

End-of-Course Test

1. Which matrix product can be evaluated to find the solution of the following system?

$$2x + 5y = 17$$

$$-3x + 4y = 9$$

- A $\begin{bmatrix} 2 & 5 \\ -3 & 4 \end{bmatrix} \begin{bmatrix} 17 \\ 9 \end{bmatrix}$
- B $\begin{bmatrix} 2 & 5 \\ -3 & 4 \end{bmatrix}^{-1} \begin{bmatrix} 17 \\ 9 \end{bmatrix}$
- C $\begin{bmatrix} 17 & 9 \end{bmatrix} \begin{bmatrix} 2 & 5 \\ -3 & 4 \end{bmatrix}$
- D $\begin{bmatrix} 17 & 9 \end{bmatrix} \begin{bmatrix} 2 & 5 \\ -3 & 4 \end{bmatrix}^{-1}$

2. Find the product: $3 \begin{bmatrix} -1 & 8 \\ 2 & -4 \\ -1 & 5 \end{bmatrix}$

- A $\begin{bmatrix} -3 & 24 \\ 6 & -12 \\ -3 & 15 \end{bmatrix}$
- B $\begin{bmatrix} -3 & -24 \\ 6 & 12 \\ -3 & -15 \end{bmatrix}$
- C $\begin{bmatrix} -3 & 6 & -3 \\ 8 & -12 & -15 \end{bmatrix}$
- D $\begin{bmatrix} 3 & -6 & 3 \\ -8 & 12 & 15 \end{bmatrix}$

3. Simplify: $\frac{4x + 16}{4x - 16}$

- A $\frac{x - 4}{x + 4}$
- B none of these
- C -1
- D $\frac{x + 16}{x - 16}$

4. What is the best classification for $\sqrt{5}$?

- A integer, rational number, real number
- B rational number, real number
- C irrational number, real number
- D whole number, integer, real number

5. Give a sine function with an amplitude of 10 and a period of 2π .

- A $y = 2\pi \sin \frac{1}{5}\theta$
- B $y = 10 \sin 1\theta$
- C $y = 10 \sin 2\pi\theta$
- D $y = 2\pi \sin 10\theta$

6. The daily cost of renting a car is \$30 plus \$0.40 per mile traveled. If Tameka paid \$122.80 for a day's rental, how many miles did she travel?

- A 23
- B 307
- C 232
- D 382

7. Solve: $|4x + 1| \geq 3$

- A $x \leq -1$ or $x \geq \frac{1}{2}$
- B $-1 < x < \frac{1}{2}$
- C $-1 \leq x \leq \frac{1}{2}$
- D $x < -1$, or $x > \frac{1}{2}$

8. Write an equation of the line that passes through the point $(3, -7)$ with slope 4.

- A $y = -4x - 7$
- B $y = -4x - 19$
- C $y = 4x - 19$
- D $y = 4x - 7$

9. Determine which relation is a function.

- A

x	1	3	1	4
y	2	1	7	0
- B

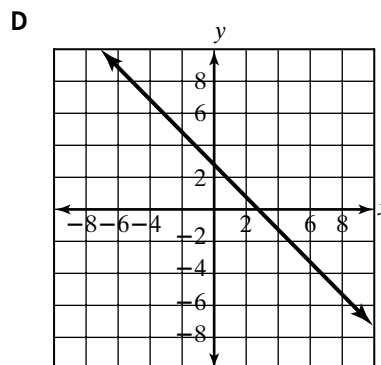
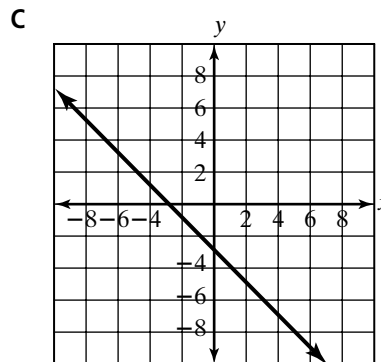
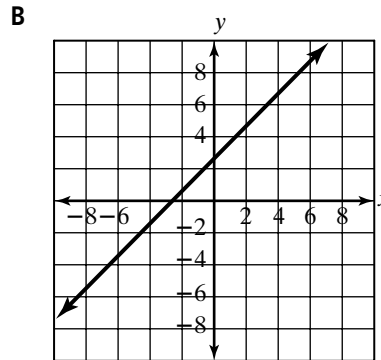
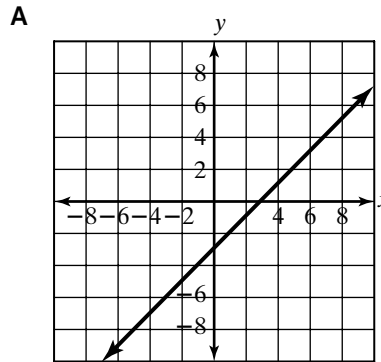
x	0	1	1	4
y	2	1	3	0
- C

x	-1	0	1	2
y	3	4	3	0
- D

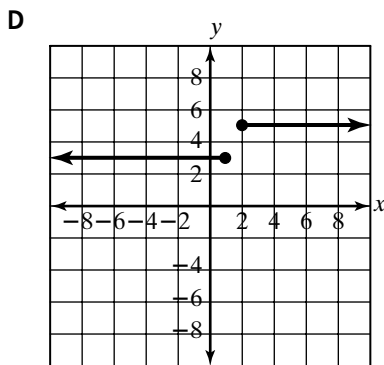
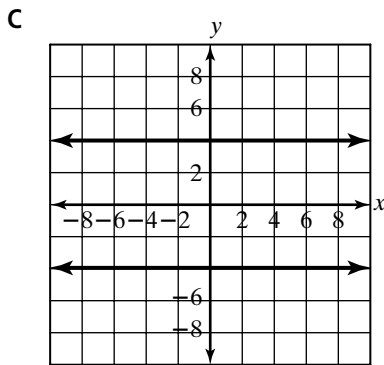
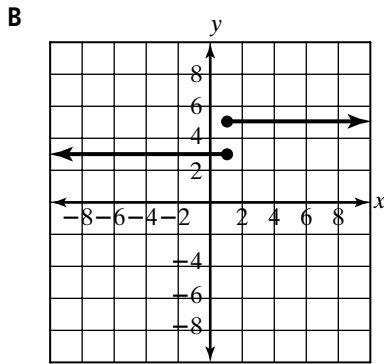
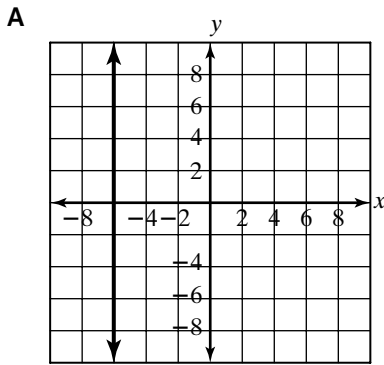
x	2	3	6	2
y	4	5	-1	0

10. Which of the following graphs contains the points described in the table?

x	0	3	6	9
y	-3	0	3	6



11. Use the vertical line test to determine which graph represents a function.



12. Find $g(f(x))$ where $f(x) = x - 2$ and $g(x) = \frac{x + 5}{5}$.

- A $\frac{x + 3}{5}$
- B $\frac{x^2 + 3x - 10}{5}$
- C $\frac{6x - 5}{5}$
- D $\frac{x - 5}{5}$

13. Write an equation for the inverse of $f(x) = \frac{x + 9}{7}$.

- A $f^{-1}(x) = \frac{7}{x + 9}$
- B $f^{-1}(x) = -7x + 56$
- C $f^{-1}(x) = 7x - 9$
- D $f^{-1}(x) = 9x + 7$

14. Find the words that best complete the sentence. The following system of equations has _____ solution(s) and is _____.

$$\begin{aligned} 4x + y + 3z &= 13 \\ 3x + 3y - z &= 1 \\ x + 4y - z &= -4 \end{aligned}$$

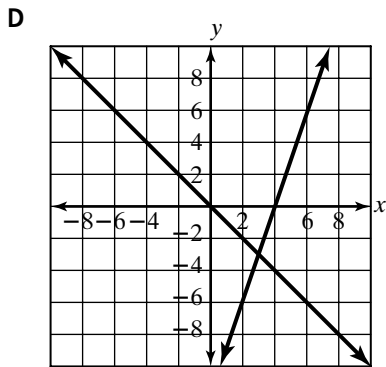
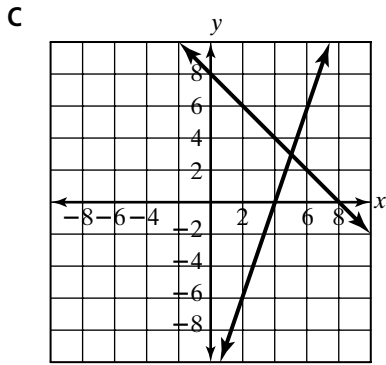
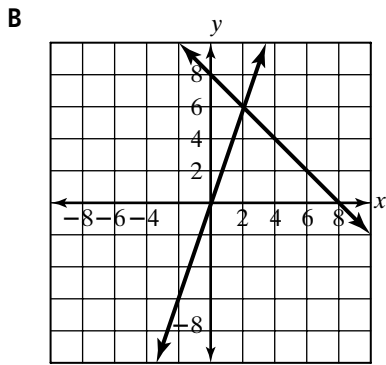
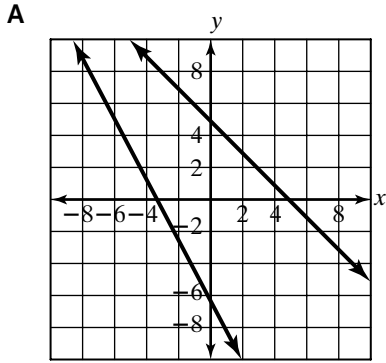
- A one, inconsistent
- B one, independent
- C no, inconsistent
- D infinitely many, dependent

15. Solve: $x + 2y = -9$
 $y = -3x - 7$

- A no solution
- B $(0, -7)$
- C $(-1, -4)$
- D $\left(-4, -\frac{5}{2}\right)$

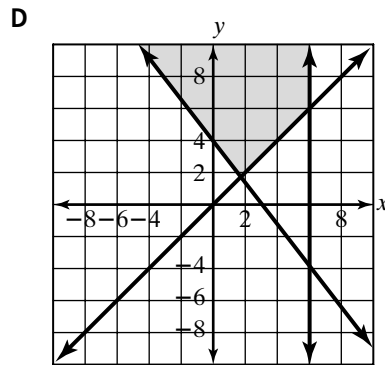
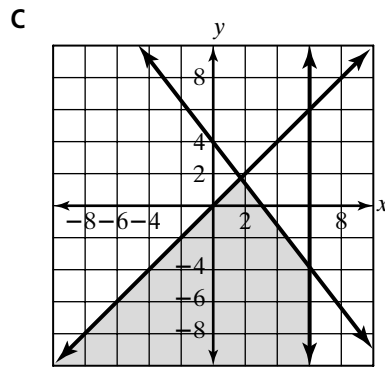
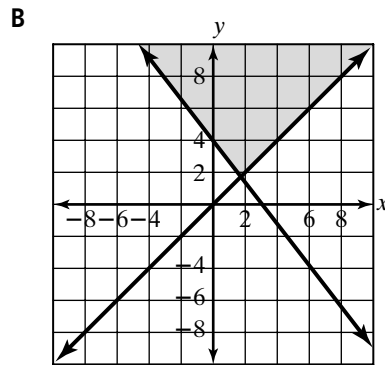
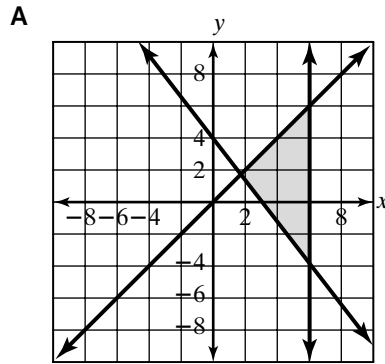
16. Solve the system by graphing.

$$\begin{aligned} x + y &= 8 \\ y &= 3x - 12 \end{aligned}$$



17. Graph the solution of the system of inequalities. $4x + 3y \geq 12$

$$\begin{aligned} x &\leq y \\ x &\leq 6 \end{aligned}$$



18. Add: $\begin{bmatrix} 8 & 3 & 4 \\ -2 & 0 & 6 \end{bmatrix} + \begin{bmatrix} -9 & 2 & -7 \\ 8 & 2 & 2 \end{bmatrix}$

A $\begin{bmatrix} 1 & 5 & -11 \\ 6 & 2 & 8 \end{bmatrix}$

B $\begin{bmatrix} -1 & 5 & -11 \\ 6 & -2 & 8 \end{bmatrix}$

C $\begin{bmatrix} -1 & 5 & -3 \\ 6 & 2 & 8 \end{bmatrix}$

D $\begin{bmatrix} 1 & 5 & 11 \\ 6 & -2 & 8 \end{bmatrix}$

19. A factory can produce two products, x and y , with a profit approximated by $P = 8x + 18y - 900$. The production of y can exceed x by no more than 200 units. Moreover, production is limited by the equation $x + 2y \leq 1000$. What production levels yield maximum profit?

A $x = 200, y = 400$

B $x = 1000, y = 0$

C $x = 0, y = 200$

D $x = 0, y = 0$

20. What is the value of $\begin{vmatrix} 7 & 1 \\ -2 & 3 \end{vmatrix}$?

A 23

B 19

C -19

D -23

21. Find the values of a, b , and c if

$$\begin{bmatrix} 3a & 6 \\ 7 & c \end{bmatrix} = \begin{bmatrix} -6 & b - a \\ 7 & -3c + 4 \end{bmatrix}.$$

A $a = -2, b = 8, c = 1$

B $a = -2, b = 4, c = 1$

C $a = 2, b = 8, c = -1$

D $a = -2, b = 4, c = -1$

22. Simplify: $\frac{3x^2 - 6x - 24}{-9x^2 + 144}$

A $\frac{-x - 2}{3(x - 4)}$

B $\frac{-x + 2}{3(x - 4)}$

C $\frac{-x - 2}{3(x + 4)}$

D $\frac{-x - 4}{3(x + 4)}$

23. Solve: $\frac{x}{x + 1} - \frac{1}{2} = -\frac{1}{x + 1}$

A 1

B 0

C -1

D no solution

24. An enclosed gas exerts a pressure P on the walls of the container. This pressure is directly proportional to the temperature T of the gas. If the pressure is 3 lb/in.^2 when the temperature is 360°F , find the constant of variation.

A 120
B $\frac{1}{120}$
C $\frac{1}{9}$
D 9

25. Which has the same value as $\sqrt[3]{729}$?

A $\frac{1}{729^3}$
B 27
C 9
D -9

26. Simplify: $\sqrt{8x^3y^8}$

A $2x^2y^6\sqrt{2x}$
B $2x^2y^6\sqrt{2xy}$
C $2xy^6\sqrt{2xy}$
D $2xy^4\sqrt{2x}$

27. Which has the same value as $64^{2/3}$?

A 16
B $\sqrt{64^3}$
C $8\sqrt{2}$
D $\frac{1}{\sqrt[3]{64^3}}$

28. Solve: $\sqrt{x + 56} = x$

A no solution
B 8
C 8, -7
D -7

29. Evaluate: $|7 + 2i|$

A 9
B $\sqrt{53}$
C 5
D 3

30. Multiply: $(7 - 4i)(5 - 2i)$

A $43 + 6i$
B $43 - 34i$
C $27 - 34i$
D $27 + 7i$

31. Solve: $3x^2 - x - 4 = 0$

A $-\frac{4}{3}, 1$
B 4, -3
C $\frac{4}{3}, -1$
D 8, 26

32. Solve: $2x^2 - 2x - 2 = 0$

- A $\frac{1 \pm 2\sqrt{5}}{2}$
- B $\frac{-1 \pm \sqrt{5}}{2}$
- C $\frac{1 \pm \sqrt{5}}{2}$
- D $\frac{-1 \pm 2\sqrt{5}}{2}$

33. Solve: $x^2 = -5x + 4$

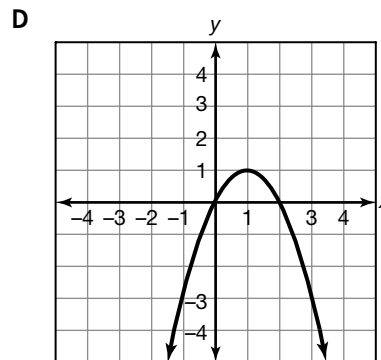
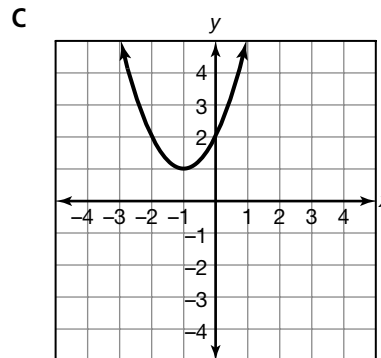
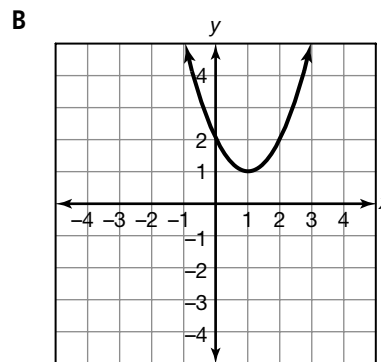
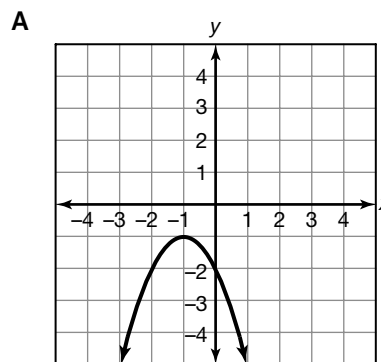
- A $\frac{5 + \sqrt{41}}{2}, \frac{5 - \sqrt{41}}{2}$
- B $-5 + \sqrt{41}, -5 - \sqrt{41}$
- C $\frac{-5 + \sqrt{41}}{2}, \frac{-5 - \sqrt{41}}{2}$
- D $5 + \sqrt{41}, 5 - \sqrt{41}$

34. Determine whether the following equation has two real solutions, one real solution, or two complex solutions. $6x^2 + 10x + 1 = 0$

- A one real solution
- B two real solutions
- C two complex solutions
- D cannot be determined

35. Graph the quadratic function:

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



36. A brick falls from the top of a tall building. The distance, in feet, between the brick and the ground t seconds after it falls is given by $d = -16t^2 - 4t + 446$. How long after the brick falls is it 390 feet from the ground?
- A $\frac{7}{4}$ sec
 B $\frac{9}{4}$ sec
 C 2 sec
 D 3 sec
37. Divide:
 $(3x^3 + 11x^2 + 13x + 7) \div (x + 2)$
- A $3x^2 + 5x + 3$
 B $3x^2 + 5x + 3$ R 1
 C $3x^2 + 11x + 3$ R 2
 D $3x^2 + 11x + 3$
38. What are the solutions of $2x^3 + 10x^2 + 12x = 0$?
- A 2, 10, 12
 B 0, 3
 C 0, -2, -3
 D 0, 2, 3
39. Solve by using a calculator. Round your solutions to the nearest tenth: $x^4 - 6x^2 + 5 = 0$
- A $\pm 1, \pm 2.2$
 B 1, 0, ± 1.1
 C $\pm 1, \pm 0.2$
 D no solutions
40. Simplify: $\frac{1 + \frac{2}{x-2}}{1 - \frac{2}{x+3}}$
- A $\frac{x^2 + 3x}{x^2 - x - 2}$
 B $\frac{x^2}{x^2 + x - 6}$
 C $\frac{x^2 - x - 12}{x^2 - x - 2}$
 D $\frac{x^2 - x - 12}{x^2 - 3x + 2}$
41. Which of the following is not true for all $\triangle ABC$?
- A $a \sin C = c \sin A$
 B $b \sin A = a \sin B$
 C $\frac{\sin A}{c} = \frac{\sin B}{a} = \frac{\sin C}{b}$
 D $2ac \cos B = a^2 + c^2 - b^2$

42. Indicate whether the following equation when graphed will be a parabola, circle, ellipse, or hyperbola.

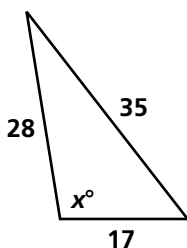
$$16x^2 = 36 - 100y^2$$

- A hyperbola
- B circle
- C parabola
- D ellipse

43. The amount a spring will stretch S varies directly with the force (or weight) F attached to the spring. If a spring stretches 0.56 inches when 11.2 pounds is attached, how far will it stretch when 17.6 pounds is attached?

- A 0.5 in.
- B 0.05 in.
- C 880 in.
- D 0.88 in.

44. Find x to the nearest tenth.



- A 99.2°
- B 71.4°
- C 53.2°
- D 31.3°

45. Evaluate: $\log_3\left(\frac{1}{81}\right)$

- A 4
- B 5
- C -4
- D -5

46. Write the equation $1024^{2/5} = 16$ in logarithmic form.

- A $5\log_2 16 = 1024$
- B $\log_{16} 1024 = \frac{5}{2}$
- C $\log_{2/5} 16 = 1024$
- D $\log_{1024} 16 = \frac{2}{5}$

47. Use a calculator to find $\log\left(\frac{1}{3}\right)$ to the nearest hundredth.

- A -1.09
- B 2.06
- C -2.06
- D -0.48

48. Use the change of base formula to find $\log_5 186$.
- A 1.5705
 - B 0.3080
 - C 1.1348
 - D 3.2469

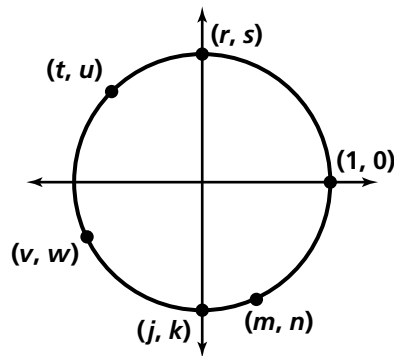
49. If \$3500 is invested at a rate of 9% compounded continuously, find the balance in the account after 4 years. Use the formula $A = Pe^{rt}$.
- A \$4940.54
 - B \$25,861.70
 - C \$5016.65
 - D \$5489.09

50. A bag contains 3 red, 6 white, and 4 blue marbles. Find the probability of obtaining a white or a blue marble in a single draw.
- A 1
 - B $\frac{9}{13}$
 - C $\frac{7}{13}$
 - D $\frac{10}{13}$

51. Eight balls numbered from 1 to 8 are placed in an urn. If one ball is selected at random, find the probability that it is number 7.
- A $\frac{3}{4}$
 - B $\frac{1}{2}$
 - C $\frac{7}{8}$
 - D $\frac{1}{8}$

52. A yogurt shop offers three different flavors of frozen yogurt and eight different toppings. How many choices are possible for a single serving of frozen yogurt with one topping?
- A 32
 - B 11
 - C 24
 - D 21

53. Use the unit circle below. Which letter stands for $\sin 90^\circ$?

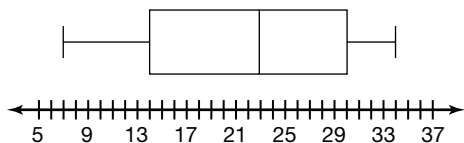


- A r
- B j
- C k
- D s

54. Find: ${}_7P_3$
- A 420
 - B 210
 - C 21
 - D 10

55. Evaluate: ${}_8C_4$
- A 140
 - B 40,320
 - C 70
 - D 1680

56. Which set of data is represented by the box-and-whisker plot?



- A 30, 24, 7, 23, 36, 29, 14
- B 30, 24, 7, 23, 34, 29, 14
- C 30, 22, 7, 23, 34, 29, 14
- D 30, 24, 7, 13, 34, 29, 14

57. Find the mean, median, and mode of the data in the following sample.
4, 5, 12, 7, 22, 2, 2, 2
- A 2, 4.5, 7
 - B 13, 7, 2
 - C 4.5, 7, 2
 - D 7, 4.5, 2

58. Multiply: $\begin{bmatrix} 4 & 3 \\ 0 & -5 \end{bmatrix} \begin{bmatrix} 2 & -1 \\ -2 & -2 \end{bmatrix}$
- A $\begin{bmatrix} 2 & -10 \\ 10 & 10 \end{bmatrix}$
 - B $\begin{bmatrix} 8 & -3 \\ 0 & 10 \end{bmatrix}$
 - C $\begin{bmatrix} 8 & -3 \\ 0 & -10 \end{bmatrix}$
 - D $\begin{bmatrix} -4 & 11 \\ 8 & 4 \end{bmatrix}$

59. Is the sequence arithmetic? If so, find the common difference.
-0.9, 13, 27, 40.8
- A no
 - B yes, 14.1
 - C yes, 13.8
 - D yes, 13.9

60. Find the sum of the first 6 terms of the series:
 $2 - 6 + 18 - 54 + \dots$
- A 122
 - B -364
 - C 1094
 - D -40