

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

Find the distance between the points $(1, -3)$ and $(-2, -9)$. Write your final answer using radicals.

SCORE: ____ / 6 POINTS

$$\sqrt{(-2-1)^2 + (-9-(-3))^2} = \sqrt{(-3)^2 + (-6)^2} = \sqrt{9+36} = \sqrt{45} = 3\sqrt{5}$$

Divide. Rationalize the denominator and simplify.

SCORE: ____ / 6 POINTS

$$\frac{\sqrt{21}}{\sqrt{56x}} = \frac{\sqrt{7}\sqrt{3}}{\sqrt{7}\sqrt{8x}} = \frac{\sqrt{3}}{\sqrt{8x}} = \frac{\sqrt{3}}{2\sqrt{2x}} = \frac{\sqrt{3}}{2\sqrt{2x}} \frac{\sqrt{2x}}{\sqrt{2x}} = \frac{\sqrt{6x}}{4x}$$

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

SCORE: ____ / 6 POINTS

“ x is no less than 9 away from 5”

The distance between x and 5 is greater than or equal to 9

$$|x - 5| \geq 9$$

If $f(x) = 2x^2 - 6x - 5$, find $f(a - 3)$.

SCORE: ____ / 8 POINTS

$$\begin{aligned} & 2(a - 3)^2 - 6(a - 3) - 5 \\ &= 2(a^2 - 6a + 9) - 6a + 18 - 5 \\ &= 2a^2 - 12a + 18 - 6a + 18 - 5 \\ &= 2a^2 - 18a + 31 \end{aligned}$$

The equation $5 - |9 - 3x| = 2$ has two solutions. One solution is $x = 2$. Find the other solution.

SCORE: ____ / 8 POINTS

Check your answer.

$$-|9 - 3x| = -3$$

$$|9 - 3x| = 3$$

$$9 - 3x = 3 \quad \text{OR} \quad 9 - 3x = -3$$

$$-3x = -6 \quad \text{OR} \quad -3x = -12$$

$$x = 2 \quad \text{OR} \quad x = 4$$

CHECK:

$$5 - |9 - 3(4)| = 5 - |9 - 12| = 5 - |-3| = 5 - 3 = 2$$

Solve the equation $13 - 4\sqrt{1 - h} = 5$ using algebra. Check your answer(s).

SCORE: ____ / 10 POINTS

$$-4\sqrt{1 - h} = -8$$

$$\sqrt{1 - h} = 2$$

$$1 - h = 4$$

$$-h = 3$$

$$h = -3$$

CHECK:

$$13 - 4\sqrt{1 - (-3)} = 13 - 4\sqrt{4} = 13 - 4(2) = 13 - 8 = 5$$

Solve the equation $m + \sqrt{7 - 2m} = 2$ using algebra. Check your answer(s).

SCORE: ____ / 12 POINTS

$$\sqrt{7 - 2m} = 2 - m$$

$$7 - 2m = (2 - m)^2$$

$$7 - 2m = 4 - 4m + m^2$$

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

$$0 = (m - 3)(m + 1)$$

$$m = 3 \text{ OR } m = -1$$

CHECK:

$$m = 3$$

$$3 + \sqrt{7 - 2(3)} = 3 + \sqrt{7 - 6} = 3 + \sqrt{1} = 3 + 1 = 4$$

$$m = -1$$

$$-1 + \sqrt{7 - 2(-1)} = -1 + \sqrt{7 + 2} = -1 + \sqrt{9} = -1 + 3 = 2$$

Solve $|11 - 2x| \geq 3$.

SCORE: ____ / 10 POINTS

The distance between 11 and $2x$ is greater than or equal to 3
 $2x \leq 8$ OR $2x \geq 14$
 $x \leq 4$ OR $x \geq 7$

OR $11 - 2x \leq -3$ OR $11 - 2x \geq 3$
 $-2x \leq -14$ OR $-2x \geq -8$
 $x \geq 7$ OR $x \leq 4$

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

SCORE: ____ / 8 POINTS

[a] $(\sqrt[3]{n})^8 = n^{\frac{8}{3}}$

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

[c] $\frac{1}{\sqrt[6]{n^{24}}} = n^{-\frac{24}{6}} = n^{-4}$

Find the equation of the circle with center $(25, -1)$ and radius 4.

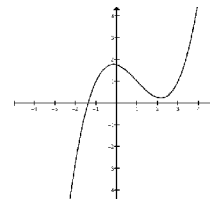
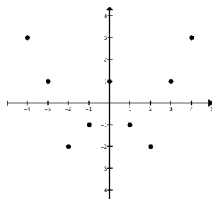
SCORE: ____ / 6 POINTS

$$(x - 25)^2 + (y - (-1))^2 = 4^2$$

$$(x - 25)^2 + (y + 1)^2 = 16$$

Circle the **two** graphs below that represent functions.

SCORE: ____ / 6 POINTS



Simplify $\sqrt{56r^9a^{16}v^{11}}$. Write your final answer using radicals.

SCORE: ____ / 6 POINTS

$$2r^4a^8v^5\sqrt{14rv}$$

Simplify $\sqrt{504}$.

SCORE: ____ / 6 POINTS

$$504 = 2 \times 2 \times 2 \times 3 \times 3 \times 7$$

$$\sqrt{504} = 2 \times 3 \sqrt{2 \times 7} = 6\sqrt{14}$$

Find the center and radius of the circle $x^2 + y^2 - 10x + 18y + 42 = 0$.

SCORE: ____ / 8 POINTS

$$x^2 - 10x + y^2 + 18y = -42$$

$$x^2 - 10x + 25 + y^2 + 18y + 81 = -42 + 25 + 81$$

$$(x - 5)^2 + (y + 9)^2 = 64$$

$$\text{CENTER} = (5, -9)$$

$$\text{RADIUS} = 8$$

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

SCORE: ____ / 14 POINTS

[a] $\sqrt{6g^{11}} \sqrt{21g^9}$

$$= \sqrt{126g^{20}}$$

$$= 3g^{10} \sqrt{14}$$

[b] $(\sqrt{5} + 4\sqrt{2})(3\sqrt{6} - \sqrt{15})$

$$= 3\sqrt{30} - \sqrt{75} + 12\sqrt{12} - 4\sqrt{30}$$

$$= 3\sqrt{30} - 5\sqrt{3} + 12(2\sqrt{3}) - 4\sqrt{30}$$

$$= -5\sqrt{3} + 24\sqrt{3} - \sqrt{30}$$

$$= 19\sqrt{3} - \sqrt{30}$$

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

SCORE: ____ / 8 POINTS

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

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

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

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

[b] $k^6 k^{\frac{3}{8}}$

$$= k^{6 + \frac{3}{8}}$$

$$= k^{\frac{51}{8}}$$

Rationalize the denominator and simplify.

SCORE: ____ / 12 POINTS

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

$$= \frac{14}{5\sqrt{21}} \frac{\sqrt{21}}{\sqrt{21}}$$

$$= \frac{14\sqrt{21}}{5(21)}$$

$$= \frac{2\sqrt{21}}{5(3)} = \frac{2\sqrt{21}}{15}$$

[b] $\frac{15}{7 + \sqrt{13}}$

$$= \frac{15}{7 + \sqrt{13}} \frac{7 - \sqrt{13}}{7 - \sqrt{13}}$$

$$= \frac{15(7 - \sqrt{13})}{49 - 13}$$

$$= \frac{15(7 - \sqrt{13})}{36} = \frac{5(7 - \sqrt{13})}{12}$$