

Name:
Teacher:

Date:
Class/Period:

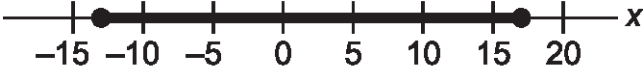

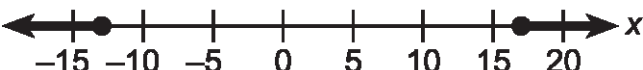
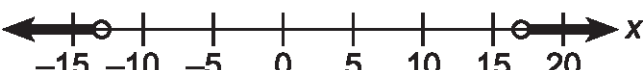
1) Find the solution set of $|x - 2| < 6$.

- A. $\{x \mid -8 < x < 4\}$
- B. $\{x \mid -4 < x < 8\}$
- C. $\{x \mid x < 4\}$
- D. $\{x \mid x < 8\}$

2) The target heart rate range during physical activity for a certain 16-year-old girl of average fitness is within 21 beats per minute of 141 beats per minute. Which inequality represents this target range?

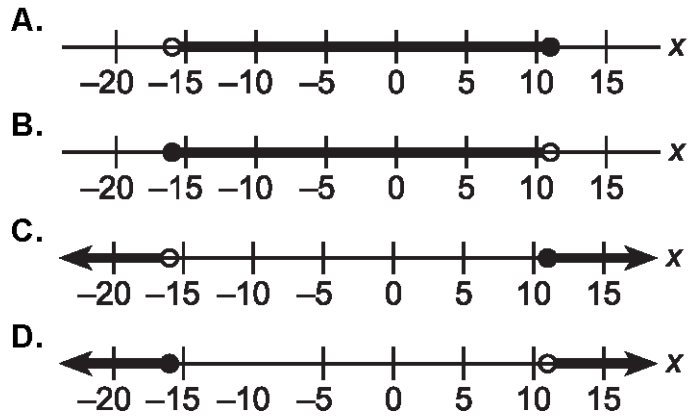
- A. $|r - 141| \leq 21$
- B. $|r - 141| \leq 162$
- C. $|r| \leq 21$
- D. $|r| \leq 120$

3) Which graph represents the solution set of $-16 < x - 3 < 14$?

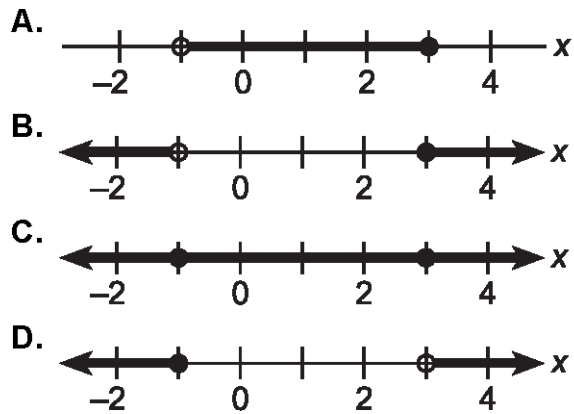
- A. 
- B. 
- C. 
- D. 

4) Which graph represents this statement?

-12 is less than $x + 4$, and $x + 4$ is less than or equal to 15.

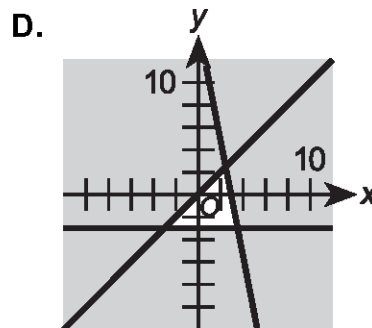
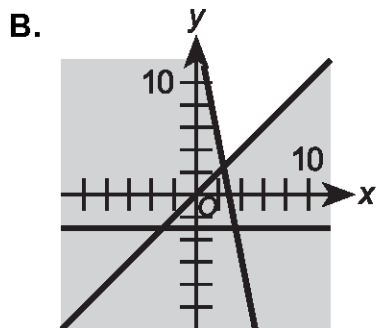
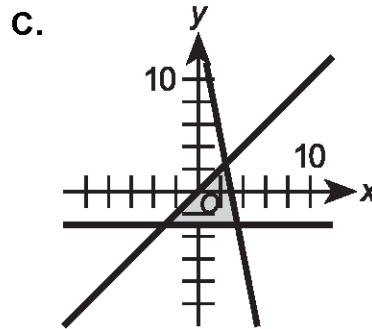
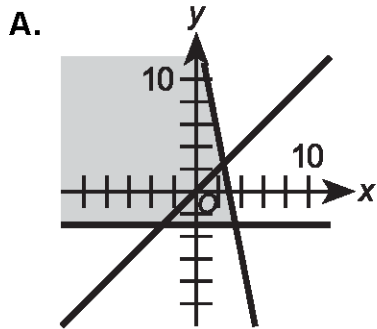


5) Which is the graph of the solution set for $2x - 10 < -12$ or $4 - 3x \leq -5$?



6) Which graph represents the solution set to this system of equations?

$$\begin{cases} y \leq x \\ y \geq -3 \\ y \leq 15 - 5x \end{cases}$$



7) The Gala Events Center has a rectangular parking lot measuring 30 m by 50 m. Only 80% of the lot is usable space. Each parked car requires 6 m^2 of space and each bus requires 30 m^2 . The attendant can handle no more than 100 vehicles. It costs \$5 to park a car and \$15 to park a bus. What is the maximum income for a full lot?

- A. \$ 500
- B. \$ 750
- C. \$1,000
- D. \$1,500

8) What is the complex conjugate of $7 + \sqrt{-8}$?

- A. $7 + 4i\sqrt{2}$
- B. $7 - 4i\sqrt{2}$
- C. $7 + 2i\sqrt{2}$
- D. $7 - 2i\sqrt{2}$

9) Which function has the same range as $y = (x + 3)^2$?

- A. $y = (x + 3)^2 - 2$
- B. $y = x^2 + 9$
- C. $y = 2(x - 3)^2 + 1$
- D. $y = (x - 5)^2$

10) A used bookstore sells paperback books for \$1.00 each, hardback books for \$3.00 each, and CDs for \$4.00 each. On Saturday, they sold 37 paperbacks, 52 hardbacks, and 42 CDs. What matrix operation would compute the store's total income for that day?

A.

$$[\$1.00 \quad \$3.00 \quad \$4.00] \begin{bmatrix} 37 \\ 52 \\ 42 \end{bmatrix}$$

C.

$$\begin{bmatrix} 37 \\ 52 \\ 42 \end{bmatrix} [\$1.00 \quad \$3.00 \quad \$4.00]$$

B.

$$[\$1.00 \quad \$3.00 \quad \$4.00][37 \quad 52$$

D.

$$\begin{bmatrix} 37 \\ 52 \\ 42 \end{bmatrix} \begin{bmatrix} \$1.00 \\ \$3.00 \\ \$4.00 \end{bmatrix}$$

11) If $c - d = 7$ and $c = 3 - 4i$, what is d ?

- A. $-4 - 4i$
- B. $-4 + 4i$
- C. $4 - 4i$
- D. $4 + 4i$

12) For the equation $x^2 - 4x + 4 = 9$, determine the discriminant.

- A. -36
- B. 0
- C. 6
- D. 36

13) What is AB ?

$$A = \begin{bmatrix} -3 & 1 \\ 6 & 0 \\ 4 & 2 \\ 9 & 7 \end{bmatrix} \quad B = \begin{bmatrix} 2 & 6 \\ 5 & 1 \end{bmatrix}$$

A. $\begin{bmatrix} 52 & 156 \\ 130 & 26 \end{bmatrix}$

C. $\begin{bmatrix} -6 & 6 \\ 30 & 0 \\ 8 & 12 \\ 45 & 7 \end{bmatrix}$

B. $\begin{bmatrix} -1 & -17 \\ 12 & 36 \\ 18 & 26 \\ 53 & 61 \end{bmatrix}$

D. $\begin{bmatrix} -42 & 14 \\ 84 & 0 \\ 56 & 28 \\ 126 & 98 \end{bmatrix}$

14) If D , E , F , and X are 2×2 matrices, with

$$D = \begin{bmatrix} 2 & -1 \\ 3 & 5 \end{bmatrix}$$

$$E = \begin{bmatrix} 3 & -1 \\ 0 & 6 \end{bmatrix}$$

$$F = \begin{bmatrix} 2 & 1 \\ -3 & 0 \end{bmatrix}$$

and $DX + E = F$, what is X ?

A. $\begin{bmatrix} 1 & 10 \\ -15 & -24 \end{bmatrix}$

C. $\begin{bmatrix} -\frac{8}{13} & \frac{4}{13} \\ \frac{3}{13} & -\frac{18}{13} \end{bmatrix}$

B. $\begin{bmatrix} -\frac{5}{4} & -\frac{1}{4} \\ -\frac{1}{4} & -\frac{11}{4} \end{bmatrix}$

D. $\begin{bmatrix} \frac{9}{52} & -\frac{11}{156} \\ \frac{2}{13} & \frac{1}{39} \end{bmatrix}$

15) Simplify this expression:

$$3(x^2 + 2) - 5(2x^2 + 3x - 4) + 2(-x^2 - 4)$$

A. $-5x^2 - 15x + 18$

B. $-5x^2 + 15x - 22$

C. $-9x^2 - 15x + 18$

D. $-9x^2 + 15x - 22$

16) Find all zeros of $f(x) = x^4 - 1$.

A. $x = -1, 1$

B. $x = 1, i$

C. $x = 1, i, -i$

D. $x = 1, -1, i, -i$

17) Which is an equivalent form of this expression?

$$(3x + 2)(x - 5) - 6(x - 1)$$

- A. $3x^2 - 6x - 9$
- B. $3x^2 - 7x - 11$
- C. $3x^2 - 9x - 16$
- D. $3x^2 - 19x - 4$

18) What is the complete factorization of $16r^{3n} - 54q^{6a}$, where a , n , r , and q are integers?

- A. $2(8r^{3n} - 27^{6a})$
- B. $(4r^{2n} + 6q^a)(4r^n - 9q^{5a})$
- C. $2(4r^{2n} + 3q^a)(2r^n - 9q^{5a})$
- D. $2(2r^n - 3q^{2a})(4r^{2n} + 6r^nq^{2a} + 9q^{4a})$

19) What is the completely simplified expression of

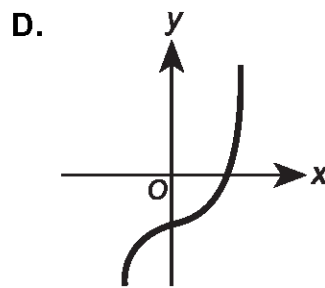
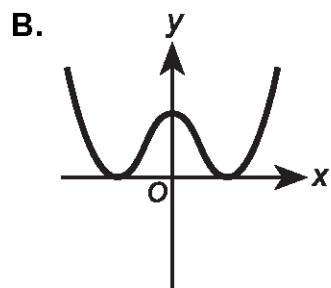
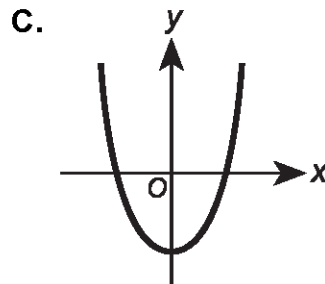
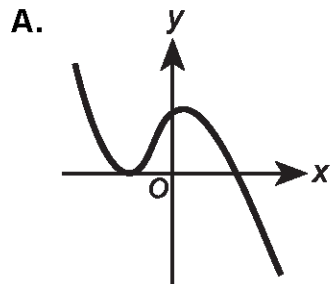
$$\frac{x^3 - 4x}{x^5 - 8x^2} ?$$

- A. $\frac{x^3 - 4x}{x^5 - 8x^2}$
- B. $\frac{1}{x(x+2)}$
- C. $\frac{x^2 - 4}{x(x^3 - 8)}$
- D. $\frac{x+2}{x(x^2 + 2x + 4)}$

20) For what values of x does the graph of $f(x) = 3x^2 - 5\frac{1}{2}x - 5$ intersect the x -axis?

- A. -11 and 5
- B. 11 and -5
- C. $-2\frac{1}{2}$ and $\frac{2}{3}$
- D. $2\frac{1}{2}$ and $-\frac{2}{3}$

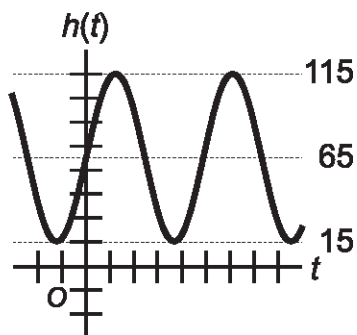
21) Which graph could represent a cubic function with 2 distinct real zeros?



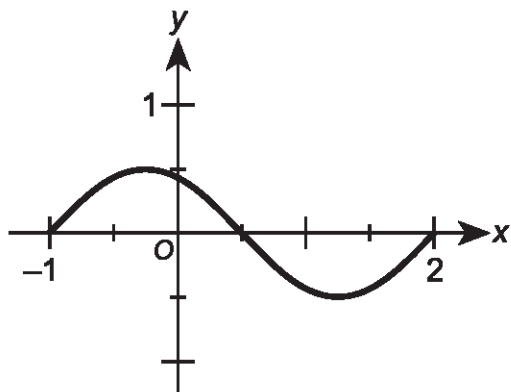
22) If $\log_2 x = -3$, what is x ?

- A. $\frac{1}{9}$
- B. $\frac{1}{8}$
- C. 8
- D. 9

- 23) This graph shows the height above ground, $h(t)$, of a rider on a Ferris wheel as a function of time, t . What is the amplitude of the sine function that models the rider's height above ground?



- A. 50
 B. 65
 C. 100
 D. 115
- 24) Which best describes the range of this graph of the relation $y = f(x)$?



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

- 25) Rewrite this expression in simplest form. Assume variables represent positive numbers.

$$\sqrt{\frac{16w^2y^3}{75x^5}}$$

- A. $\frac{\sqrt{3xy}}{3x}$
- B. $\frac{4wy\sqrt{3xy}}{15x^3}$
- C. $\frac{4wy^2\sqrt{5xy}}{25x^3}$
- D. $\frac{4wy^2\sqrt{3xy}}{15x^3}$

- 26) Which expression is equivalent to $\ln(3e^{2x})$?

- A. $2x + \ln 3$
- B. $2x \ln 3$
- C. $6x$
- D. $3 \ln 2x$

- 27) The radius of circle O is 15 m. Two radii, \overline{OA} and \overline{OB} , form an angle of 80° . To the nearest tenth of a meter, how long is chord \overline{AB} ?

- A. 14.8
- B. 15.0
- C. 19.3
- D. 21.2

- 28) A business owner spent \$500 on start-up fees to produce and sell candles. Each candle costs an additional \$3.00 to produce. What is the minimum number of candles that the owner must produce for the average cost per candle to be less than \$3.75 ?

- A. 134
- B. 167
- C. 375
- D. 667

29) Yi has a bag of 15 stones: 8 blue and 7 purple and randomly chooses 3 stones from the bag. If Yi picks 2 blue stones and does not return them to the bag, what is the probability that she will pick a purple stone next?

A. $\frac{7}{15}$

B. $\frac{6}{15}$

C. $\frac{7}{13}$

D. $\frac{6}{13}$

30) Richard has 5 shirts, 6 pairs of jeans, and 3 vests. How many different outfits, each composed of a shirt, a pair of jeans, and a vest, can he make?

A. 6

B. 14

C. 33

D. 90

31) Find the 100th term of this arithmetic sequence.

5, 8, 11, 14, 17, ...

A. 302

B. 305

C. 308

D. 311

32) In a geometric sequence where $a_1 = 15$ and $a_5 = 240$, what is the first term in the sequence that is a multiple of 4?

A. $a_2 = 20$

B. $a_3 = 60$

C. $a_4 = 60$

D. $a_4 = 120$

33) On the first of every month, a new library receives a new shipment of 575 book titles. If the library starts the beginning of the first year with 3,000 book titles and does receive a shipment that month, how many book titles will it have at the end of 3 years?

- A. 42,900
- B. 23,700
- C. 5,363
- D. 4,150

34) The yearbook staff includes 8 photographers. One photographer needs to cover a dance, and another needs to cover a basketball game. In how many ways can photographers be assigned to these events?

- A. 16
- B. 28
- C. 56
- D. 64

35) This chart shows the number of students, by gender, in each grade at a local high school. The principal will randomly select one student to meet the governor.

	9th	10th	11th	12th
Female	80	95	75	80
Male	75	100	75	70

Let $A = \{\text{choosing a female}\}$ and $B = \{\text{choosing a ninth grader}\}$. What is $P(B|A)$?

- A. $\frac{8}{65}$
- B. $\frac{31}{66}$
- C. $\frac{16}{31}$
- D. $\frac{8}{33}$

Reference Sheet for the QualityCore™ Algebra II End-of-Course Assessment

Equations of a Line

Standard Form	$Ax + By = C$	A , B , and C are constants with A and B not both equal to zero.
Slope-Intercept Form	$y = mx + b$	(x_1, y_1) is a point.
Point-Slope Form	$y - y_1 = m(x - x_1)$	m = slope b = y-intercept

Quadratics

Standard Form of a Quadratic Equation	$ax^2 + bx + c = 0$	a , b , and c are constants, where $a \neq 0$.
Quadratic Formula	$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$	

Conic Sections

Circle	$(x - h)^2 + (y - k)^2 = r^2$	center (h, k) r = radius
Parabola	$y = a(x - h)^2 + k$	axis of symmetry $x = h$ vertex (h, k) directrix $y = k - \frac{1}{4a}$ focus $(h, k + \frac{1}{4a})$
Parabola	$x = a(y - k)^2 + h$	axis of symmetry $y = k$ vertex (h, k) directrix $x = h - \frac{1}{4a}$ focus $(h + \frac{1}{4a}, k)$
Ellipse	$\frac{(x - h)^2}{a^2} + \frac{(y - k)^2}{b^2} = 1$	foci $(h \pm c, k)$ where $c^2 = a^2 - b^2$, center (h, k)
Ellipse	$\frac{(y - k)^2}{a^2} + \frac{(x - h)^2}{b^2} = 1$	foci $(h, k \pm c)$ where $c^2 = a^2 - b^2$, center (h, k)
Hyperbola	$\frac{(x - h)^2}{a^2} - \frac{(y - k)^2}{b^2} = 1$	foci $(h \pm c, k)$ where $c^2 = a^2 + b^2$, center (h, k)
Hyperbola	$\frac{(y - k)^2}{a^2} - \frac{(x - h)^2}{b^2} = 1$	foci $(h, k \pm c)$ where $c^2 = a^2 + b^2$, center (h, k)

Lines and Points

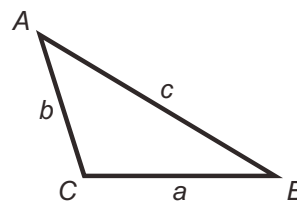
Slope	$m = \frac{y_2 - y_1}{x_2 - x_1}$	(x_1, y_1) and (x_2, y_2) are 2 points. m = slope
Midpoint	$M = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$	M = midpoint d = distance
Distance	$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$	

Miscellaneous

Distance, Rate, Time	$D = rt$	$D =$ distance $r =$ rate $t =$ time
Simple Interest	$I = prt$	$I =$ interest $p =$ principal
Compound Interest	$A = p\left(1 + \frac{r}{n}\right)^{nt}$	$A =$ amount of money after t years $n =$ number of times interest is compounded annually
Pythagorean Theorem	$a^2 + b^2 = c^2$	a and $b =$ legs of right triangle $c =$ hypotenuse

Laws of Sines and Cosines

Law of Sines	$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$
Law of Cosines	$a^2 = b^2 + c^2 - 2bc \cos A$

**Sequences, Series, and Counting**

Arithmetic Sequence	$a_n = a_1 + (n - 1)d$	$a_n =$ n^{th} term
Arithmetic Series	$s_n = \frac{n}{2}(a_1 + a_n)$	$n =$ number of the term $d =$ common difference
Geometric Sequence	$a_n = a_1(r^{n-1})$	$s_n =$ sum of the first n terms $r =$ common ratio
Geometric Series	$s_n = \frac{a_1 - a_1 r^n}{1 - r}$ where $r \neq 1$	$k =$ number of objects in the set $m =$ number of objects selected
Combinations	${}_k C_m = C(k, m) = \frac{k!}{(k-m)! m!}$	
Permutations	${}_k P_m = P(k, m) = \frac{k!}{(k-m)!}$	

Circumference, Area, and Volume

Triangle	$A = \frac{1}{2}bh$	$A =$ area $b =$ base $h =$ height
Parallelogram	$A = bh$	$r =$ radius
Trapezoid	$A = \frac{1}{2}(b_1 + b_2)h$	$C =$ circumference $d =$ diameter
Circle	$A = \pi r^2$ $C = \pi d$	$V =$ volume
General Prism	$V = Bh$	$B =$ area of base $\pi \approx 3.14$
Right Circular Cylinder	$V = \pi r^2 h$	
Pyramid	$V = \frac{1}{3}Bh$	
Right Circular Cone	$V = \frac{1}{3}\pi r^2 h$	
Sphere	$V = \frac{4}{3}\pi r^3$	

Answer Key

- 1) B
- 2) A
- 3) B
- 4) A
- 5) B
- 6) C
- 7) B
- 8) D
- 9) D
- 10) A
- 11) A
- 12) D
- 13) B
- 14) C
- 15) C
- 16) D
- 17) D
- 18) D
- 19) D
- 20) D
- 21) A
- 22) B
- 23) A
- 24) D
- 25) B
- 26) A
- 27) C
- 28) D
- 29) C
- 30) D
- 31) A
- 32) B
- 33) B
- 34) C
- 35) D