

Instructional Materials for WCSD Math Common Finals

The Instructional Materials are for student and teacher use and are aligned to the 2021-2022 Course Guides for the following courses:

High School Algebra 1 S2

- #2202 Algebra 1 S2
- #7770 Foundations in Algebra 1 S2

Middle School Algebra 1 S2

- #228 Algebra 1 (Semester 2)
- #217B VMS ALG 1 S2
- #776 ACCEL Algebra 1

#1-7
#8-14
#15-21
#22-28
#29-35
#36-42
#43-49
#50-53

When used as test practice, success on the Instructional Materials does not guarantee success on the district math common final or the Nevada End of Course Exam.

Students can use these Instructional Materials to become familiar with the format and language used on the district common finals. Familiarity with standards and vocabulary as well as interaction with the types of problems included in the Instructional Materials can result in less anxiety on the part of the students. The length of the actual final exam may differ in length from the Instructional Materials.

Teachers can use the Instructional Materials in conjunction with the course guides to ensure that instruction and content is aligned with what will be assessed. The Instructional Materials are not representative of the depth or full range of learning that should occur in the classroom.

Algebra 1 Reference Sheet

Note: You may use these formulas throughout this entire test.

Linear

Slope $m = \frac{y_2 - y_1}{x_2 - x_1}$

Midpoint $M = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$

Distance $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

Slope-Intercept Form $y = mx + b$

Quadratic

Vertex-Form $y = a(x - h)^2 + k$

Standard Form $y = ax^2 + bx + c$

Intercept Form $y = a(x - p)(x - q)$

Exponential

(h, k) Form $y = ab^{x-h} + k$

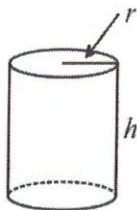
Probability

$P(A \text{ and } B) = P(A) \cdot P(B)$

$P(A \text{ and } B) = P(A) \cdot P(B|A)$

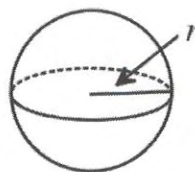
$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$

Volume and Surface Area



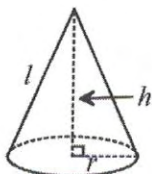
$$V = \pi r^2 h$$

$$SA = 2(\pi r^2) + h(2\pi r)$$



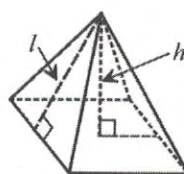
$$V = \frac{4}{3} \pi r^3$$

$$SA = 4\pi r^2$$



$$V = \frac{1}{3} \pi r^2 h$$

$$SA = \pi r^2 + \frac{1}{2} (2\pi r \cdot l)$$

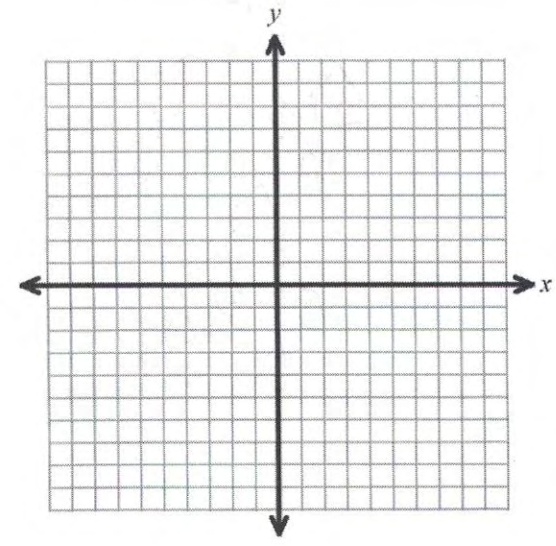
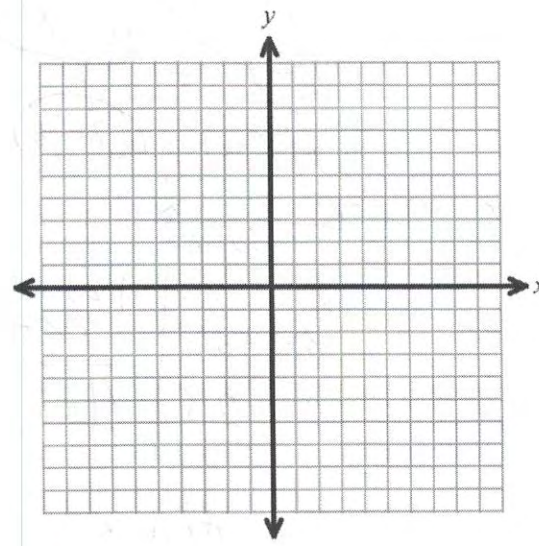
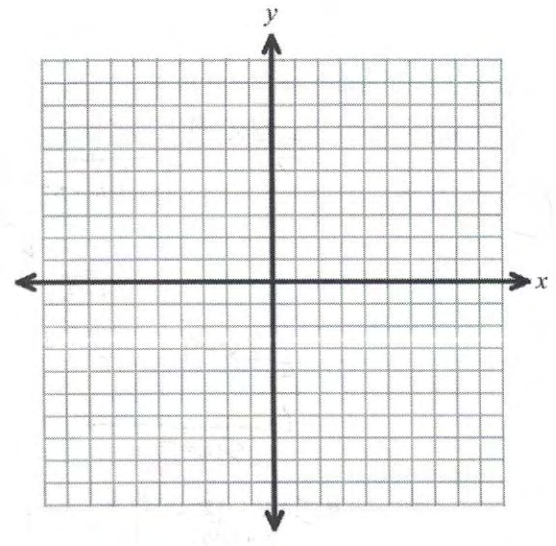
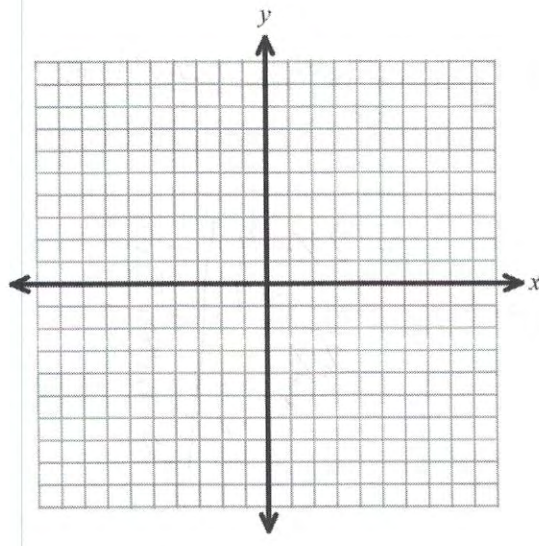
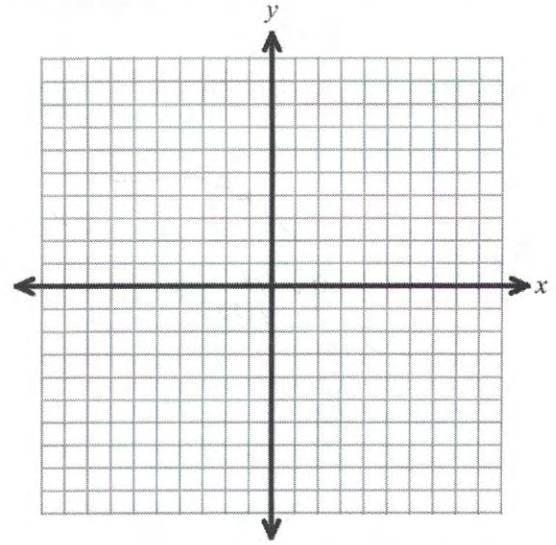
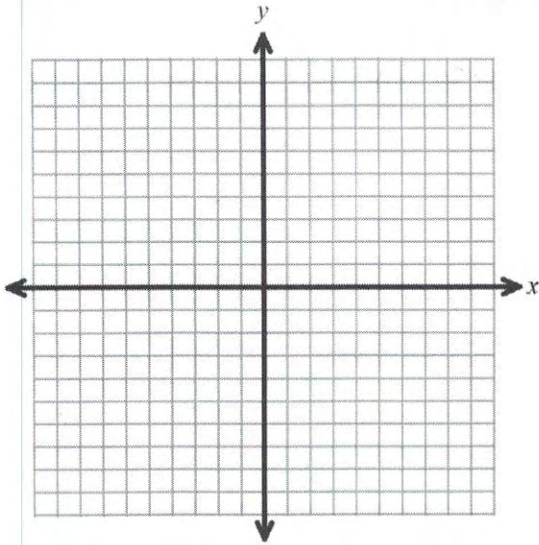


$$V = \frac{1}{3} B h$$

$$SA = B + \frac{1}{2} (P l)$$

Where B = base area
and P = base perimeter

Student Work Area



D 1. Which expression is equivalent to $\sqrt{x^3}$?

A. x^3
B. $x^{\frac{2}{3}}$
C. $x^{\frac{1}{3}}$
D. $x^{\frac{3}{2}}$

Handwritten notes:
 - "Square root" with an arrow pointing to the radical symbol in $\sqrt{x^3}$.
 - "power" with an arrow pointing to the 3 in x^3 .
 - "root" with an arrow pointing to the 2 in the denominator of the exponent in option D.
 - A diagram shows $\sqrt{x^3} \rightarrow x^{\frac{3}{2}}$.

B 2. What is the solution for x in $5^{2x-9} = \frac{1}{125}$?

A. $x = -8$
B. $x = 3$
C. $x = 6$
D. $x = 17$

Handwritten notes:
 - "* Convert to the same base"
 - $5^{2x-9} = \frac{1}{125}$
 - $\frac{1}{125} = \frac{1}{5^3} = 5^{-3}$ (labeled "negative exponent")
 - $5^{2x-9} = 5^{-3}$ (labeled "Same")
 - "Set powers equal to each other"
 - $2x - 9 = -3$

$$\begin{array}{r} 2x - 9 = -3 \\ +9 \quad +9 \\ \hline 2x \quad = 6 \\ \frac{2x}{2} \quad = \frac{6}{2} \\ x = 3 \end{array}$$

C 3. Solve for x : $256^{x-1} = 64^{2x-6}$

A. $x = -1$
B. $x = 5$
C. $x = 7$
D. $x = 9$

Handwritten notes:
 - Prime factorization trees for 256 and 64:
 - 256: $2 \rightarrow 2 \rightarrow 4 \rightarrow 8 \rightarrow 16 \rightarrow 32 \rightarrow 64 \rightarrow 128 \rightarrow 256$
 - 64: $2 \rightarrow 2 \rightarrow 4 \rightarrow 8 \rightarrow 16 \rightarrow 32 \rightarrow 64$
 - "power of powers" with circled 8 and 64 in the equation.
 - $8(x-1) = 6(2x-6)$

$$\begin{array}{r} 8(x-1) = 6(2x-6) \\ 8x - 8 = 12x - 36 \\ -8x + 36 \quad -8x + 36 \\ \hline 28 = 4x \\ \frac{28}{4} = \frac{4x}{4} \\ 7 = x \end{array}$$

ALGEBRA 1 SEMESTER 2 INSTRUCTIONAL MATERIALS

HS Courses: #2202 Algebra 1 S2 and #7770 Foundations in Algebra 1 S2
MS Courses: #218 Algebra 1, #217B VMS ALG 1 S2, and #776 ACCEL Algebra 1

2021-2022

I, J 4. Determine which functions below are exponential. Select all that apply.

F.

x	0	1	2	3	4
y	0	10	50	60	100

→ Check ratio of y values.

$\frac{10}{0} \neq \frac{50}{10} \neq \frac{60}{50} \neq \frac{100}{60}$ (4)

G.

x	0	1	2	3	4
y	21	18	15	12	9

 $\frac{18}{21} \neq \frac{15}{18} \neq \frac{12}{15} \neq \frac{9}{12}$ (4)

H.

x	0	1	2	3	4
y	3	3.5	4	4.5	5

 $\frac{3.5}{3} \neq \frac{4}{3.5} \neq \frac{4.5}{4} \neq \frac{5}{4.5}$ (4)

I.

x	0	1	2	3	4
y	7	$\frac{7}{3}$	$\frac{7}{9}$	$\frac{7}{27}$	$\frac{7}{81}$

 $\frac{7}{3} = \frac{7}{3} = \frac{7}{27} = \frac{7}{81}$ (11)

J.

x	0	1	2	3	4
y	10	20	40	80	160

 $\frac{20}{10} = \frac{40}{20} = \frac{80}{40} = \frac{160}{80}$ (4)

C 5. What is the domain and range of $h(x) = \left(\frac{1}{4}\right)^x$?

A. domain: $x \geq 0$
range: all real numbers

B. domain: $x > 0$
range: all real numbers

C. domain: all real numbers
range: $y \geq 0$

D. domain: all real numbers
range: $y > 0$

exponential decay ($0 < b < 1$)

$\begin{array}{l|l} x & y \\ 0 & \left(\frac{1}{4}\right)^0 = 1 \\ 1 & \left(\frac{1}{4}\right)^1 = \frac{1}{4} \end{array}$

D 6. If $f(x) = 3 \cdot 4^x$ and $g(x) = 3 \cdot 2^x$, compare the functions and determine which of the following statements is correct.

A. The x-intercept of $f(x)$ is greater than the x-intercept of $g(x)$. *no x-ints*

B. The y-intercept of $f(x)$ is greater than the y-intercept of $g(x)$. *Same*

C. The functions increase at the same rate.

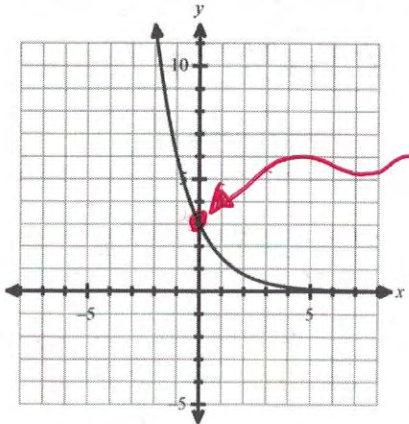
D. The functions have the same y-intercept.

$\begin{array}{l|l} f(x) & g(x) \\ x & y \\ 0 & 3 \cdot 4^0 = 3 \\ 1 & 3 \cdot 4^1 = 12 \end{array} \quad \begin{array}{l|l} x & y \\ 0 & 3 \cdot 2^0 = 3 \\ 1 & 3 \cdot 2^1 = 6 \end{array}$

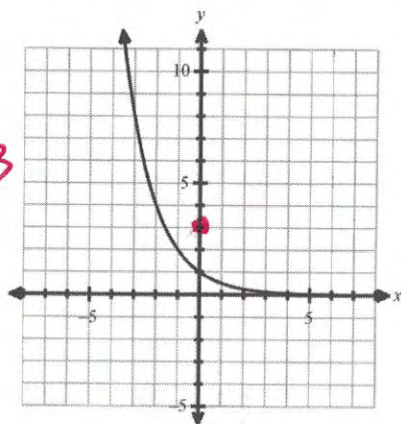
A 7. Which of the following represents the graph of $f(x) = 3 \cdot \left(\frac{1}{2}\right)^x$?

base: decay

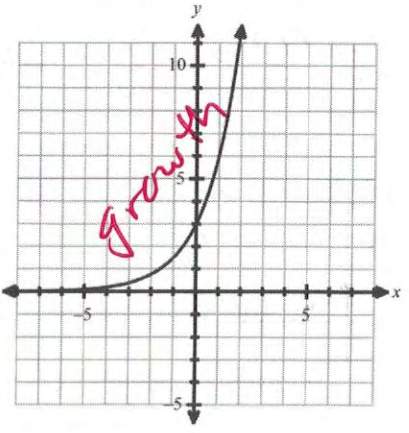
A.



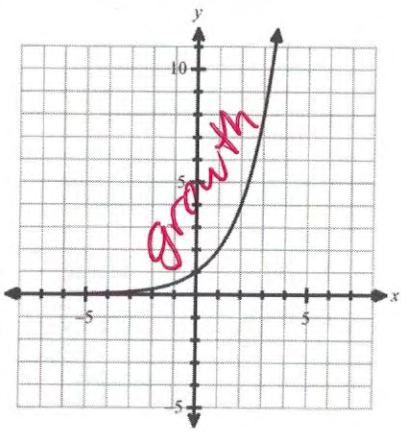
$\frac{x}{y}$
 $0 \mid 3 \cdot \left(\frac{1}{2}\right)^0$
 $0 \mid 3 \cdot 1 = 3$



B.



D.



C 8. Which function is represented by the table of values below?

x	0	1	2	3	4
y	16	4	1	$\frac{1}{4}$	$\frac{1}{16}$

A. $f(x) = \frac{1}{16} \cdot (4)^x$

B. $f(x) = \frac{1}{4} \cdot (16)^x$

base
 $\cdot \frac{1}{4} \cdot \frac{1}{4} \cdot \frac{1}{4}$
 $\div 4$
 C. $f(x) = 16 \cdot \left(\frac{1}{4}\right)^x$

D. $f(x) = 4 \cdot \left(\frac{1}{16}\right)^x$

F, J, K

9. Identify which functions represent exponential decay.
Select all that apply.

base: between 0 & 1
with power x

F. $f(x) = 100(1 - 0.9)^x$ 0.1

G. $f(x) = 0.4(9)^x$

H. $f(x) = \left(\frac{3}{2}\right)^x$ 1.5

I. $f(x) = 250(1 + 0.25)^x$ 1.25

J. $f(x) = \left(\frac{2}{5}\right)^x$ 0.40

K. $f(x) = 8(0.75)^x$

A 10. A local shipping company offers starting employees a salary of \$30,000 per year. Employees receive a 3% pay increase each year they are with the company. What function represents the amount of an employee's salary after t years?

A. $f(t) = 30,000(1.03)^t$ ← power

C. $f(t) = 30,000(0.03)^t$

B. $f(t) = 30,000(t + 0.03)$

D. $f(t) = 30,000(1.03t)$

100 + 3 → 103% or 1.03

A 11. What is the average rate of change of $f(x) = 7 \cdot (3)^x$ over the interval $2 \leq x \leq 5$?

A. 546 slope

C. 63

B. 189

D. 21

$$= \frac{y_2 - y_1}{x_2 - x_1}$$

$$= \frac{1701 - 63}{5 - 2} = \frac{1638}{3} = \boxed{546}$$

x	y
2	$7 \cdot 3^2 = 7 \cdot 9 = \boxed{63}$
5	$7 \cdot 3^5 = \boxed{1701}$

C 12. Write a recursive formula for the sequence below, assuming $f(1)$ is the first term in the sequence:

1st term
 $3, -6, 12, -24, 48 \dots$
 • (-2)

$f(1) = 3$
 $f(n) = f(n-1) \cdot (-2)$
 previous term

A. $f(1) = -6$ and $f(n) = f(n-1) \cdot (-2)$, for $n \geq 2$

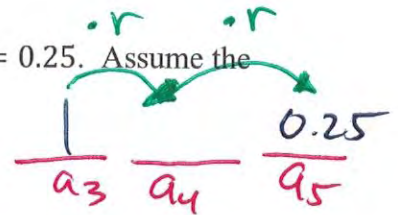
B. $f(1) = -2$ and $f(n) = f(n-1) \cdot 3$, for $n \geq 2$

C. $f(1) = 3$ and $f(n) = f(n-1) \cdot (-2)$, for $n \geq 2$

D. $f(1) = 3$ and $f(n) = f(n-1) - 9$, for $n \geq 2$

B 13. Write an explicit formula for the geometric sequence given $a_3 = 1$ and $a_5 = 0.25$. Assume the common ratio is positive.

multiply



A. $a_n = 8(0.25)^{n-1}$

C. $a_n = 0.5(4)^{n-1}$

B. $a_n = 4(0.5)^{n-1}$

D. $a_n = 0.25(8)^{n-1}$

Common ratio

Common ratio?
 $1 \cdot r \cdot r = 0.25$
 $r^2 = 0.25$
 $r = \sqrt{0.25}$
 $r = 0.5$

C 14. Simplify: $(6x + 14x^3 - 7x^2 - 1) + (-3x^2 + 5 - 9x^3)$

add

Combine like terms

A. $19x^3 - 16x^2 + 3x - 1$

C. $5x^3 - 10x^2 + 6x + 4$

B. $15x^3 + 2x^2 + 9x - 1$

D. $23x^3 - 4x^2 + 6x + 4$

$14x^3 + -9x^3, -7x^2 + -3x^2, 6x, -1 + 5$
 $\rightarrow 5x^3 - 10x^2 + 6x + 4$

- D 15. Simplify: $(3p^2 - 2p + 3) - (-p^2 - 2p + 3)$
 A. $2p^2 - 4p + 6$
 B. $4p^2 - 4p + 6$
 C. $2p^2$
 D. $4p^2$

subtract
Combine like terms

$$\begin{array}{r} 3p^2 - 2p + 3 + p^2 + 2p - 3 \\ \hline \rightarrow 3p^2 + p^2 - 2p + 2p \quad 3 - 3 \\ \hline \rightarrow 4p^2 \end{array}$$

- B 16. What is the product of $(6x - 5)$ and $(3x + 2)$?
 A. $18x^2 - 10$
 B. $18x^2 - 3x - 10$
 C. $18x^2 + 12x - 5$
 D. $18x^2 + 27x + 10$

multiply
FOIL or

	$3x$	$+2$
$6x$	$18x^2$	$12x$
-5	$-15x$	-10

$\rightarrow 18x^2 - 3x - 10$

- D 17. Find the product: $(x - 2)(4x^2 - 8x + 7)$
 A. $-4x^2 + 8x - 7$
 B. $4x^3 - 8x^2 + 7x - 2$
 C. $4x^3 + 10x^2 - 3x + 5$
 D. $4x^3 - 16x^2 + 23x - 14$

$4x^2 - 8x + 7$

x	$4x^3$	$-8x^2$	$+7x$
-2	$-8x^2$	$+16x$	-14

$\rightarrow 4x^3 - 16x^2 + 23x - 14$

- A 18. What is the simplified form of $(b + 7)^2$?
 A. $b^2 + 14b + 49$
 B. $b^2 + 49$
 C. $b^2 + 49b + 49$
 D. $b^2 + 14$

$(b+7)(b+7)$

	b^2	$+7b$
$(+)$	$+7b$	$+49$
	<hr/>	
	b^2	$+14b + 49$

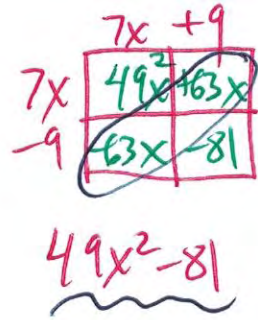
ALGEBRA 1 SEMESTER 2 INSTRUCTIONAL MATERIALS

HS Courses: #2202 Algebra 1 S2 and #7770 Foundations in Algebra 1 S2
MS Courses: #218 Algebra 1, #217B VMS ALG 1 S2, and #776 ACCEL Algebra 1

2021-2022

- B** 19. Which of the following is the product of $(7x - 9)(7x + 9)$?
- A. $49x^2 + 81$
B. $49x^2 - 81$
 C. $49x^2 + 126x + 81$
 D. $49x^2 - 126x - 81$

Conjugates
FOIL

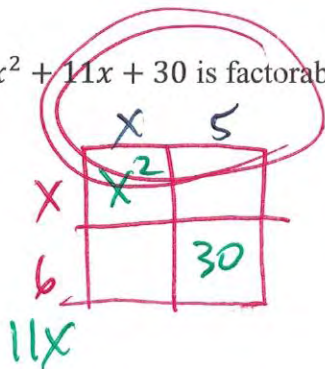


- A** 20. Which of the following is the fully factored form of $27x^4 - 36x^2 + 45x$?
- A.** $9x(3x^3 - 4x + 5)$
 B. $9x^4(3x^3 - 4x + 5)$
 C. $3x(9x^3 - 12x + 15)$
 D. $3x^3(9x^3 - 12x + 15)$

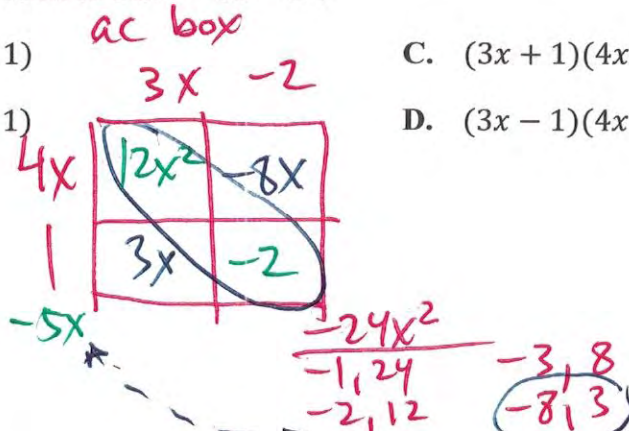
mono GCF 1st

$9x(3x^3 - 4x + 5)$

- D** 21. The polynomial $x^2 + 11x + 30$ is factorable. One factor is $(x + 6)$, what is the other factor?
- A. $(x + 1)$
 B. $(x + 3)$
 C. $(x - 5)$
D. $(x + 5)$



- B** 22. What is the factored form of $12x^2 - 5x - 2$?
- A. $(3x + 2)(4x - 1)$
B. $(3x - 2)(4x + 1)$
 C. $(3x + 1)(4x - 2)$
 D. $(3x - 1)(4x + 2)$



ALGEBRA 1 SEMESTER 2 INSTRUCTIONAL MATERIALS

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2021-2022

23. Determine which expressions are equivalent to $-x^2 + 3x + 10$.

Select all that apply.

F, G, I

- F. $-(x + 2)(x - 5)$
- G. $(x + 2)(5 - x)$
- H. $(x + 5)(x - 2)$
- I. $(-x - 2)(x - 5)$
- J. $(-x + 2)(-x - 5)$

$$-1(x^2 - 3x - 10)$$

$$-1(x - 5)(x + 2)$$

$$(-x + 5)$$

or

$$(5 - x)$$

$$(-x - 2)$$

24. Which of the following is a factor of $3x^2 - 12$?

- A. $(x + 12)$
- B. $(x - 4)$
- C. $(x - 2)$
- D. $(x + 4)$

mono GCF

$$3(x^2 - 4)$$

$$3(x - 2)(x + 2)$$

difference of squares

25. If $f(x) = \frac{1}{2}x^2 + 6$, what is the value of $f(8)$?

- A. $f(8) = 14$
- B. $f(8) = 38$
- C. $f(8) = \pm 2$
- D. $f(8) = 4x^2 + 48$

$$f(8) = \frac{1}{2}(8)^2 + 6$$

$$= \frac{1}{2} \cdot 64 + 6$$

$$= 32 + 6$$

$$= \boxed{38}$$

ALGEBRA 1 SEMESTER 2 INSTRUCTIONAL MATERIALS

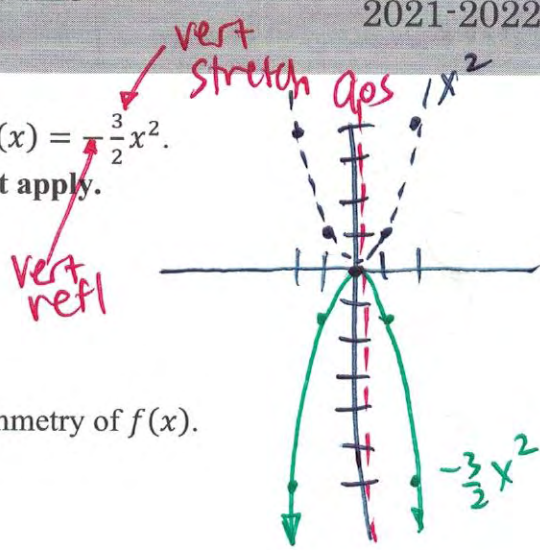
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I, J, K

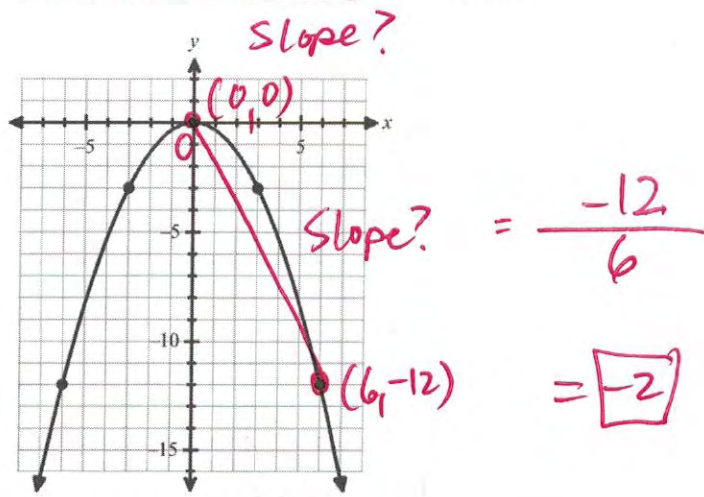
26. The function $f(x) = x^2$ is transformed into the function $g(x) = -\frac{3}{2}x^2$. Determine which statements below are true. **Select all that apply.**

- F. The graph of $g(x)$ opens upward.
- G. The graph of $g(x)$ is wider than the graph of $f(x)$.
- H. The axis of symmetry of $g(x)$ is left of the axis of symmetry of $f(x)$.
- I. The graph of $g(x)$ opens downward.
- J. The axis of symmetry of $g(x)$ and $f(x)$ are the same.
- K. The graph of $g(x)$ is narrower than the graph of $f(x)$.



D 27. The function $f(x)$ is graphed below. What is the average rate of change of $f(x)$ over the interval $0 \leq x \leq 6$?

- A. $\frac{1}{2}$
- B. 2
- C. $-\frac{1}{2}$
- D. -2



ALGEBRA 1 SEMESTER 2 INSTRUCTIONAL MATERIALS

HS Courses: #2202 Algebra 1 S2 and #7770 Foundations in Algebra 1 S2

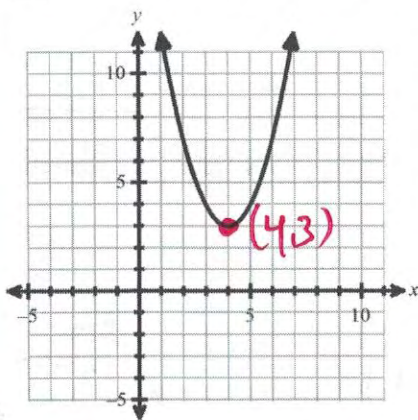
MS Courses: #218 Algebra 1, #217B VMS ALG 1 S2, and #776 ACCEL Algebra 1

2021-2022

vertex form: $a(x-h)^2 + k$ $v: (h, k)$

A 28. Which of the following graphs represents $f(x) = (x - 4)^2 + 3$?

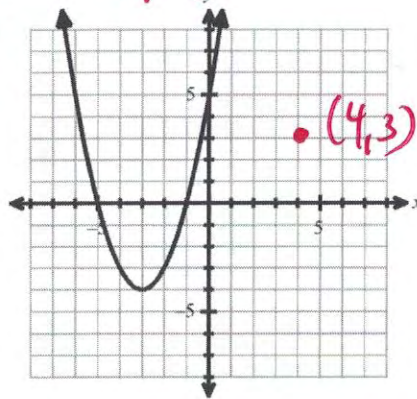
A.



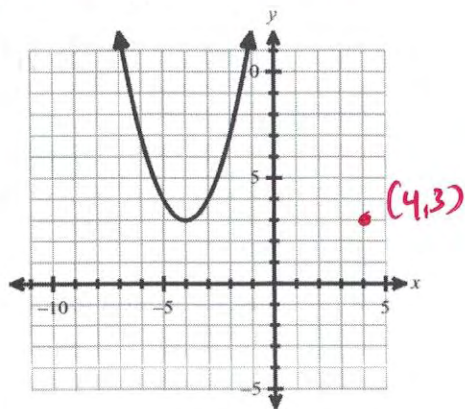
$h=4$

$k=3$

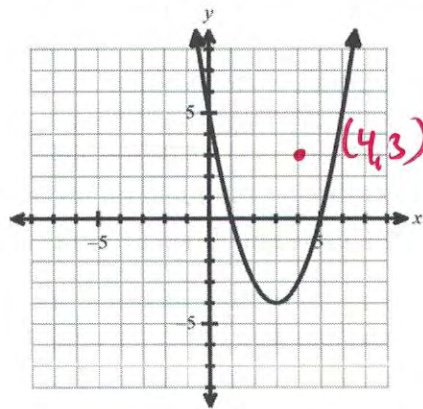
C.



B.



D.



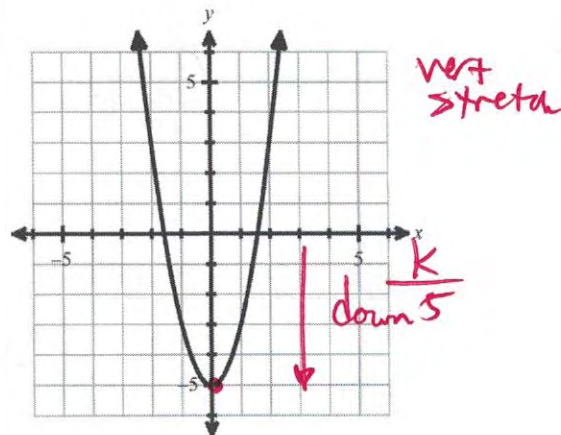
B 29. Which of the following quadratic functions represents the function graphed below?

A. $y = \frac{1}{2}x^2 - 5$

B. $y = 2x^2 - 5$ $k: -5$

C. $y = \frac{1}{2}(x + 5)^2$

D. $y = 2(x - 5)^2$



C 30. Describe how the graph of the function $f(x) = x^2$ changes after the transformation $f(x + 7)$ is applied.

A. The graph is translated 7 units up.

B. The graph is translated 7 units down.

C. The graph is translated 7 units left.

D. The graph is translated 7 units right.

$$a(x-h)^2+k$$

$h: -7$
left

A 31. Which of the following properly describes the graph of the function $f(x) = \frac{1}{2}(x - 6)^2 - 10$?

A. The graph of the function is compressed vertically by a factor of $\frac{1}{2}$ and translated to the right 6 units and down 10 units from the parent function.

B. The graph of the function is compressed vertically by a factor of $\frac{1}{2}$ and translated to the left 6 units and down 10 units from the parent function.

C. The graph of the function is stretched vertically by a factor of 2 and translated to the left 6 units and down 10 units from the parent function.

D. The graph of the function is stretched vertically by a factor of 2 and translated to the right 6 units and down 10 units from the parent function.

$$a(x-h)^2+k$$

vert. shrink
 $h: 6$ right
 $k: -10$ down

C 32. Translate the graph of $f(x) = x^2$ four units to the left, three units up and vertically stretch the graph by a factor of 5. Which of the following is the function after the transformations?

A. $f(x) = \frac{1}{5}(x + 4)^2 + 3$

C. $f(x) = 5(x + 4)^2 + 3$

B. $f(x) = \frac{1}{5}(x - 4)^2 + 3$

D. $f(x) = 5(x - 4)^2 + 3$

$$f(x) = a(x-h)^2+k$$

$h: -4$ $k: 3$

$a: 5$

D 33. Which of the following is the vertex for $f(x) = -4(x - 5)^2 + 2$?

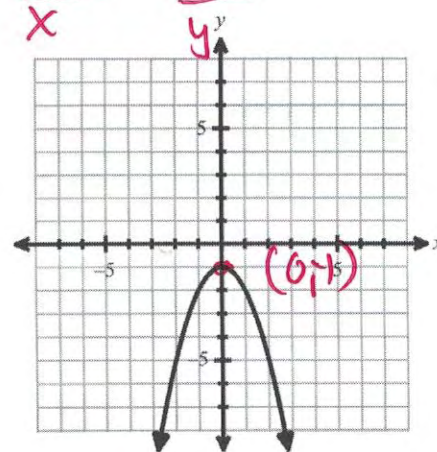
- A. (25, 2)
- B. (-20, 2)

- C. (-5, 2)
- D. (5, 2)

$a(x-h)^2+k$
 $v: (h, k)$
 $h=5$
 $k=2$

C 34. Given the equation and graph of $y = -x^2 - 1$, what is the domain and range?

- A. Domain: *all real numbers*
Range: $y \geq 1$
- B. Domain: *all real numbers*
Range: $y \leq 1$
- C. Domain: *all real numbers*
Range: $y \leq -1$
- D. Domain: $-1 \leq x \leq 1$
Range: $y \leq -1$



D 35. What is the vertex of the function $f(x) = -2x^2 + 8x - 9$?

- A. (-4, -73)
- B. (4, -9)

- C. (-2, -33)
- D. (2, -1)

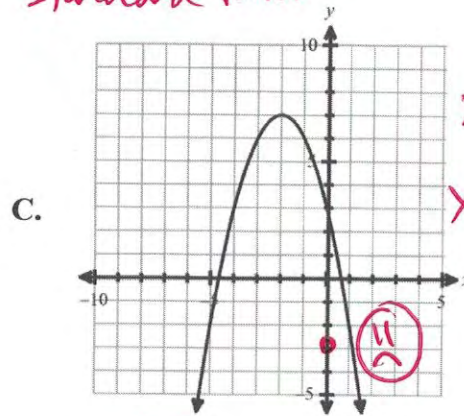
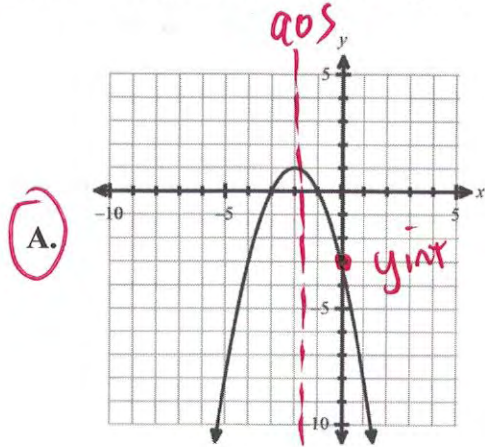
Standard form
 $a: -2$ $b: 8$ $c: -9$
 $x = \frac{-b}{2a}$

$= \frac{-(8)}{2(-2)} = \frac{-8}{-4} = 2$
 (2 is circled and labeled 'x')

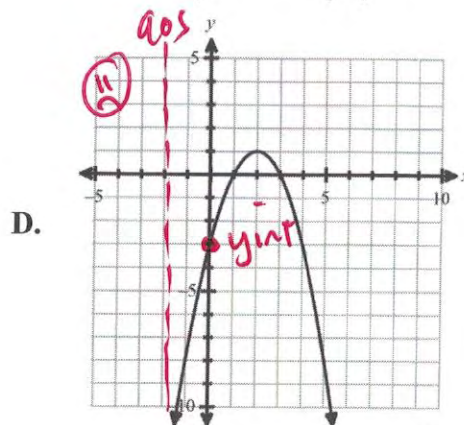
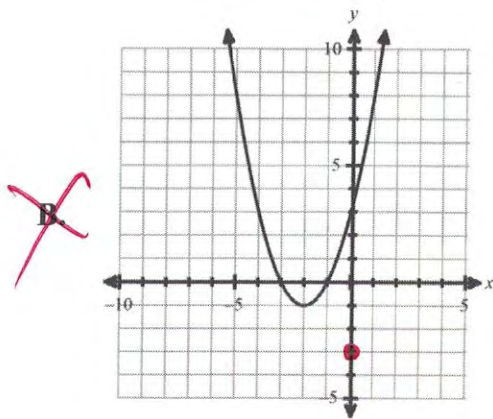
vertex
 $f(2) = -2(2)^2 + 8(2) - 9$
 $= -2 \cdot 4 + 16 - 9$
 $= -8 + 16 - 9$
 $= 8 - 9$
 $= -1$
 $V: (2, -1)$

A 36. Which of the following is the graph of $f(x) = -x^2 - 4x - 3$?

Standard Form
y-intercept



aos
 $x = \frac{-b}{2a}$
 $x = \frac{-(-4)}{2(-1)}$
 $= \frac{4}{-2} = -2$
aos
 $x = -2$



B 37. What is the axis of symmetry and the maximum value of the function $f(x) = -2x^2 + 12x - 16$?

y-value of vertex *Standard Form*

A. axis of symmetry: $x = 6$
maximum value: -16

C. axis of symmetry: $x = 2$
maximum value: 3

$x = \frac{-b}{2a} = \frac{-(12)}{2(-2)}$

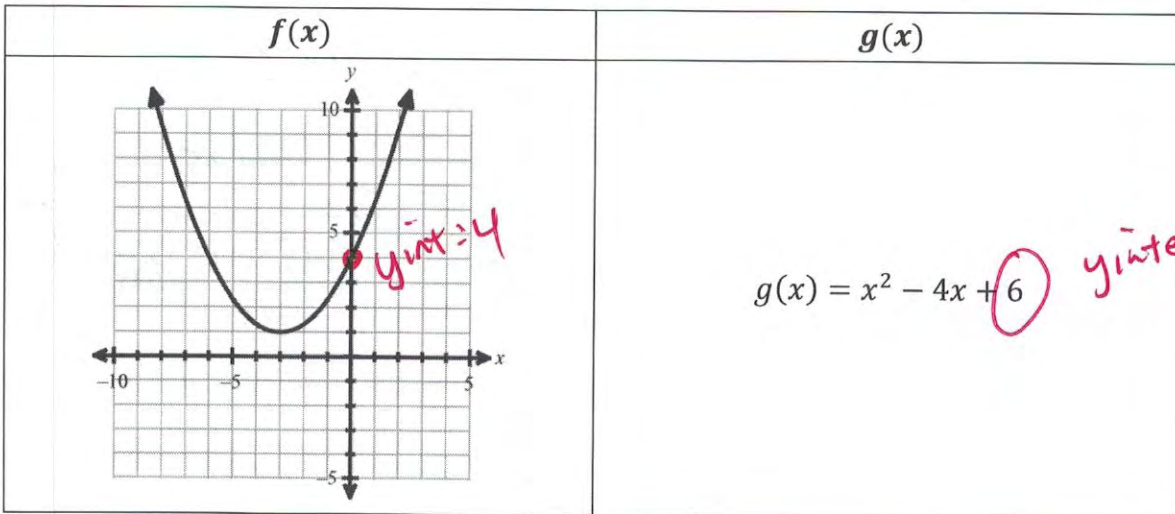
B. axis of symmetry: $x = 3$
maximum value: 2

D. axis of symmetry: $x = -16$
maximum value: 6

$= \frac{-12}{-4} = 3$

$f(3) = -2(3)^2 + 12(3) - 16$
 $= -2 \cdot 9 + 36 - 16$
 $= -18 + 36 - 16$
 $18 - 16 = 2$

B 38. The functions $f(x)$ and $g(x)$ are represented below.



Which of the following statements about the y-intercepts of the functions is true?

- A. $f(x)$ does not have a y-intercept.
- B. The y-intercept of $f(x)$ is below the y-intercept of $g(x)$.
- C. The y-intercept of $f(x)$ is above the y-intercept of $g(x)$.
- D. $f(x)$ and $g(x)$ have the same y-intercept.

Standard Form

C 39. If $f(x) = g(x)$ and $f(x) = 2(x - 5)^2 + 3$, then which of the following functions can represent $g(x)$?

- A. $g(x) = x^2 - 10x + 28$
- B. $g(x) = 2x^2 - 10x + 3$
- C. $g(x) = 2x^2 - 20x + 53$
- D. $g(x) = 2x^2 - 20x + 50$

same vertex form

$$\begin{aligned} &\rightarrow 2(x-5)(x-5) + 3 \\ &\rightarrow 2(x^2 - 5x - 5x + 25) + 3 \\ &\rightarrow 2(x^2 - 10x + 25) + 3 \\ &\rightarrow 2x^2 - 20x + 50 + 3 \\ &\rightarrow \boxed{2x^2 - 20x + 53} \end{aligned}$$

D 40. A model rocket is launched from the top of a platform 6 feet above the ground with an initial velocity of 125 ft/s. The function $h(t) = -16t^2 + 125t + 6$ represents the height (h) of the rocket t seconds after it is launched. What is the maximum height of the rocket to the nearest foot?

- A. 104 feet
- B. 125 feet

- C. 180 feet
- D.** 250 feet

vertex?

aos
 $x = \frac{-b}{2a} = \frac{-(125)}{2(-16)} = \frac{-125}{-32} = 3.90625 \text{ sec.}$

$h(3.90) = -16(3.90)^2 + 125(3.90) + 6$
 $h(3.90625) = 250.140625$

A 41. Which of the following best describes the data in the table?

x	1	2	3	4
y	3	9	27	81

- A.** Exponential with a growth factor of 3
- B. Linear with a rate of change of 6
- C. Quadratic with a second difference of 12
- D. None of the above

H, K 42. The table below represents the function $y = 4x^2 + 8x - 12$. Use the table to find the solutions of the equation $4x^2 + 8x - 12 = 0$. Select all that apply.

X-intercepts

- F. $x = -16$
- G. $x = -12$
- H.** $x = -3$
- I. $x = -1$
- J. $x = 0$
- K.** $x = 1$

x	y
-4	20
-3	0
-2	-12
-1	-16
0	-12
1	0
2	20

A 43. Which of the following are the x-intercepts for $y = (x + 2)^2 - 16$?

- A. $(-6, 0), (2, 0)$
- B. $(-2, 0), (16, 0)$
- C. $(-6, 0), (-2, 0)$
- D. $(2, 0), (-16, 0)$

$\downarrow 0$

Set $y=0$

$$0 = (x+2)^2 - 16$$

$$+16 \quad +16$$

$$\pm \sqrt{16} \quad \sqrt{(x+2)^2}$$

$$\pm 4 = x+2$$

$$\underline{-2} \quad \underline{-2}$$

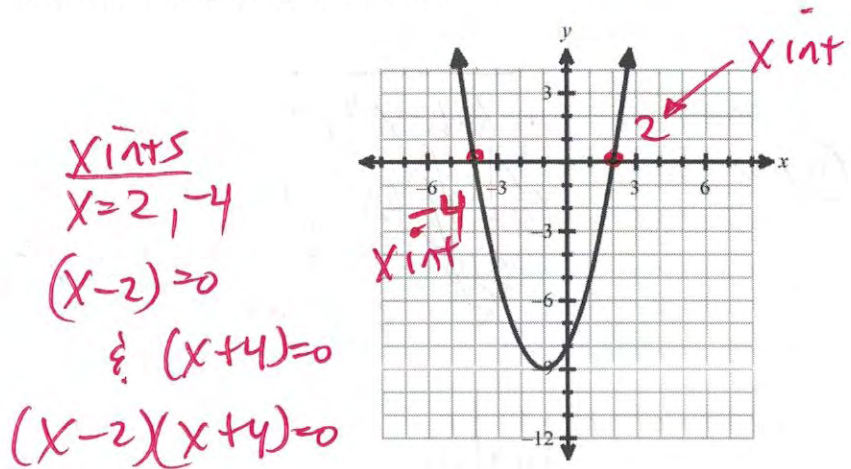
$$= x$$

or $4-2$
 $-4-2$

or (2)
 $(-6) = x$

D 44. Which of the following functions is modeled by the graph below?

- A. $y = (x - 1)(x - 9)$
- B. $y = (x + 1)(x + 9)$
- C. $y = (x + 2)(x - 4)$
- D. $y = (x - 2)(x + 4)$



C 45. What are the zeros of the function $f(x) = 2x^2 - 12x + 18$?

- A. $x = 2$ and $x = 3$
- B. $x = -3$ and $x = 3$
- C. $x = 3$
- D. $x = -3$

PST

$$2x^2 - 12x + 18 = 0$$

$$\rightarrow 2(x^2 - 6x + 9) = 0$$

$$\rightarrow 2(x-3)(x-3) = 0$$

$$2=0 \quad \boxed{x-3=0} \quad x-3=0$$

$$\boxed{x=3}$$

C 46. A quadratic function has zeros at 1 and -8. Which of the following could be the function?

A. $f(x) = x^2 + 8x$

B. $f(x) = x^2 - 8x$

$X=1$ or $X=-8$
 $X-1=0$ | $X+8=0$
 $(X-1)=0$ | $(X+8)=0$
 $(X-1)(X+8) \rightarrow X^2+8x-1x-8$
 $\rightarrow X^2+7x-8$

C. $f(x) = x^2 + 7x - 8$

D. $f(x) = x^2 - 7x - 8$

B 47. Simplify the expression: $\sqrt{8x^4} \cdot \sqrt{6x^3}$

A. $16x^6\sqrt{x^3}$

B. $4x^3\sqrt{3x}$

$\sqrt{8 \cdot 6 \cdot x^4 x^3}$
 $\begin{matrix} \textcircled{2} & \textcircled{4} & \textcircled{2} & \textcircled{3} \\ \textcircled{2} & \textcircled{2} & & \end{matrix}$
 X^7
 3 pairs
 + 1 extra

C. $12x^3\sqrt{x}$

D. $24x^6$

$2 \cdot 2x^3\sqrt{3 \cdot x} \rightarrow 4x^3\sqrt{3x}$

B 48. Solve for x in $16x^2 - 49 = 0$.

A. $x = \pm \frac{49}{16}$

B. $x = \pm \frac{7}{4}$

$\frac{+49}{16} \mid \frac{+49}{16}$
 $\frac{16x^2}{16} = \frac{49}{16}$
 $x^2 = \frac{49}{16}$

C. $x = \pm \frac{16}{49}$

D. $x = \pm \frac{4}{7}$

$X = \pm \sqrt{\frac{49}{16}}$
 $= \pm \frac{7}{4}$

A 49. What value of c will make $x^2 - 24x + c$ a perfect square trinomial?

A. $c = 144$

B. $c = -12$

C. $c = 576$

D. $c = -48$

$\left(\frac{-24}{2}\right)^2 \rightarrow (-12)^2 \rightarrow 144$

ALGEBRA 1 SEMESTER 2 INSTRUCTIONAL MATERIALS

IHS Courses: #2202 Algebra 1 S2 and #7770 Foundations in Algebra 1 S2
MS Courses: #218 Algebra 1, #217B VMS ALG 1 S2, and #776 ACCEL Algebra 1

2021-2022

50. Which of the following is the vertex form of $f(x) = x^2 + 4x + 7$?

A. $f(x) = (x + 2)^2 + 7$ C. $f(x) = (x + 2)^2 + 3$
 B. $f(x) = (x - 2)^2 + 4$ D. $f(x) = (x - 2)^2 + 3$

Complete the square ---
 $f(x) = x^2 + 4x + 4 + 7 - 4$
 $f(x) = (x+2)^2 + 3$
 PST

51. Solve for x : $x^2 + 4x - 8 = 0$.

A. $x = -2 \pm 2\sqrt{3}$ C. $x = -4 \pm 4\sqrt{3}$
 B. $x = -4 \pm 2\sqrt{3}$ D. $x = -2 \pm 4\sqrt{3}$

$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
 $x = \frac{-4 \pm \sqrt{4^2 - 4(1)(-8)}}{2(1)}$
 $= \frac{-4 \pm \sqrt{16 + 32}}{2} = \frac{-4 \pm \sqrt{48}}{2} = \frac{-4 \pm 2 \cdot 2\sqrt{3}}{2} = \frac{-4 \pm 4\sqrt{3}}{2} = -2 \pm 2\sqrt{3}$

52. Which of the following is a solution to $2x^2 + 14x - 18 = 0$?

A. $x = \frac{7 \pm \sqrt{85}}{2}$ C. $x = \frac{-7 \pm \sqrt{85}}{2}$
 B. $x = \frac{-7 \pm \sqrt{13}}{2}$ D. $x = \frac{14 \pm \sqrt{340}}{4}$

$2x^2 + 14x - 18 = 0$
 $x^2 + 7x - 9 = 0$
 $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{-7 \pm \sqrt{7^2 - 4(1)(-9)}}{2(1)}$
 $= \frac{-7 \pm \sqrt{49 + 36}}{2} = \frac{-7 \pm \sqrt{85}}{2}$

53. The height (h), in feet, of a person jumping off a diving platform can be modeled by the equation $h = -16t^2 + 4t + 6$ where t represents the time in seconds the person is in the air. After how many seconds does the person jumping off the platform enter the water?

A. $-\frac{1}{2}$ second C. $\frac{4}{3}$ seconds
 B. $\frac{3}{4}$ second D. 2 seconds

$h = 0$
 $0 = -16t^2 + 4t + 6$
 $t = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{-4 \pm \sqrt{4^2 - 4(-16)(6)}}{2(-16)}$
 $= \frac{-4 \pm \sqrt{16 + 64}}{-32} = \frac{-4 \pm \sqrt{80}}{-32}$
 $t = -0.5 \text{ \& } 0.75$