^{13}} = b^{\frac{13}{5}}$

[c] $\dfrac{1}{\sqrt{p^9}} = p^{-\frac{9}{2}}$

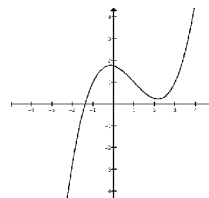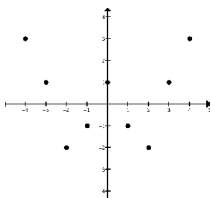Find the equation of the circle with center $(-4, 16)$ and radius 9.   **SCORE: ___ / 6 POINTS**

$$(x - (-4))^2 + (y - 16)^2 = 9^2$$
$$(x + 4)^2 + (y - 16)^2 = 81$$

Circle the **two** graphs below that represent functions.   **SCORE: ___ / 6 POINTS**

Simplify $\sqrt{60 r^{16} a^{13} v^9}$. **Write your final answer using radicals.**   **SCORE: ___ / 6 POINTS**

$$2 r^8 a^6 v^4 \sqrt{15 a v}$$

Simplify $\sqrt{588}$.   **SCORE: ___ / 6 POINTS**

$$588 = 2 \times 2 \times 3 \times 7 \times 7$$
$$\sqrt{588} = 2 \times 7\sqrt{3} = 14\sqrt{3}$$

Find the center and radius of the circle $x^2 + y^2 - 14x + 12y + 4 = 0$.   **SCORE: ___ / 8 POINTS**

$$x^2 - 14x + y^2 + 12y = -4$$
$$x^2 - 14x + 49 + y^2 + 12y + 36 = -4 + 49 + 36$$
$$(x-7)^2 + (y+6)^2 = 81$$

CENTER $= (7, -6)$
RADIUS $= 9$

Perform the indicated operations and simplify. **Write your final answers using radicals.**   **SCORE: ___ / 14 POINTS**

[a] $\sqrt{10g^5}\,\sqrt{15g^{11}}$ [b] $(4\sqrt{5}+\sqrt{3})(\sqrt{6}-2\sqrt{10})$

$= \sqrt{150g^{16}}$ $= 4\sqrt{30} - 8\sqrt{50} + \sqrt{18} - 2\sqrt{30}$
$= 5g^8\sqrt{6}$ $= 4\sqrt{30} - 8(5\sqrt{2}) + 3\sqrt{2} - 2\sqrt{30}$
      $= 2\sqrt{30} - 40\sqrt{2} + 3\sqrt{2}$
      $= 2\sqrt{30} - 37\sqrt{2}$

Perform the indicated operations and simplify. **Write your final answers using fractional exponents.**   **SCORE: ___ / 8 POINTS**

[a] $\dfrac{\sqrt[6]{w}}{\sqrt[15]{w}}$ [b] $k^8 k^{\frac{5}{6}}$

$= \dfrac{w^{\frac{1}{6}}}{w^{\frac{1}{15}}}$ $= k^{8+\frac{5}{6}}$

$= w^{\frac{1}{6}-\frac{1}{15}}$ $\quad = w^{\frac{1}{10}}$ $= k^{\frac{53}{6}}$

Rationalize the denominator and simplify.   **SCORE: ___ / 12 POINTS**

[a] $\dfrac{10}{7\sqrt{15}}$ [b] $\dfrac{33}{6+\sqrt{14}}$

$= \dfrac{10}{7\sqrt{15}}\dfrac{\sqrt{15}}{\sqrt{15}}$ $= \dfrac{33}{6+\sqrt{14}}\dfrac{6-\sqrt{14}}{6-\sqrt{14}}$

$= \dfrac{10\sqrt{15}}{7(15)}$ $= \dfrac{33(6-\sqrt{14})}{36-14}$

$= \dfrac{2\sqrt{15}}{7(3)}$ $= \dfrac{2\sqrt{15}}{21}$ $= \dfrac{33(6-\sqrt{14})}{22}$ $= \dfrac{3(6-\sqrt{14})}{2}$

Find the distance between the points $(-6, -3)$ and $(1, -4)$. **Write your final answer using radicals.** $\qquad$ **SCORE: ___ / 6 POINTS**

$$\sqrt{(1-(-6))^2 + (-4-(-3))^2} \;=\; \sqrt{7^2 + (-1)^2} \;=\; \sqrt{49+1} \;=\; \sqrt{50} \;=\; 5\sqrt{2}$$

Divide. Rationalize the denominator and simplify. $\qquad$ **SCORE: ___ / 6 POINTS**

$$\frac{\sqrt{56}}{\sqrt{21y}}$$

$$= \frac{\sqrt{7}\sqrt{8}}{\sqrt{7}\sqrt{3y}} \;=\; \frac{\sqrt{8}}{\sqrt{3y}} \;=\; \frac{2\sqrt{2}}{\sqrt{3y}} \;=\; \frac{2\sqrt{2}\,\sqrt{3y}}{\sqrt{3y}\,\sqrt{3y}} \;=\; \frac{2\sqrt{6y}}{3y}$$

Translate the following sentence into an absolute value equation or inequality. $\qquad$ **SCORE: ___ / 6 POINTS**

" x is no more than 8 away from 4 "

The distance between x and 4 is less than or equal to 8

$$|x-4| \le 8$$

If $f(x) = 2x^2 - 5x - 6$, find $f(a-4)$. $\qquad$ **SCORE: ___ / 8 POINTS**

$$2(a-4)^2 - 5(a-4) - 6$$
$$= 2(a^2 - 8a + 16) - 5a + 20 - 6$$
$$= 2a^2 - 16a + 32 - 5a + 20 - 6$$
$$= 2a^2 - 21a + 46$$

The equation $7 - |11 - 3x| = 2$ has two solutions. One solution is $x = 2$. Find the other solution. $\qquad$ **SCORE: ___ / 8 POINTS**
Check your answer.

$$-|11-3x| = -5$$

CHECK:

$$|11-3x| = 5$$

$$7 - \left|11 - 3\left(\frac{16}{3}\right)\right| \;=\; 7 - |11-16| \;=\; 7 - |-5| \;=\; 7 - 5 \;=\; 2$$

$11 - 3x = 5$	OR	$11 - 3x = -5$
$-3x = -6$	OR	$-3x = -16$
$x = 2$	OR	$\boxed{x = \dfrac{16}{3}}$

Solve the equation $11 - 3\sqrt{2-h} = 5$ using algebra. **Check your answer(s).**

$$-3\sqrt{2-h} = -6$$
$$\sqrt{2-h} = 2$$
$$2 - h = 4$$
$$-h = 2$$
$$\boxed{h = -2}$$

CHECK:
$$11 - 3\sqrt{2-(-2)} \;=\; 11 - 3\sqrt{4} \;=\; 11 - 3(2) \;=\; 11 - 6 \;=\; 5$$

Solve the equation $m + \sqrt{16-5m} = 2$ using algebra. **Check your answer(s).**

$$\sqrt{16-5m} = 2 - m$$
$$16 - 5m = (2-m)^2$$
$$16 - 5m = 4 - 4m + m^2$$
$$0 = m^2 + m - 12$$
$$0 = (m-3)(m+4)$$
$$m = 3 \ \text{OR} \ \boxed{m = -4}$$

CHECK:
$$m = 3$$
$$3 + \sqrt{16-5(3)} \;=\; 3 + \sqrt{16-15} \;=\; 3 + \sqrt{1} \;=\; 3 + 1 \;=\; 4$$
$$m = -4$$
$$-4 + \sqrt{16-5(-4)} \;=\; -4 + \sqrt{16+20} \;=\; -4 + \sqrt{36} \;=\; -4 + 6 \;=\; 2$$

Solve $|7 - 4x| \geq 5$.

The distance between 7 and $4x$ is greater than or equal to 5 OR $7 - 4x \leq -5$ OR $7 - 4x \geq 5$
$4x \leq 2$ OR $4x \geq 12$ $-4x \leq -12$ OR $-4x \geq -2$
$x \leq \dfrac{1}{2}$ OR $x \geq 3$ $x \leq \dfrac{1}{2}$ OR $x \geq 3$