Use the functions, $f(x)=\sqrt{2x+1}$ and $g(x)=x^2-7$, to answer questions #1 and #2:

1. Find and simplify $(f-g)(4)$.

A. 12

B. 6

C. -12

D. -6

E. None of the above.

2. Find and simplify $(g\circ f)(x)$.

A. $2x-6$

B. $\sqrt{2x^2-13}$

C. $x^2\left(\sqrt{2x+1}\right)-7\left(\sqrt{2x+1}\right)$

D. $x^2\left(\sqrt{2x+1}\right)-7$

E. None of the above.

3. Given in each table are several values of two functions *F* and *G*. Use this information to find $(F\circ G)(-1)$.

x	–2	–1	9
F(x)	0	2	11

x	–5	–1	2
G(x)	4	9	–3

A. -3

B. 2

C. 11

D. 0

E. Cannot be determined.

4. If $f(x) = 2x^3 - 5kx + k - 3$, find the value of k such that the graph of f contains the point $(-1, 4)$.

A. $k = \frac{3}{2}$

B. $k = 4$

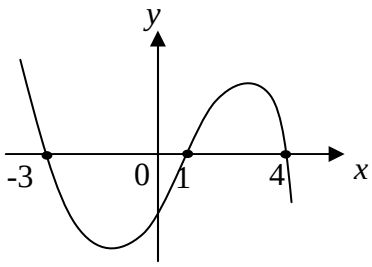
C. $k = -\frac{5}{4}$

D. $k = -\frac{1}{4}$

E. None of the above.

5. Which of the following best depicts $f(x) = (x-1)(x+3)(x-4)$?

A.



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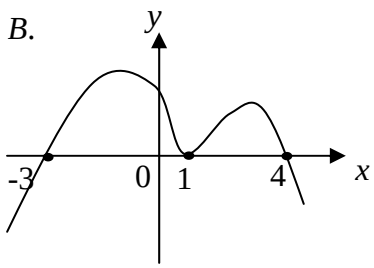

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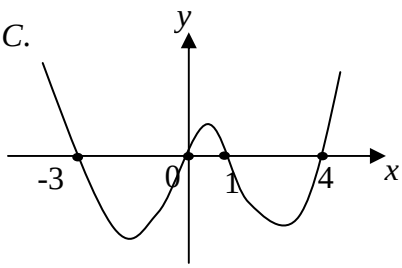
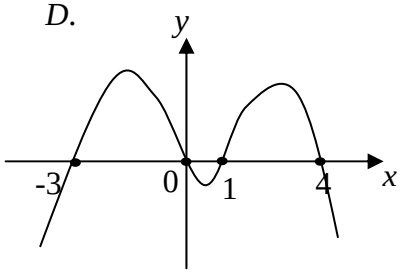
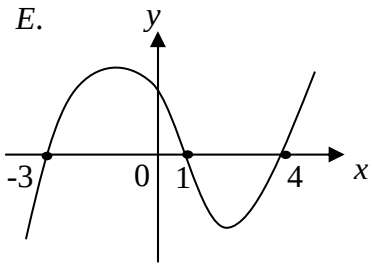


D.



E.



6. Solve the following system of equations for x:

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

A. $x=0,\ x=\frac{4}{3}$

B. $x=2,\ x=4$

C. $x=0,\ x=-\frac{4}{3}$

D. $x=-2,\ x=-4$

E. There is no solution for x.

7. Which of the following is (are) true about the system of equations given by:

$$\begin{cases} 2m+n=5 \\ 6m+3n=15 \end{cases}$$

A. The solution is $(0,0)$.

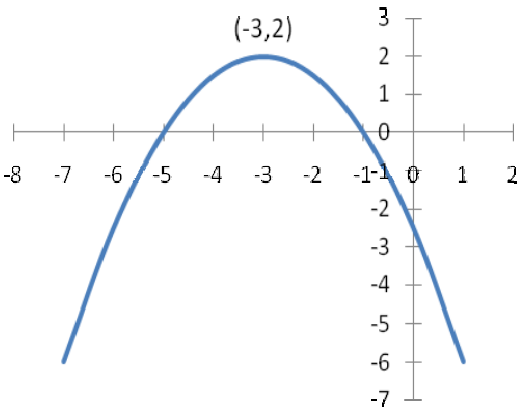
B. There is no solution.

C. All (m,n) are solutions such that $2m+n=5$.

D. None are true.

E. Only answers *A* and *C* are true.

8. Find the equation of the parabola shown below.



A. $y=-\frac{1}{32}(x-3)^2+2$

B. $y=-\frac{7}{9}(x+3)^2+2$

C. $y=-\frac{1}{3}(x-3)^2+2$

D. $y=-\frac{1}{2}(x+3)^2+2$

E. $y=-\frac{2}{3}(x+3)^2+2$

9. Solve the inequality. Express your answer in interval notation.

$$\frac{(x+1)(x-5)}{(x-2)(x-5)} > 0$$

A. $(-1,2)$

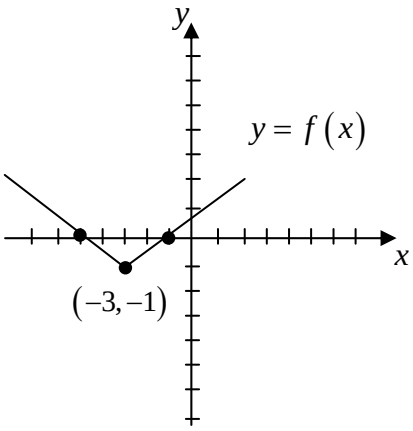
B. $(-1,2)\cup(5,\infty)$

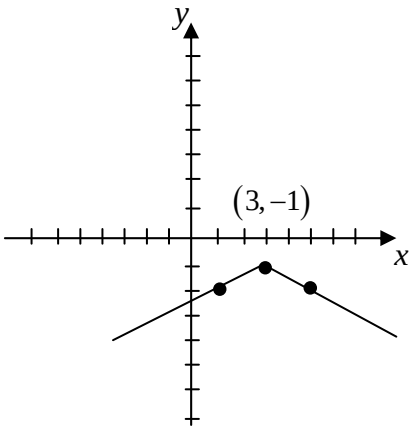
C. $(-\infty,-1)\cup(2,5)\cup(5,\infty)$

D. $(2,5)\cup(5,\infty)$

E. $(-\infty,-1)\cup(-1,2)$

10. Given below, on the left, is the graph of a basic function, $y = f(x)$. The graph on the right was obtained by shifting, reflecting, stretching, and/or compressing the basic graph. Which of the following best describes the graph on the right?





A. $y = -f(x-6)$

B. $y = -f(x+6)$

C. $y = -f(x+6)-2$

D. $y = -f(x-6)-2$

E. Cannot be determined.

11. Express the equation of the parabola given by $y = 2x^2 - 12x + 5$ in standard form.

A. $y = 2(x-6)^2 + 5$

B. $y = 2(x-3)^2 + 5$

C. $y = 2(x-3)^2 - 4$

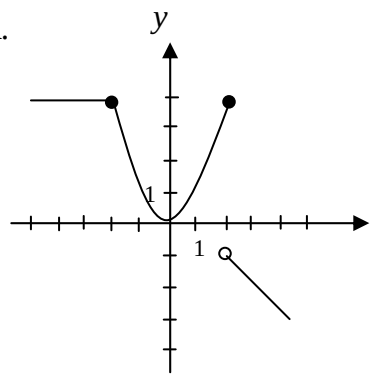
D. $y = 2(x-6)^2 + 13$

E. $y = 2(x-3)^2 - 13$

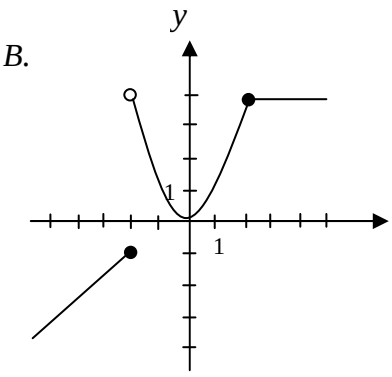
12. Which of the following depicts the graph of:

$$f(x)=\begin{cases} x+1 & \text{if } x\le -2 \\ x^2 & \text{if } -2<x\le 2 \\ 4 & \text{if } x>2 \end{cases}$$

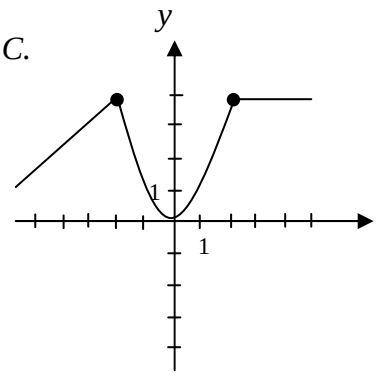
A.



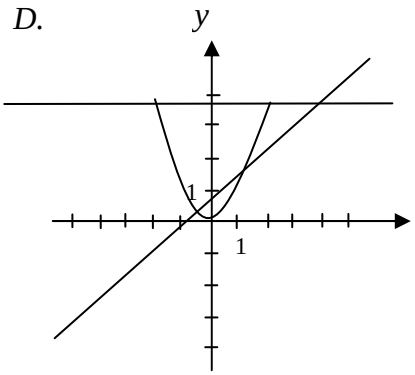
B.



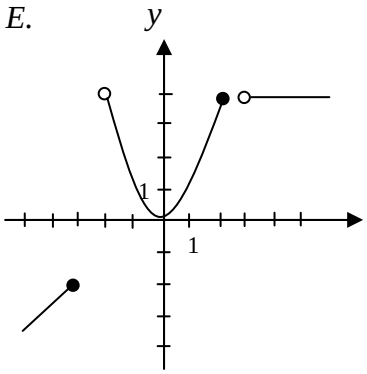
C.



D.



E.



13. The number of hours Bill can work at his part time job in one month is directly proportional to the amount of money he spends in one month and inversely proportional to the sum of the number of hours he must study and the number of hours he spends at the gym. In January, Bill spent \$850, studied for 15 hours, and spent 5 hours at the gym. He worked 119 hours in January. How many hours can Bill work in February if he expects to spend \$725, studies for 12 hours, and spends 6 hours at the gym? Round your answer to the nearest hour.

A. 125 hours
B. 108 hours
C. 113 hours
D. 119 hours
E. Not enough information given.

14. An object is projected upward from the ground with an initial velocity of 112 ft./sec. Its distance, *s(t)*, in feet, above the ground after *t* seconds is given by $s(t) = -16t^2 + 112t$. Find the object's maximum distance above the ground.

A. 196 feet

B. 225 feet

C. 168 feet

D. 185 feet

E. None of the above

15. The price of admission to a spring matinee is \$1.25 for children and \$2.00 for adults. There were 65 tickets sold for a total of \$80.00. If *x* represents the number of children and *y* the number of adults, choose the system of equations that would be used to solve for *x* and *y*.

A. $\begin{cases} x + y = 80.00 \\ 2.00x + 1.25y = 65 \end{cases}$

B. $\begin{cases} x + 2.00 = 65 \\ 1.25x + y = 80.00 \end{cases}$

C. $\begin{cases} 1.25x + y = 65 \\ x + 2.00y = 80.00 \end{cases}$

D. $\begin{cases} x + y = 80.00 \\ 1.25x + 2.00y = 65 \end{cases}$

E. $\begin{cases} x + y = 65 \\ 1.25x + 2.00y = 80.00 \end{cases}$