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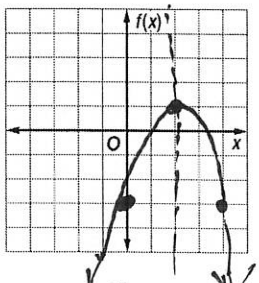
Unit 2 Review

(Chapters 3-4)

SCORE

For Questions 1–7, simplify. Assume that no denominator equals 0.

1. $(7x^2 + 3x - 9) - (-x^2 + 8x - 3)$ → 1. $8x^2 - 5x - 6$
2. $5x^3(7x)^2$ → 2. $245x^5$
3. $(2x - 3)^2$ → 3. $4x^2 - 12x + 9$
4. $\frac{8y^3+27}{2xy - 10y + 3x - 15}$ → 4. $\frac{4y^2+6y+9}{x-5}$
5. $\sqrt{16x^2y^4}$ → 5. $4xy^2$
6. $\sqrt{12} - \sqrt{18} + 3\sqrt{50} + \sqrt{75}$ → 6. $9\sqrt{3} + 12\sqrt{2}$
7. $\frac{2+i}{1-3i}$ → 7. $-\frac{1}{10} + \frac{7}{10}i$
8. Use synthetic division to find $(2x^3 - 5x^2 + 7x - 1) \div (x - 1)$. → 8. $2x^2 - 3x + 4 + \frac{3}{x-1}$
9. Write the expression $m^{\frac{7}{9}}$ in radical form. → 9. $\sqrt[9]{m^7}$
10. Solve $\sqrt{3x + 6} + 4 \leq 7$. → 10. $x \leq 1$
11. Graph $f(x) = -x^2 + 4x - 3$, labeling the y-intercept, vertex, and axis of symmetry. → 11.



12. The shape of a supporting arch can be modeled by $h(x) = -0.03x^2 + 3x$, where $h(x)$ represents the height of the arch and x represents the horizontal distance from one end of the base of the arch in meters. Find the maximum height of the arch. → 12. $h(50) = 75$
13. Solve $2x^2 = 3x + 2$ by ~~graphing~~. If exact roots cannot be found, state the consecutive integers between which the roots are located. → 13. $x = 2, -\frac{1}{2}$
14. Solve $x^2 - 2x = 24$ by factoring. → 14. $x = -4, 6$
15. Write a quadratic equation with $-\frac{3}{4}$ and 4 as its roots. Write the equation in the form $ax^2 + bx + c = 0$, where a, b, and c are integers. → 15. $4x^2 - 13x - 12$
16. Find the exact solutions to $6x^2 + x + 4 = 0$ by using the Quadratic Formula. → 16. no real solution
17. Find the value of the discriminant for $9x^2 + 1 = 6x$. Then describe the number and type of roots for the equation. → 17. 1 real solution rational

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Unit 2 Review *(continued)*

18. Identify the vertex, axis of symmetry, and direction of opening for $y = 2(x + 3)^2 - 5$.

18. opens up; axis $x = -3$; vertex $(-3, -5)$

19. Write $y = -4x^2 + 8x - 1$ in vertex form.

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

19. $y = -4(x-1)^2 + 3$

20. Graph $y > x^2 - 2x + 1$.

$y > (x-1)^2$ test $(0,0)$ $0 > 1$ false

20.

For Questions 21 and 22, use the matrices below.

$$A = \begin{bmatrix} 17 & 2 & 3 \\ 11 & 4 & -9 \end{bmatrix} \quad B = \begin{bmatrix} 10 & 6 & -7 \\ -4 & 3 & 0 \end{bmatrix} \quad C = \begin{bmatrix} -1 \\ 2 \\ -2 \end{bmatrix}$$

21. Find $A - B$.

$\begin{bmatrix} 7 & -4 & 10 \\ 15 & 1 & -9 \end{bmatrix}$

21.

22. Find BC, if possible.

$\begin{bmatrix} -10 & +12 & -14 \\ 10(-1) + 6(2) + (-7)(-2) \\ (-4)(-1) + (3)(2) + (0)(-2) \end{bmatrix} = \begin{bmatrix} -4 \\ 10 \\ 4 + 6 + 0 \end{bmatrix}$

22.

23. Solve the system of inequalities by graphing.

$4x - y \geq 4$

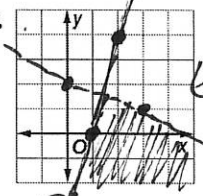
$3y < -x + 6$

x	y
1	0
2	4

Test (0,0) false

x	y
0	2
3	1

Test (0,0). $0 < 6$ true



23.

24. Evaluate $\begin{vmatrix} 12 & 5 & -2 \\ -3 & 0 & 1 \\ -5 & 4 & 2 \end{vmatrix}$ using diagonals.

$12 \cdot 0 \cdot 2 + 5 \cdot 1 \cdot (-5) + (-2)(-3)(4)$

$0 - 25 + 24$

-1

24.

25. Use Cramer's Rule to set up the solution for y of equations $3x - 5y = 21$ and $4x + 2y = 2$. *Do not solve.*

$4x + 2y = 2$

$y = \begin{vmatrix} 3 & 21 \\ 4 & 2 \end{vmatrix}$

$\begin{vmatrix} 3 & -5 \\ 4 & 2 \end{vmatrix}$

25.

26. Solve the matrix equation $\begin{bmatrix} 4 & -5 \\ 1 & 2 \end{bmatrix} \cdot \begin{bmatrix} m \\ n \end{bmatrix} = \begin{bmatrix} 32 \\ -5 \end{bmatrix}$ using ~~the inverse matrices~~. OR...

$2(4m - 5n = 32)$ then solve...

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

$8m - 10n = 64$

$5m + 10n = -25$

$13m = 39$

$m = 3$

$4(3) - 5n = 32$

$12 - 5n = 32$

$-5n = 20$

$n = -4$

26. $(3, -4)$