ACTAAP

Released Item Booklet

Algebra I
Mid-Year End-of-Course Examination

January 2008 Administration

Arkansas Department of Education

1. Which set of points represents a function?

    A.   (0, 2) (1, 4) (2, 6) (0, 8)

 * B.   (−2, 4) (0,4) (2, 4) (4, 4)

    C.   (4, −2) (4, 0) (4, 2) (4, 4)

    D.   (−2, 2) (2, 2) (−2, −2) (2, −2)

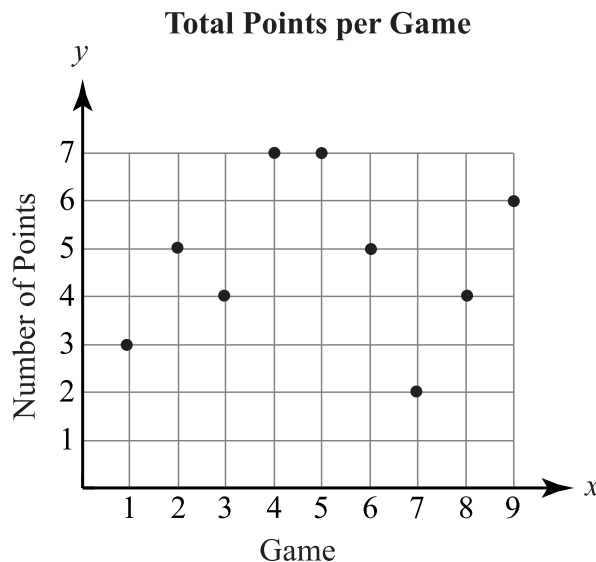**2.** What is the solution to the equation below?

$$\frac{3}{5}x + 5 = \frac{2}{3}x + 3$$

    A. $x = -1\frac{11}{19}$

    B. $x = 6\frac{6}{19}$

    C. $x = -4$

 * D. $x = 30$

3. Which formula would **not** create the sequence shown in the table below?

n	T_n
1	19
2	24
3	29
4	34

 * A. $T_n = 19 + 5n$

    B. $T_n = 14 + 5n$

    C. $T_n = 19 + 5(n − 1)$

    D. $\begin{cases} T_1 = 19 \\ T_n = T_{n-1} + 5 \end{cases}$

4. The scatterplot below shows the number of points the team scored in each of its games this season.

Total Points per Game

What can be inferred from the scatterplot?

    A.   The team scored fewer points against better opponents.

    B.   The team scored more points as the season progressed.

    C.   The team's highest point total was in Game 3.

 * D.   The point totals showed no correlation.

5. The function $f(x) = 2.15 + 0.15x$ describes the cost of taxicab fare, where $f(x)$ = cost of the ride (in dollars), and x = mileage. If the domain is {5, 10, 15, 20}, what is the range of the given function?

    A.   {$19, $59, $85.67, $119}

    B.   {$2.31, $2.30, $2.30, $2.30}

 * C.   {$2.90, $3.65, $4.40, $5.15}

    D.   {$7.30, $12.30, $17.30, $22.30}
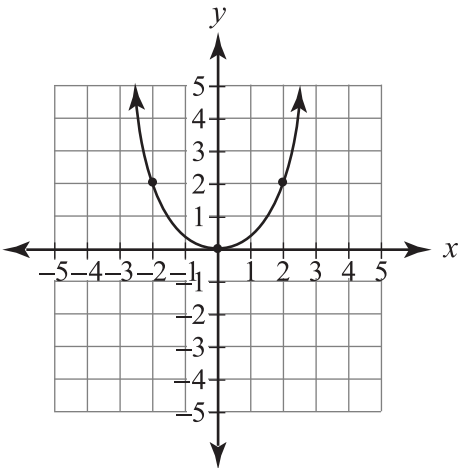
6.   Which graph shows a vertical shift of the one below?

*A.
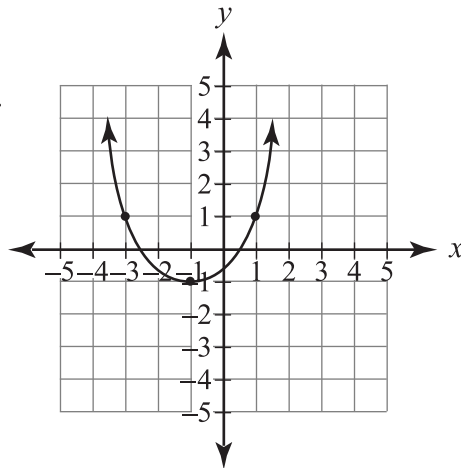
B.

C.

D.
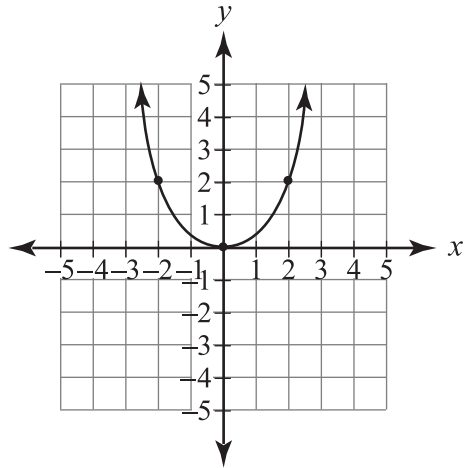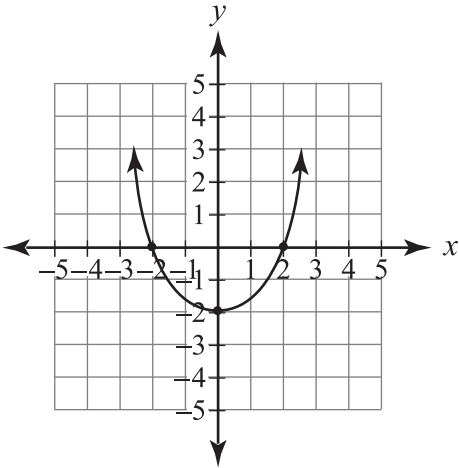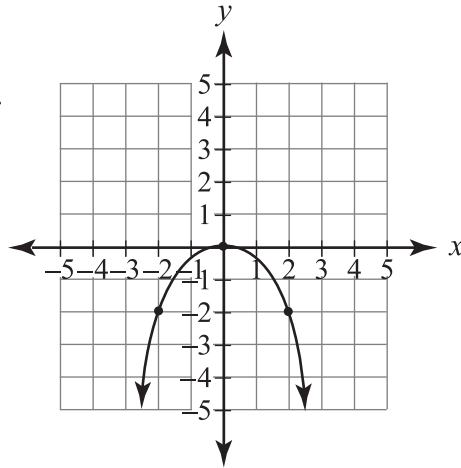
7. What is the **correct** way to factor the polynomial $8x^2 - 4x - 22$?

   A. $2(x^2 - x - 11)$

 * B. $2(4x^2 - 2x - 11)$

   C. $(8x + 11)(x - 2)$

   D. $2(4x^2 + 2x + 11)$

8. What is the slope of the line passing through points $(6, -1)$ and $(1, 8)$?

 * A. $-\dfrac{9}{5}$

   B. $-\dfrac{7}{5}$

   C. $-\dfrac{5}{7}$

   D. $-\dfrac{5}{9}$

9. Given the matrices below, what is $(2A - B)$?

$$A = \begin{bmatrix} 2 & -5 & 8 \\ 7 & 3 & -4 \end{bmatrix} \qquad B = \begin{bmatrix} -9 & 8 & 3 \\ 0 & 6 & -7 \end{bmatrix}$$

   A. $\begin{bmatrix} 11 & -13 & 5 \\ 7 & -3 & 3 \end{bmatrix}$

   B. $\begin{bmatrix} 13 & -18 & 13 \\ 7 & -3 & 3 \end{bmatrix}$

 * C. $\begin{bmatrix} 13 & -18 & 13 \\ 14 & 0 & -1 \end{bmatrix}$

   D. $\begin{bmatrix} -5 & -18 & 13 \\ 14 & 0 & -15 \end{bmatrix}$

10. Sarah bought a \$450 microwave on credit from a local discount store. Interest will be \$12 per month. The equation that represents Sarah's bill is $y = 12x + 450$. What is the slope of the equation?

   A.   10

 * B.   12

   C.   450

   D.   462

11. The graph of $y = x^2 + x - 6$ is shown below.
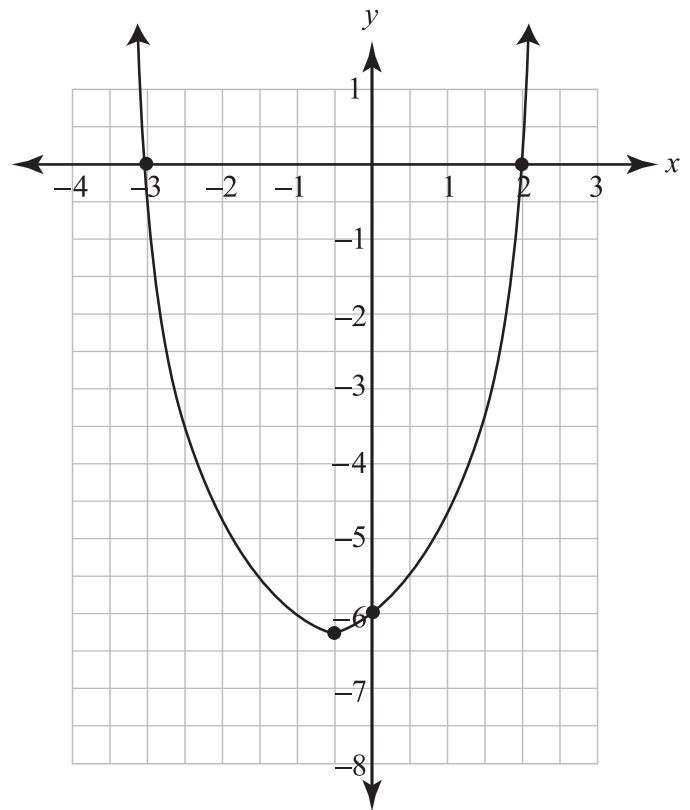
What are the coordinates of the zero(s) of the equation?

   A. $(0, -6)$

   B. $(-0.5, -6.25)$

 * C. $(-3, 0), (2, 0)$

   D. $(-2, 0), (3, 0)$

12. The high temperatures shown below were recorded for the first two weeks in July.

Sun.	Mon.	Tue.	Wed.	Thur.	Fri.	Sat.
						84
86	92	89	83	84	94	93
95	95	84	84	85	89	

If the next four temperatures are 95, 95, 98, and 101, how will this change the mean and median of the data already in the table?

  * A.   The mean and median will increase.

    B.   The mean and median will decrease.

    C.   The mean will increase and the median will decrease.

    D.   The median will increase and the mean will decrease.

13. If $f(x) = 4x - 2$ and $g(x) = x^2 + 3$, what is the value of $f(4) + g(3)$?

    A.   23

  * B.   26

    C.   54

    D.   97

14. A car's efficiency, in mpg, is represented by the expression $-0.03s^2 + 2.1s + 7$, where s is the speed of the car. If the car is traveling at a speed of 60 mph, what is the car's efficiency?

    A.   7 mpg

  * B.   25 mpg

    C.   131 mpg

    D.   135 mpg

15. Which is the complete factorization of the polynomial $x^2 + 2x - 24$?

  * A. $(x + 6)(x - 4)$

    B. $(x - 6)(x + 4)$

    C. $(x + 12)(x - 2)$

    D.   not factorable

16. Solve the formula below for t.

$$d = rt$$

    A. $t = d - r$

    B. $t = rd$

    C. $t = \dfrac{r}{d}$

  * D. $t = \dfrac{d}{r}$

17. Which ordered pair is a solution to the system below?

$$\begin{cases} 3x + 2y = 2 \\ 4x + 4y = 8 \end{cases}$$

  A. $(-5, 7)$

  B. $(-4, 7)$

* C. $(-2, 4)$

  D. $(4, -2)$

18. What value of y would cause the expression below to be undefined?

$$\frac{5x}{3y - 12}$$

  A. $y = \dfrac{3}{12}$

  B. $y = \sqrt{3}$

* C. $y = 4$

  D. $y = 3$

19. What is the product of the expression below?

$$(2x^2 - 11x + 5)(3x - 4)$$

* A. $6x^3 - 41x^2 + 59x - 20$

  B. $6x^3 - 25x^2 - 29x + 35$

  C. $-2x^2 + 11x - 35$

  D. $2x^2 - 8x - 1$

20. Completely factor the expression below.

$$16x^2 - 9$$

  A. $16(x + 3)(x - 3)$

  B. $(4x + 3)(4x + 3)$

* C. $(4x - 3)(4x + 3)$

  D. $16(x^2 - 9)$

21. Which shows all of the solution(s) to the equation below?

$$|x| - 6 = -3$$

  A. $x = 3$

  B. $-x = 3$

  C. $x = -3$

* D. $x = -3, x = 3$

22. Simplify $\sqrt{\dfrac{125}{36}}$ completely.

* A. $\dfrac{5\sqrt{5}}{6}$

  B. $\dfrac{\sqrt{125}}{6}$

  C. $\dfrac{\sqrt{4,500}}{36}$

  D.   cannot be simplified

23. Below are matrices showing the final wins and losses for the Young Sprouts Baseball League for the 2003 and 2004 seasons.

	2003 W L			**2004** W L
Aces	$\begin{bmatrix} 6 & 6 \end{bmatrix}$		Aces	$\begin{bmatrix} 4 & 8 \end{bmatrix}$
Juniors	$2 \quad 10$		Juniors	$7 \quad 5$
Short Stops	$7 \quad 5$		Short Stops	$9 \quad 3$
Sluggers	$9 \quad 3$		Sluggers	$4 \quad 8$

Which matrix shows the 2004 wins and losses minus the 2003 wins and losses?

* A.

	W L
Aces	$\begin{bmatrix} -2 & 2 \end{bmatrix}$
Juniors	$5 \quad -5$
Short Stops	$2 \quad -2$
Sluggers	$-5 \quad 5$

B.

	W L
Aces	$\begin{bmatrix} 2 & -2 \end{bmatrix}$
Juniors	$-5 \quad 5$
Short Stops	$-2 \quad 2$
Sluggers	$5 \quad -5$

C.

	W L
Aces	$\begin{bmatrix} 10 & 14 \end{bmatrix}$
Juniors	$9 \quad 15$
Short Stops	$16 \quad 8$
Sluggers	$13 \quad 11$

D.

	W L
Aces	$\begin{bmatrix} 24 & 48 \end{bmatrix}$
Juniors	$14 \quad 50$
Short Stops	$63 \quad 15$
Sluggers	$36 \quad 24$

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24. Which is the slope of a line containing the points $(-6, 20)$ and $(-1, 13)$?

A. $\dfrac{7}{5}$

B. $-\dfrac{5}{7}$

C. -1

* D. $-\dfrac{7}{5}$

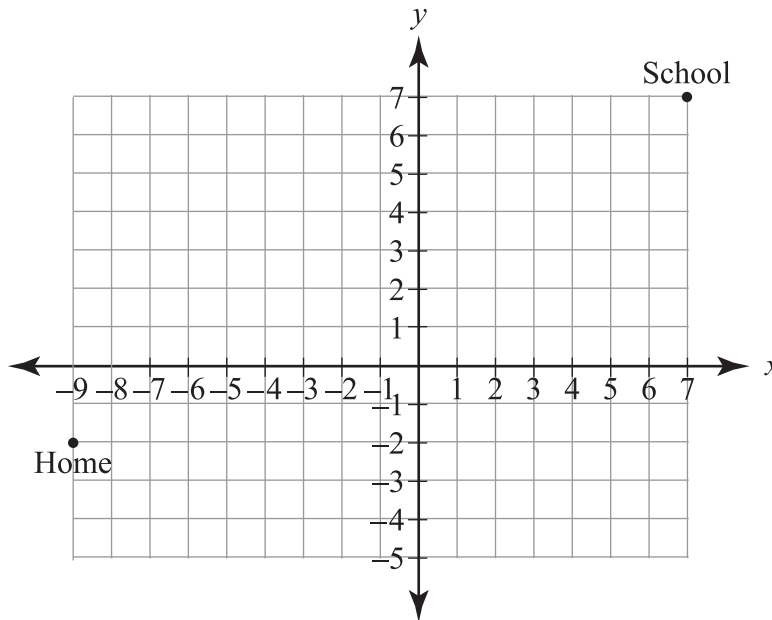**25.** What would be the first operation performed when solving the algebraic expression below?

$$\frac{x^4 - 5(16+12)}{8}$$

A. $x \div 8$

B. $x - 5$

C. $x^4 \div 8$

* D. $(16 + 12)$

26. If the scale of the coordinate plane below is 1 mile = 4 grid spaces, what is the distance between the house and the school, to the nearest mile?

- A. 1 mile
- B. 3 miles
- * C. 5 miles
- D. 19 miles

27. Susie's monthly cell phone rate is $14.99 plus $0.05 per minute. Markus spends $19.99 per month plus $0.02 per minute on his cell phone. This month, Markus and Susie have used the same number of minutes. Which represents their combined bills in terms of the number of minutes (m)?

- A. $0.07m$
- B. $15.04m + $20.01m$
- * C. $34.98 + 0.07m$
- D. $34.98 + 0.10m$

28. Line a and line b are graphed on the same coordinate grid. The slope of line a is 0 and the slope of line b is undefined. What do these two lines create?

- A. a parabola
- B. vertical lines
- * C. perpendicular lines
- D. a set of parallel lines

29. Compare the graphs of the two functions below. The solid line is the graph of the equation $y = -x^2 - 2$.
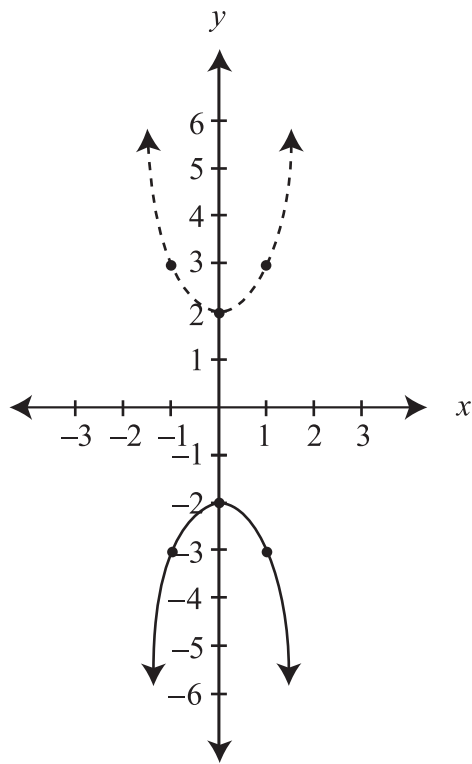
Which equation is the graph of the dashed line?

   A. $y = -x^2 + 2$

* B. $y = x^2 + 2$

   C. $y = x^2 - 2$

   D. $y = x^2 + 4$

30. The local animal shelter houses 9 dogs to every 4 cats. If the total number of dogs and cats is 104, how many are dogs?

   A.   32

   B.   40

* C.   72

   D.   234

31. What is the value of $f(4)$ in the function $f(x) = -2x^2 - 6x$?

   A. -1

   B. -2

   C. -8

* D. -56

32. What is the solution for x in the quadratic equation $x^2 - 14x + 49 = 0$?

* A. $x = 7$

   B. $x = -7$

   C. $x = 49, x = 1$

   D. $x = 49, x = -14$

33. Becky is Sarah's older sister. When they go jogging together, Sarah realizes that she must take more steps than Becky to cover the same distance. Their numbers of steps are shown below.

Becky	Sarah
4	7
13	25
8	15
20	39

According to the data, which describes Sarah's steps (S) as a function of Becky's steps (B)?

   A. $S = B + 3$

   B. $B = 2S - 1$

* C. $S = 2B - 1$

   D. $S = 3B - 9$