

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

PUT A BOX AROUND YOUR FINAL ANSWER

- [1] Write using fractional and/or negative exponents.

SCORE: \_\_\_\_ / 6 POINTS

[a]  $\sqrt[3]{n^7} = n^{\frac{7}{3}}$

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

- [2] Perform any indicated operations and simplify. Write your final answers using radicals.

SCORE: \_\_\_\_ / 35 POINTS

[a]  $\sqrt{10h^7} \sqrt{6h^4}$   
 $= \sqrt{60h^{11}}$   
 $= 2h^5 \sqrt{15h}$

[b]  $\sqrt{75x^9} - 4x^2 \sqrt{27x^5}$   
 $= 5x^4 \sqrt{3x} - 4x^2 (3x^2 \sqrt{3x})$   
 $= 5x^4 \sqrt{3x} - 12x^4 \sqrt{3x}$   
 $= -7x^4 \sqrt{3x}$

[c]  $\sqrt{6}(4\sqrt{2} - \sqrt{15})$   
 $= 4\sqrt{12} - \sqrt{90}$   
 $= 4(2\sqrt{3}) - 3\sqrt{10}$   
 $= 8\sqrt{3} - 3\sqrt{10}$

[d]  $\sqrt{72c^9t^{10}y^3}$   
 $= 6c^4t^5y \sqrt{2cy}$

[e]  $\sqrt{45} + \sqrt{80}$   
 $= 3\sqrt{5} + 4\sqrt{5}$   
 $= 7\sqrt{5}$

- [3] Find the distance between the points  $(5, -7)$  and  $(-1, -3)$ .

SCORE: \_\_\_ / 6 POINTS

Write your final answer in simplest radical form.

$$\begin{aligned} d &= \sqrt{(5 - (-1))^2 + (-7 - (-3))^2} \\ &= \sqrt{6^2 + (-4)^2} \\ &= \sqrt{36 + 16} = \sqrt{52} = \boxed{2\sqrt{13}} \end{aligned}$$

- [4] Rationalize the denominator and simplify. Write your final answers using radicals.

SCORE: \_\_\_ / 14 POINTS

[a]  $\frac{\sqrt{7}}{\sqrt{140}}$

$$\begin{aligned} &= \sqrt{\frac{7}{140}} \\ &= \sqrt{\frac{1}{20}} \\ &= \frac{1}{\sqrt{20}} \end{aligned}$$

$$\begin{aligned} &= \frac{1}{2\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}} \\ &= \boxed{\frac{\sqrt{5}}{10}} \end{aligned}$$

[b]  $\frac{8}{4 - \sqrt{10}}$

$$\begin{aligned} &= \frac{8}{4 - \sqrt{10}} \cdot \frac{4 + \sqrt{10}}{4 + \sqrt{10}} \\ &= \frac{8(4 + \sqrt{10})}{16 - 10} \\ &= \frac{8(4 + \sqrt{10})}{6} = \frac{4 \cdot 8(4 + \sqrt{10})}{3 \cdot 2} = \boxed{\frac{16 + 4\sqrt{10}}{3}} \end{aligned}$$

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

SCORE: \_\_\_ / 10 POINTS

$$\begin{aligned} -2\sqrt{3 - 2j} &= -6 \\ \sqrt{3 - 2j} &= 3 \\ 3 - 2j &= 9 \\ -2j &= 6 \\ j &= \boxed{-3} \end{aligned}$$

CHECK:  $11 - 2\sqrt{3 - 2(-3)}$

$$\begin{aligned} &= 11 - 2\sqrt{9} \\ &= 11 - 2(3) \\ &= 11 - 6 \\ &= 5 \checkmark \end{aligned}$$

- [6] Simplify. Write your final answers using fractional exponents.

SCORE: \_\_\_ / 10 POINTS

[a]  $\frac{\sqrt[4]{s}}{\sqrt[6]{s}}$

$$\begin{aligned} &= \frac{s^{\frac{1}{4}}}{s^{\frac{1}{6}}} \\ &= s^{\frac{1}{4} - \frac{1}{6}} \\ &= s^{\frac{3}{12} - \frac{2}{12}} \\ &= \boxed{s^{\frac{1}{12}}} \end{aligned}$$

[b]  $k^{\frac{2}{3}} k^{\frac{3}{5}}$

$$\begin{aligned} &= k^{\frac{2}{3} + \frac{3}{5}} \\ &= k^{\frac{10}{15} + \frac{9}{15}} \\ &= \boxed{k^{\frac{19}{15}}} \end{aligned}$$



[7] If  $f(x) = 2 - 4\sqrt{1-x}$ , find  $f(-3)$ .

SCORE: \_\_\_ / 4 POINTS

$$\begin{aligned} f(-3) &= 2 - 4\sqrt{1-(-3)} \\ &= 2 - 4\sqrt{4} \\ &= 2 - 4(2) \\ &= 2 - 8 \\ &= -6 \end{aligned}$$

[8] Find the domain of  $f(x) = 3 - \frac{2}{5x+4}$ .

SCORE: \_\_\_ / 6 POINTS

$$\begin{aligned} 5x+4 &\neq 0 \\ 5x &\neq -4 \\ x &\neq -\frac{4}{5} \end{aligned}$$

[9] Find the range of  $f(x) = 6 - \sqrt{5-x}$ .

SCORE: \_\_\_ / 7 POINTS

$$\begin{aligned} \sqrt{5-x} &\geq 0 \\ -\sqrt{5-x} &\leq 0 \\ 6 - \sqrt{5-x} &\leq 6 \\ y &\leq 6 \end{aligned}$$

[10] If  $f(x) = 4 - 2x - x^2$ , find  $f(a-3)$ . Simplify your answer.

SCORE: \_\_\_ / 7 POINTS

$$\begin{aligned} f(a-3) &= 4 - 2(a-3) - (a-3)^2 \\ &= 4 - 2a + 6 - (a^2 - 6a + 9) \\ &= 4 - 2a + 6 - a^2 + 6a - 9 \\ &= -a^2 + 4a + 1 \end{aligned}$$

[11] Find the inverse of  $f(x) = 7 + \sqrt{5-x}$ .

SCORE: \_\_\_ / 7 POINTS

$$y = 7 + \sqrt{5-x}$$

$$y - 7 = \sqrt{5-x}$$

$$(y-7)^2 = 5-x$$

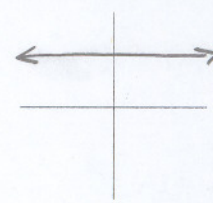
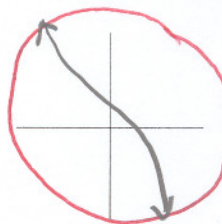
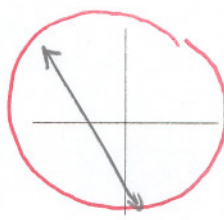
$$(y-7)^2 - 5 = -x$$

$$5 - (y-7)^2 = x = f^{-1}(y)$$

$$f^{-1}(x) = 5 - (x-7)^2$$

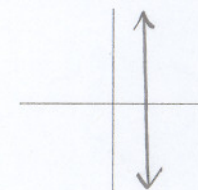
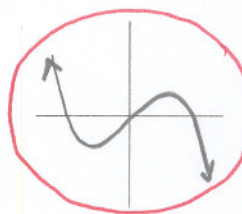
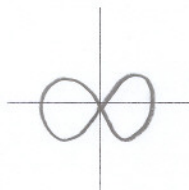
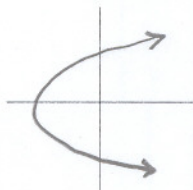
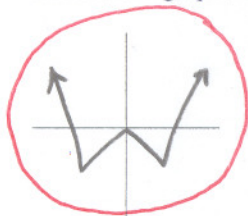
[12] Circle the 2 graphs which represent one-to-one functions.

SCORE: \_\_\_ / 4 POINTS



[13] Circle the 2 graphs which represent functions.

SCORE: \_\_\_ / 4 POINTS



[14] Sketch the inverse of the function shown below.

SCORE: \_\_\_ / 5 POINTS

