

SOL Practice

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SAMPLE A

Which expression is equivalent to $\sqrt{\frac{7x}{16}}$?

A $\frac{7x}{4}$

$$\frac{\sqrt{7x}}{\sqrt{16}} = \frac{\sqrt{7x}}{4}$$

B $\frac{7x}{8}$

C $\frac{\sqrt{7x}}{4}$

D $\frac{\sqrt{7x}}{8}$

SAMPLE B

What value of x makes $\sqrt{x} - 3 = 6$ true?

$$\sqrt{x} = 9$$

$$(\sqrt{x})^2 = 9^2$$

$$x = 81$$

$$\boxed{x = 81}$$

1. Which expression is equivalent to $\frac{3n}{n+3} + \frac{5}{n-4}$ if no denominator equals zero?

A $\frac{3n^2 - 7n + 3}{(n+3)(n-4)}$

$$\frac{3n(n-4) + 5(n+3)}{(n+3)(n-4)}$$

B $\frac{3n^2 - 7n + 15}{(n+3)(n-4)}$

$$\frac{3n^2 - 12n + 5n + 15}{(n+3)(n-4)}$$

C $\frac{3n^2 + 5n + 3}{(n+3)(n-4)}$

$$\frac{3n^2 - 7n + 15}{(n+3)(n-4)}$$

D $\frac{3n^2 + 5n + 15}{(n+3)(n-4)}$

+ -
-7 45
45, 1
5, 9
 $\therefore 3n^2 - 7n + 15$ is
not factorable

2. Which number is equivalent to $(-6 - i) + 5i - (11 + 13i)$?

A $-17 - 9i$

B $-17 + 17i$

C $-5 - 9i$

D $-5 + 17i$

$$\underline{-6} - \underline{i} + \underline{5i} - \underline{11} - \underline{13i} \quad (\text{combine like terms})$$

$$-17 - 9i$$

KEY

3. Which of the following is the factored form of $x^3 - 216$?

- A $(x - 6)^3$
- B $(x - 6)(x^2 + 36)$
- C $(x - 6)(x^2 + 12x + 36)$
- D $(x - 6)(x^2 + 6x + 36)$

$x^3 - 6^3$

difference of cubes!
 $a^3 - b^3 = (a - b)(a^2 + ab + b^2)$
 $x^3 - 6^3 = (x - 6)(x^2 + 6x + 36)$

4. Which expression is equivalent to $\sqrt{75x^3} - \sqrt{27x^3}$, if $x > 0$?

- A $4x\sqrt{6x}$
- B $4x\sqrt{3x}$
- C $2x\sqrt{6x}$
- D $2x\sqrt{3x}$

$= \sqrt{25 \cdot 3 \cdot x^2 \cdot x} - \sqrt{9 \cdot 3 \cdot x^2 \cdot x}$

$= 5x\sqrt{3x} - 3x\sqrt{3x}$ ← (like radical expressions)
 (combine similar to other like terms)
 $= 2x\sqrt{3x}$

5. Assuming that no denominator equals zero, which is equivalent to $\frac{r^2 - r - 6}{(r - 2)(r - 3)}$?

- A $\frac{r + 2}{r - 2}$
- B $\frac{r + 3}{r - 3}$
- C $\frac{r + 2}{r - 1}$
- D $\frac{2(r - 1)}{r - 2}$

$= \frac{(r - 3)(r + 2)}{(r - 2)(r - 3)}$
 $= \frac{(r + 2)}{(r - 2)}$

6. Which expression is equivalent to $\sqrt[4]{16x^{15}y^{17}}$, where $x > 0$ and $y > 0$?

- A $4x^{11}y^{13}$
- B $4x^{\frac{15}{4}}y^{\frac{17}{4}}$
- C $2x^{11}y^{13}$
- D $2x^{\frac{15}{4}}y^{\frac{17}{4}}$

$\sqrt[4]{2^4 x^{15} y^{17}}$
 $2x^{\frac{15}{4}}y^{\frac{17}{4}}$

index $\sqrt{\text{base}^{\text{power}}} = \text{base}^{\frac{\text{power}}{\text{index}}}$

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7. Which is equivalent to $(6 + \sqrt{7})(5 + \sqrt{7})$?

A $11 + 2\sqrt{7}$

$$30 + 6\sqrt{7} + 5\sqrt{7} + 7$$

B $30 + 11\sqrt{7}$

$$37 + 11\sqrt{7}$$

C $30 + 18\sqrt{7}$

D $37 + 11\sqrt{7}$

8. Simplify completely: $\sqrt[3]{162x^6y^7}$

$$\sqrt[3]{27 \cdot 6 \cdot x^3 \cdot x^3 \cdot y^3 \cdot y^3 \cdot y^1}$$

$$3 \cdot x \cdot x \cdot y \cdot y \cdot \sqrt[3]{6y}$$

$$3x^2y^2 \sqrt[3]{6y}$$

$$\boxed{3x^2y^2} \sqrt[3]{\boxed{6y}}$$

2	3	6	9
x	x ²	x ³	x ⁴
y	y ²	y ³	y ⁴

9. Which expression is equivalent to $x^{\frac{3}{7}}y^{\frac{36}{7}}$?

$$\text{base}^{\frac{\text{power}}{\text{index}}} = \sqrt[\text{index}]{\text{base}^{\text{power}}}$$

A $\frac{1}{7} \sqrt{x^3y^{36}}$

$$\sqrt[7]{x^3y^{36}}$$

B $\frac{1}{7}y^5 \sqrt{x^3y}$

$$\sqrt[7]{x^3y^7 \cdot y^7 \cdot y^7 \cdot y^7 \cdot y^7 \cdot y^1}$$

C $y^5 \sqrt[7]{x^3y}$

$$y \cdot y \cdot y \cdot y \cdot y \sqrt[7]{x^3y}$$

D $x^3y^5 \sqrt[7]{y}$

$$y^5 \sqrt[7]{x^3y}$$

10. Factor the following polynomial.

$$8x^2 - 18xy - 5y^2$$

$$8x^2 - 20xy + 2xy - 5y^2$$

$$4x(2x-5y) + y(2x-5y)$$

$$(2x-5y)(4x+y)$$

$$\begin{array}{r} + \quad - \\ -18 \quad -40 \end{array} \quad \begin{array}{r} + \quad - \\ -18 \quad -40 \end{array} \quad \begin{array}{r} + \quad - \\ -18 \quad -40 \end{array}$$

$$8x^2 - 18xy - 5y^2 = \boxed{(2x-5y)(4x+y)}$$

- (x + 5y) (2x - 5y) (2x - y) (4x + y) (4x + 5y) (8x - y)

key

11. Which statement illustrates the symmetric property of equality?

- A If $7\sqrt{x} + 17i = 49i$, then $7\sqrt{x} + 17i = 49i$.
- B If $7\sqrt{x} + 17i = 49i$, then $49i = 7\sqrt{x} + 17i$.
- C If $7\sqrt{x} + 17i = 49i$ and $49i = 12\sqrt{x} - 3i$, then $7\sqrt{x} + 17i = 12\sqrt{x} - 3i$.
- D If $7\sqrt{x} + 17i = 49i$ and $7\sqrt{x} + 17i - y = -35i$, then $49i - y = -35i$.

12. Identify each expression that is equivalent to i .

$i^1 = i$
 $i^2 = -1$
 $i^3 = -i$
 $i^4 = 1$

$i^{47} = (i^4)^{11} \cdot i^3 = -i$ also, try calculator
 $\star i^{33} = (i^4)^8 \cdot i^1 = i$
 $\star i^{21} = (i^4)^5 \cdot i^1 = i$
 $i^{15} = (i^4)^3 \cdot i^3 = -i$



13.

$$\frac{\frac{n-15}{9n}}{\frac{15-n}{3n^5}} \div$$

Assuming no denominator equals zero, which expression is equivalent to the given expression?

- A $-\frac{n^4}{3}$
- B $\frac{n^4}{3}$
- C $-\frac{3}{n^4}$
- D $\frac{3}{n^4}$

$$\frac{n-15}{9n} \div \frac{15-n}{3n^5}$$

$$\frac{n-15}{9n} \cdot \frac{3n^5}{15-n} \implies \frac{(n-15)}{9n} \cdot \frac{3n^5}{-1(n-15)} = \frac{3n^5}{-9n}$$

$$= -\frac{1}{3}n^4$$

$$\text{or } -\frac{n^4}{3}$$

14. What is the solution set of $\sqrt{8x-1} + 4 = 8$?

- A $\left\{\frac{67}{8}\right\}$
- B $\left\{\frac{61}{8}\right\}$
- C $\left\{\frac{17}{8}\right\}$
- D $\left\{\frac{15}{8}\right\}$

$$\sqrt{8x-1} = 4$$

$$\left(\sqrt{8x-1}\right)^2 = 4^2$$

$$8x-1 = 16$$

$$8x = 17$$

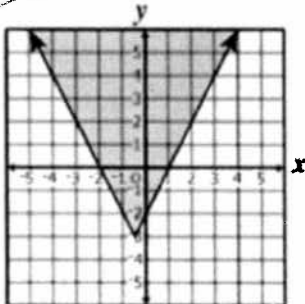
$$x = \frac{17}{8}$$

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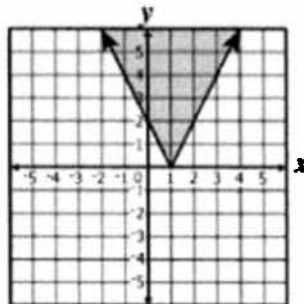
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15. Which graph best represents the solution for $y \geq |2x + 1| - 3$? Shifts left $\frac{1}{2}$ and down 3.

A



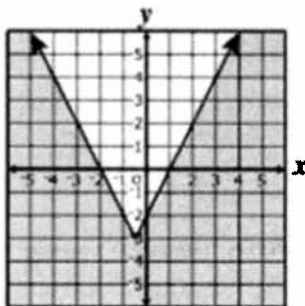
C



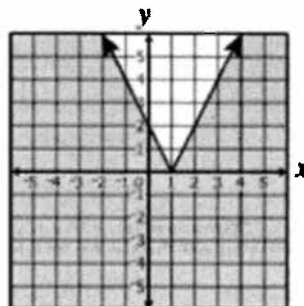
$y \geq$ → put pencil on vertex... greater than, so shade upward.

also, graph on calculator! (Do you know how to shade using calc?)

B



D



16. What is the solution set to $x^2 = 16 - 4x$?

$$x^2 + 4x - 16 = 0$$

(not factorable)

$$x = \frac{-4 \pm \sqrt{16 - 4(1)(-16)}}{2(1)}$$

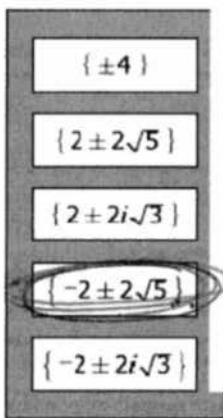
$$x = \frac{-4 \pm \sqrt{16 + 64}}{2}$$

$$x = \frac{-4 \pm \sqrt{80}}{2}$$

$$x = \frac{-4 \pm \sqrt{16 \cdot 5}}{2}$$

$$x = \frac{-4 \pm 4\sqrt{5}}{2}$$

$$x = -2 \pm 2\sqrt{5}$$



17. What is the solution set for $\left(\frac{1}{4}x + 3\right)^3 = (2)^3$?

A $\left\{\frac{5}{4}\right\}$

B $\left\{\frac{11}{4}\right\}$

C $\{20\}$

D $\{44\}$

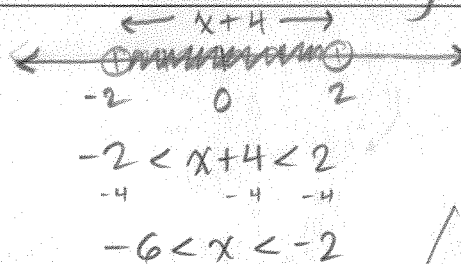
$$\frac{1}{4}x + 3 = 8$$

$$\frac{1}{4}x = 5$$

$$x = 20$$

18. What is the solution to $|x + 4| < 2$?

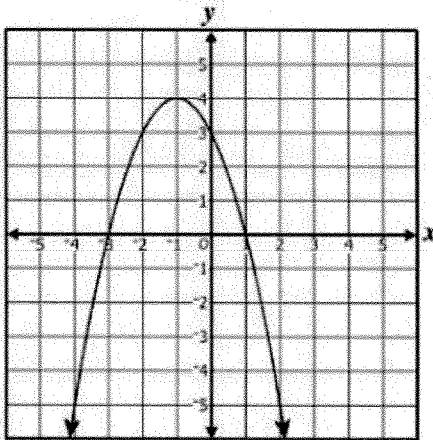
- A $x < -6$ or $x > -2$
- B $-6 < x < -2$
- C $x < -2$
- D $2 < x < 6$



Absolute value is the distance of a value from zero.

Recall: less THAN and greater

19. The graph of $g(x)$ is shown.



Which appears to be a solution of $g(x) = 0$?

- A -3
- B -1
- C 0
- D 3

What is the value of x where $y = 0$? \rightarrow $(?, 0) \rightarrow$ x -intercepts!
 $(-3, 0)$ and $(1, 0)$

20. Given: $\begin{cases} x + y + 10 = 0 \rightarrow y = -x - 10 \\ x^2 + y - 2 = 0 \end{cases}$

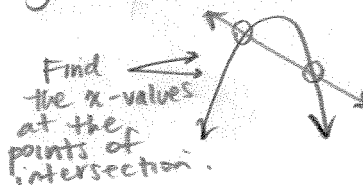
$x^2 - x - 12 = 0$

$(x-4)(x+3) = 0$
 $x-4=0$ $x+3=0$
 $x=4, x=-3$

What are the x -values for the solutions to the given system of equations?

- A $x = -3, -7$
- B $x = -3, 4$
- C $x = -4, 3$
- D $x = 4, -14$

Also... Graph or calc: $x + y + 10 = 0 \rightarrow y = -x - 10$
 $x^2 + y - 2 = 0 \rightarrow y = -x^2 - 2$



2nd > calc > intersect

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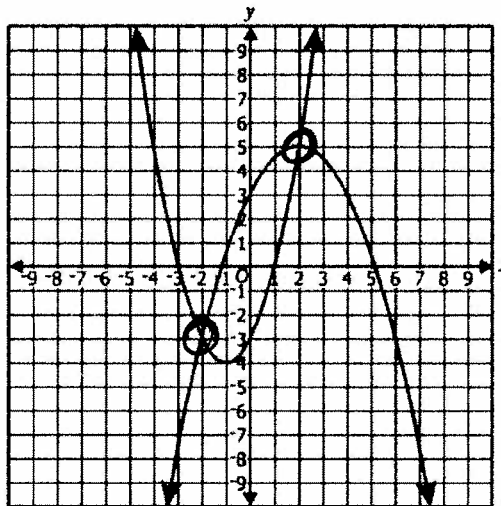
21. Which is a solution for $\sqrt[4]{w-4} + 11 = 14$?

- A $w = 8$
- B $w = 16$
- C $w = 77$
- D $w = 85$

$$\begin{aligned} \sqrt[4]{w-4} &= 3 \\ (\sqrt[4]{w-4})^4 &= 3^4 \\ w-4 &= 81 \\ w &= 85 \end{aligned}$$

22. Directions: Click on the grid to plot each point that is a solution. You must plot all correct solutions.

The graph of a system of two equations is shown on the grid. Identify only the apparent solutions to this system of equations. Find the points of intersection



(2, 5)
(-2, -3)

23. Which is a solution to $\frac{4n-37}{3} = \frac{10}{n}$, if $n \neq 0$?

- A -10
- B $-\frac{27}{4}$
- C $-\frac{10}{11}$
- D $-\frac{3}{4}$

It's a proportion (one fraction/ratio = one fraction),
so CROSS-MULTIPLY.

$$(4n-37)(n) = (3)(10)$$

$$4n^2 - 37n = 30$$

$$4n^2 - 37n - 30 = 0$$

$$4n^2 - 40n + 3n - 30 = 0$$

$$4n(n-10) + 3(n-10) = 0$$

$$(4n+3)(n-10) = 0$$

$$4n+3=0 \quad n-10=0$$

$$4n = -3 \quad n = 10$$

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

(You could also graph and use x-intercepts to find the solution.)

$$\begin{array}{r} + \quad - \\ -37 \quad -120 \\ \hline 2 \quad 60 \\ \hline 3, -40 \end{array}$$

KEY

24. Which is a solution of $|2x - 7| + 1 = 9$?

- A $x = \frac{17}{2}$
- B $x = \frac{1}{2}$
- C $x = -\frac{1}{2}$
- D $x = -\frac{3}{2}$

$$|2x - 7| = 8$$

$2x - 7 = -8$
 $2x = -1$
 $x = -\frac{1}{2}$

$2x - 7 = 8$
 $2x = 15$
 $x = \frac{15}{2}$

- ① isolate absolute value
- ② set up two equations using the definition of absolute value (the distance of a value from zero.)
- ③ solve the two equations.

(you could also graph each side of equation in Y_1 and Y_2 and find the x -values at the points of intersection.)

25. If $x \neq 0$, what is the solution to the following equation?

LCD = x
 (multiply every term by LCD) $\rightarrow \left(\frac{x}{7} \cdot \frac{1-x}{x}\right) + 2^x \left(\frac{7}{x}\right) = x \Rightarrow 1-x + 2^x = 7$

$x + 1 = 7$
 $x = 6$

$x = 6$
 (cursor... ignore.)
 $x = 6$

26. A solution to a quadratic equation is $13 - 11i\sqrt{7}$. Which of the following must also be a solution to this equation?

- A $-13 - 11i\sqrt{7}$
- B $-13 + 11i\sqrt{7}$
- C $13 - 11i\sqrt{7}$
- D $13 + 11i\sqrt{7}$

\uparrow
 complex numbers come in conjugate pairs!
 $a + bi$ and $a - bi$

27. Which of the following functions does NOT have a range of only the real numbers greater than or equal to zero?

- A $f(x) = \sqrt{4-x} \Rightarrow f(x) = \sqrt{-1(x-4)}$ $\rightarrow (4,0)$ range: $y \geq 0$
- B $f(x) = |x-4| \Rightarrow$ range: $y \geq 0$
- C $f(x) = x^4 \Rightarrow$ range: $y \geq 0$
- D $f(x) = \log x$ \leftarrow (vertical asymptote $x=0$) \rightarrow range: all real numbers

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28. What is the sum of this infinite series?

$$r = \frac{60}{100} = \frac{3}{5}, r = \frac{36}{60} = \frac{3}{5}$$

see formula sheet

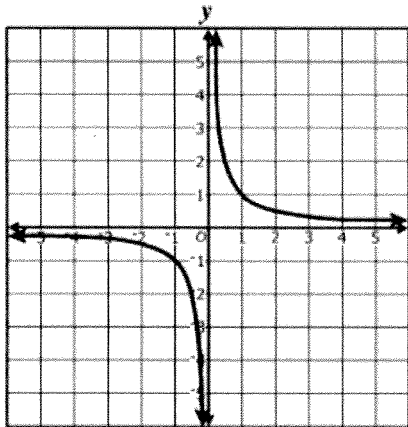
$$S_{\infty} = \frac{a_1}{1-r}$$

$$100 + 60 + 36 + \frac{108}{5} + \dots$$

$$= \frac{100}{1 - \frac{3}{5}} = \frac{100}{\frac{2}{5}} = 100 \cdot \frac{5}{2} = \boxed{250}$$

29. The graph of a parent function is shown.

Which function belongs to this same family?



reciprocal function

$$y = \frac{a}{x-h} + k$$

A $g(x) = -\log(x-1)$

B $g(x) = \left(\frac{1}{3}\right)^{(x-1)}$

C $g(x) = 3^{(x-1)}$

D $g(x) = \frac{3}{x-1}$

30. Which number is a zero of $f(x) = \log(4x-1)$?

A $\frac{7}{2}$

B $\frac{11}{4}$

C $\frac{1}{2}$

D $\frac{1}{4}$

graph and find point where $y=0$ (the x-intercept!)

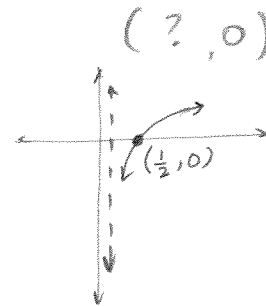
also algebraically
 $0 = \log_{10}(4x-1)$

$$10^0 = 4x-1$$

$$1 = 4x-1$$

$$\frac{2}{4} = \frac{4x}{4}$$

$$x = \frac{1}{2}$$



31. What is the equation of the horizontal asymptote of the graph of the following equation?

$$f(x) = 6^{(x-5)} - 4$$

shifts down 4 units...

$$y = -4$$

A $y = 6$

B $y = 0$

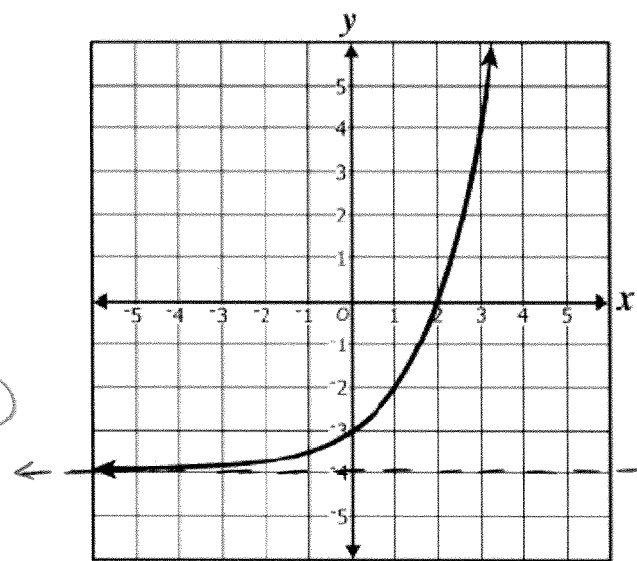
C $y = -4$

D $y = -5$

Key

32. Which function best represents this graph?

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



the horizontal asymptote has shifted down 4 units.

33. The graph of $g(x) = \log(2x)$ has —

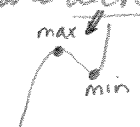
- A no x -intercept or y -intercept
- B one x -intercept and no y -intercept
- C two x -intercepts and no y -intercept
- D one x -intercept and one y -intercept

It has a vertical asymptote at $x=0$.

34. Throughout which of the following intervals is $f(x) = (x - 1)(x - 4)^2$ only decreasing?

- A $-\infty < x < 0$
- B $-\infty < x < 1$
- C $1 < x < 4$
- D $2 < x < 4$

graph on calc. Look for interval where the y -values (the function) are decreasing.



Find max and min using 2nd calc max then 2nd calc min

max(2,4), min(4,0)

35. Given: $f(x) = \log(x - 16) + 15$

graph shifts right 16 units so the vertical asymptote shifts from $x=0$ to $x=16$

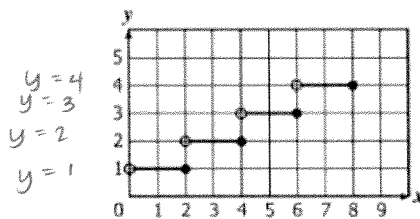
What is the equation of an asymptote of the graph of the given function?

- A $x = 16$
- B $y = 16$
- C $x = 15$
- D $y = 15$

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36. The graph of a function is shown on the grid.

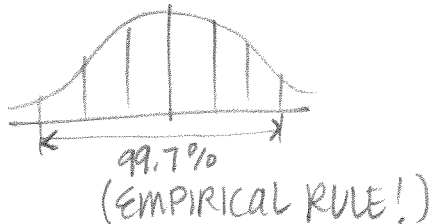


What appears to be the range of this function?

- A $\{y \mid y=1, 2, 3, 4\}$
- B $\{y \mid y=0, 2, 4, 6, 8\}$
- C $\{y \mid 1 < y < 4\}$
- D $\{y \mid 0 < y < 8\}$

37. The heights of a large population of ostriches are normally distributed. Which is closest to the percentage of these heights that is within 3 standard deviations of the mean?

- A 0.3%
- B 5%
- C 95%
- D 99.7%



within 1 std. dev. 68%
2 std. dev. 95%
3 std. dev. 99.7%

38. Which of these situations involves a combination?

- A Determining how many different groups of 3 employees can be chosen from 10 employees
- B Determining how many different seating charts can be made placing 7 people around a table
- C Determining how many different ways 8 runners can be assigned lanes on a track for a preliminary race
- D Determining how many different 6-letter passwords can be made using the letters in the word "pencil"

order does not matter...

39. What is the 14th term of the arithmetic sequence with a first term of 7 and a common difference of 10?

- A 130
- B 137
- C 147
- D 221

$$a_1 = 7$$

$$d = 10$$

$$a_{14} = ?$$

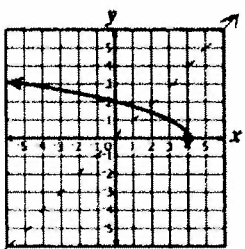
$$a_{14} = a_1 + 13d$$

$$a_{14} = 7 + 13(10)$$

$$a_{14} = 137$$

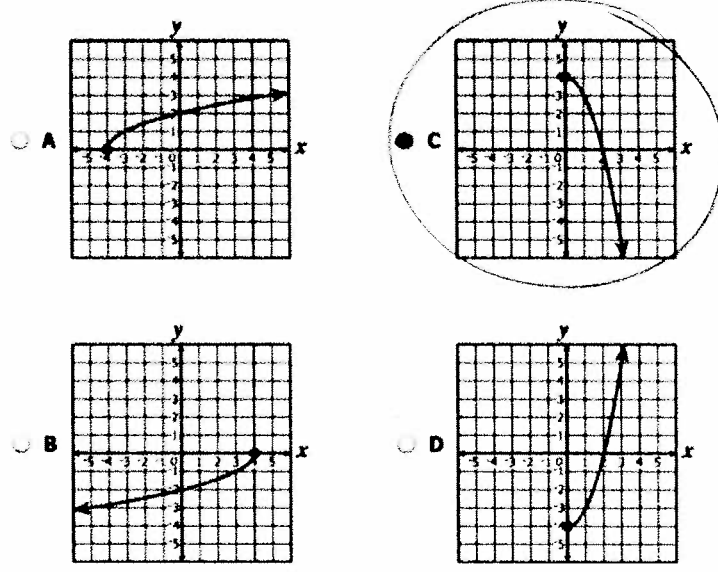
KEY

40. The graph of the function g is shown on the following grid.



reflects across the $y = x$ line of reflection...
 * also, (4,0) would be (0,4) on the graph of the inverse!

Which graph best represents the inverse of g ?



41. Directions: Click on a box to choose each ordered pair you want to select. You must select all correct ordered pairs.

Identify each of the x- and y-intercepts of the function $h(x) = x^3 + 3x^2 - 4x - 12$.

y-intercept (let $x=0$)
 $y = x^3 + 3x^2 - 4x - 12$
 $y = 0^3 + 3(0)^2 - 4(0) - 12$
 $y = -12$
 $(0, -12)$

<input checked="" type="checkbox"/> (-3, 0)	<input type="checkbox"/> (0, -2)
<input checked="" type="checkbox"/> (-2, 0)	<input type="checkbox"/> (0, 0)
<input checked="" type="checkbox"/> (0, -12)	<input type="checkbox"/> (0, 2)
<input type="checkbox"/> (0, -3)	<input checked="" type="checkbox"/> (2, 0)

Graph on calc, find x-intercepts and y-intercept
 also $0 = x^3 + 3x^2 - 4x - 12$
 (x-intercepts) $0 = x^2(x+3) - 4(x+3)$
 (let $y=0$) $0 = (x^2 - 4)(x+3)$
 $0 = (x+2)(x-2)(x+3)$
 $x = -2, x = 2, x = -3$
 $(-2, 0), (2, 0), (-3, 0)$

42. Which of the following describes the end behavior of $y = -x^2 + bx + c$ as x approaches either positive or negative infinity?

- A y approaches positive infinity
- B y approaches negative infinity
- C y approaches c
- D y approaches $-\frac{c}{b}$

As $x \rightarrow -\infty$ $f(x) \rightarrow -\infty$
 As $x \rightarrow \infty$ $f(x) \rightarrow -\infty$

43. If $f(x) = \frac{2}{3}x^2 + 1$ and $g(x) = 6x - 15$, which polynomial is equivalent to $g(f(x))$?

- A $4x^2 - 13$
- B $4x^2 - 9$
- C $4x^3 - 10x^2 + 6x - 15$
- D $16x^2 - 80x + 101$

$$g(f(x)) = 6\left(\frac{2}{3}x^2 + 1\right) - 15$$

$$= 4x^2 + 6 - 15$$

$$g(f(x)) = 4x^2 - 9$$

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44. The domain of the function $f(x) = \frac{x+3}{x^2+5x-24}$ is all real numbers except —

- A -8, -3, 3
- B -8, 3
- C -3, 8
- D 8

$$= \frac{x+3}{(x+8)(x-3)}$$

vertical asymptotes @
@ $x = -8$ and $x = 3$

45. The amount of work (W) done when lifting an object varies jointly with the mass of the object (M) and the distance the object is lifted (D). Which equation models this relationship?

- A $W = \frac{k}{MD}$
- B $W = \frac{kM}{D}$
- C $W = kMD$
- D $W = \frac{kD}{M}$

$$z = kxy$$

$$W = kMD$$

46. Madison deposited \$1,000 into a savings account that compounds interest yearly. After her initial deposit, Madison did not withdraw or deposit any money from this account. The table below shows the amount in her savings account over a period of years.

Amount in Savings Account

x Number of Years After the Deposit (L_1)	Amount in Savings (L_2)
2	\$1,123.60
4	\$1,262.48
6	\$1,418.52
8	\$1,593.85
10	\$1,790.85

STAT > CALC > ExpReg
XList : L1
YList : L2
FregList : leave blank
Store RegEQ : (vars > Y-vars > Y1)

Using the exponential curve of best fit, which is closest to the expected amount in the savings account 30 years after the time Madison deposited the initial \$1,000?

- A \$2,854
- B \$3,291
- C \$5,743
- D \$16,854

$$y = ab^x$$

$$y = 1000.000694 \cdot (1.060000073)^x$$

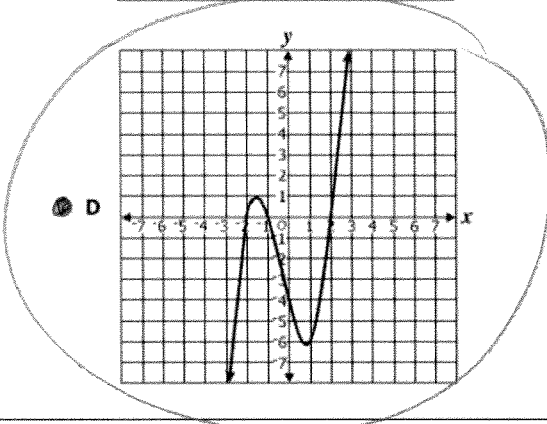
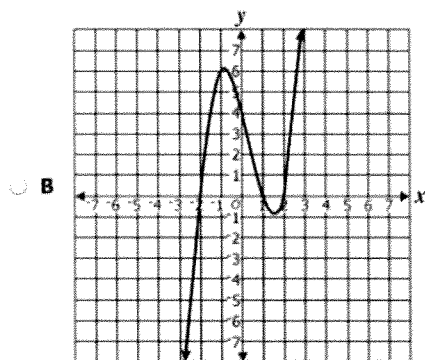
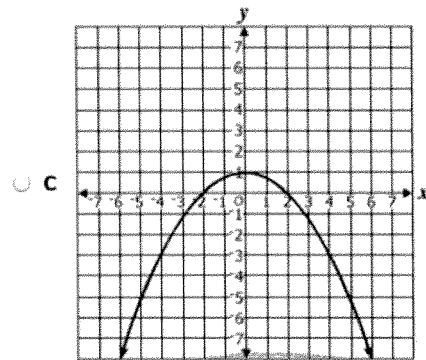
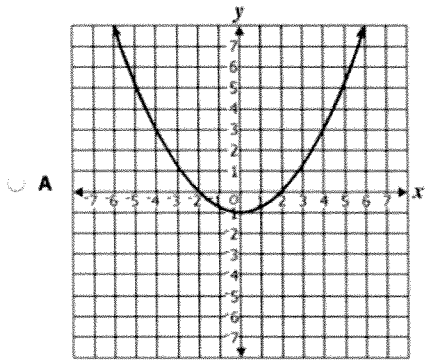
check the table for $x = 30$ years

↑ ↑
This will store your equation in Y1 so you can graph and view the table of values.

KEY

47. Which graph best represents a function with zeros of -2, -1, and 2?

x-intercepts!



48. The number of permutations of 8 objects taken 3 at a time is —

- A 40,320
- B 6,720
- C 4,920
- D 336

$$P_{8,3} = \frac{8!}{5!} = 8 \cdot 7 \cdot 6 = 336$$

On calc: MATH > PROB > nPr > [] [] []

49. If y varies inversely as the square root of x , what is the constant of proportionality if $y = 16$ when $x = 4$?

- A 4
- B 8
- C 32
- D 64

$$y = \frac{k}{x} \leftarrow \text{"y varies inversely as x"}$$

$$y = \frac{k}{\sqrt{x}} \leftarrow \text{"y varies inversely as } \sqrt{x} \text{"}$$

$$16 = \frac{k}{\sqrt{4}}$$

$$16 = \frac{k}{2}$$

$$k = 32$$

(k is the constant of variation, a.k.a. the constant of proportionality)

50. Which of the following describes the root(s) of the equation $9x^2 = 6x - 1$?

- A Exactly one real root
- B Two distinct real roots
- C Exactly one imaginary root
- D Two distinct imaginary roots

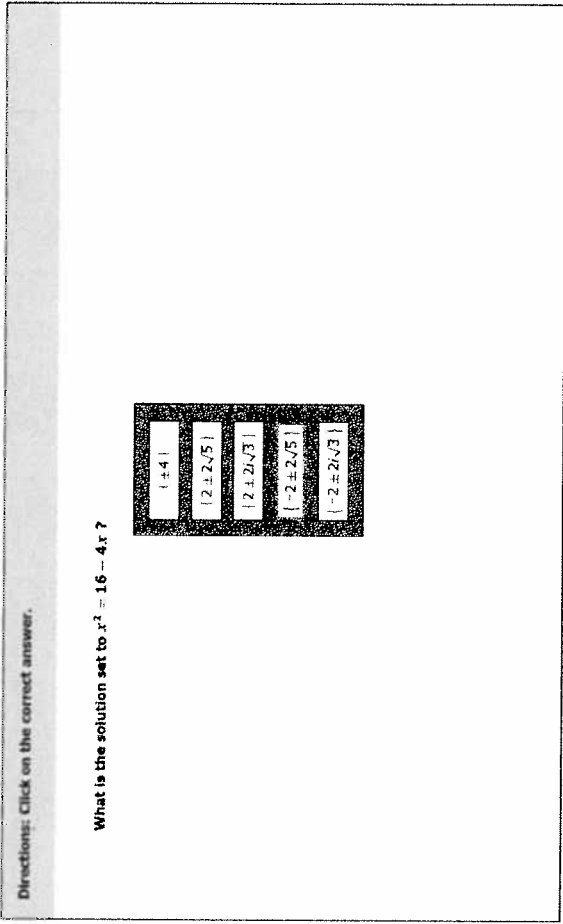
$9x^2 - 6x + 1 = 0$ \leftarrow
 let $y = 0$
 and graph in $Y =$
 \leftarrow describe the x-intercept(s)

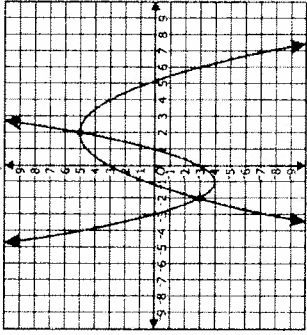
Algebra II
Released Test Spring 2014
Answer Key

Test Sequence Number	Item Type: Multiple Choice (MC) or Technology Enhanced Item (TEI)	Correct Answer	Reporting Category	Reporting Category Description									
1	MC	B	001	Expressions and Operations									
2	MC	A	001	Expressions and Operations									
3	MC	D	001	Expressions and Operations									
4	MC	D	001	Expressions and Operations									
5	MC	A	001	Expressions and Operations									
6	MC	D	001	Expressions and Operations									
7	MC	D	001	Expressions and Operations									
8	TEI	<p>$3, x^2$, and y^2 should be placed in the box to the left of the radical sign. The order in which these are placed in this box does not matter.</p> <p>6 and y should be placed in the box to the right of the radical sign. The order in which these are placed in this box does not matter.</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p style="font-size: small;">Directions: Click and drag each selected term to the correct box.</p> <p style="font-size: small;">Simplify completely: $\sqrt[3]{162x^6y^9}$</p> <div style="display: flex; align-items: center; justify-content: center;"> <div style="border: 1px solid black; padding: 5px; margin-right: 10px;"> $3x^2y^2\sqrt[3]{6y}$ </div> <div style="border: 1px solid black; padding: 5px;"> <table border="1" style="font-size: x-small; text-align: center;"> <tr><td>9</td><td>+</td><td>√</td></tr> <tr><td>2</td><td>+</td><td>√</td></tr> <tr><td>1</td><td>+</td><td>√</td></tr> </table> </div> </div> </div>	9	+	√	2	+	√	1	+	√	001	Expressions and Operations
9	+	√											
2	+	√											
1	+	√											

Test Sequence Number	Item Type: Multiple Choice (MC) or Technology Enhanced Item (TEI)	Correct Answer	Reporting Category	Reporting Category Description
9	MC	C	001	Expressions and Operations
10	TEI	<p>($2x - 5$) (the second answer from the left) and ($4x + y$) (the fourth answer from the left) must be placed inside the box.</p> <p>Both of these answers, and only these answers, must be selected. The order in which they are placed in the box does not matter.</p> <div style="border: 1px solid black; padding: 10px; margin: 10px 0;"> <p>Directions: Click and drag each selected binomial to the box.</p> <p>Factor the following polynomial.</p> $8x^2 - 18xy - 5y^2$ <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid gray; padding: 2px 5px;">$(x - 5y)$</div> <div style="border: 1px solid gray; padding: 2px 5px;">$(2x - y)$</div> <div style="border: 1px solid gray; padding: 2px 5px;">$(2x - 5y)$</div> <div style="border: 1px solid gray; padding: 2px 5px;">$(4x + y)$</div> </div> </div>	001	Expressions and Operations
11	MC	B	001	Expressions and Operations

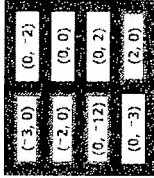
Test Sequence Number	Item Type: Multiple Choice (MC) or Technology Enhanced Item (TEI)	Correct Answer	Reporting Category	Reporting Category Description
12	TEI	<p>i^{33} (the second box from the left) and i^{21} (the third box from the left) Both of these answers, and only these answers, must be selected.</p> <div style="border: 1px solid black; padding: 5px;"> <p>Directions: Click on the box to choose each expression you want to select. You must select all the correct expressions.</p> <p>Identify each expression that is equivalent to i.</p> <div style="display: flex; justify-content: center; gap: 10px;"> <div style="border: 1px solid black; padding: 2px;">i^{33}</div> <div style="border: 1px solid black; padding: 2px;">i^{21}</div> <div style="border: 1px solid black; padding: 2px;">i^{21}</div> <div style="border: 1px solid black; padding: 2px;">i^{33}</div> </div> </div>	001	Expressions and Operations
13	MC	A	001	Expressions and Operations
14	MC	C	002	Equations and Inequalities
15	MC	A	002	Equations and Inequalities

Test Sequence Number	Item Type: Multiple Choice (MC) or Technology Enhanced Item (TEI)	Correct Answer	Reporting Category	Reporting Category Description
16	TEI	<p>$\{-2 + 2\sqrt{5}\}$ (the fourth box from the top)</p>  <p>Directions: Click on the correct answer.</p> <p>What is the solution set to $x^2 - 16 = 4x$?</p> <p> <input type="radio"/> $\{+4\}$ <input type="radio"/> $\{2+2\sqrt{5}\}$ <input type="radio"/> $\{2+2\sqrt{3}\}$ <input type="radio"/> $\{-2+2\sqrt{5}\}$ <input type="radio"/> $\{-2+2\sqrt{3}\}$ </p>	002	Equations and Inequalities
17	MC	C	002	Equations and Inequalities
18	MC	B	002	Equations and Inequalities
19	MC	A	002	Equations and Inequalities
20	MC	B	002	Equations and Inequalities
21	MC	D	002	Equations and Inequalities

Test Sequence Number	Item Type: Multiple Choice (MC) or Technology Enhanced Item (TEI)	Correct Answer	Reporting Category	Reporting Category Description
22	TEI	<p>Points $(-2,-3)$ and $(2,5)$ Both of these points, and only these points, must be plotted on the coordinate plane.</p> <div style="border: 1px solid black; padding: 10px; margin: 10px 0;"> <p>Directions: Click on the grid to plot each point that is a solution. You must plot all correct solutions.</p> <p>The graph of a system of two equations is shown on the grid. Identify only the apparent solutions to this system of equations.</p>  </div>	002	Equations and Inequalities
23	MC	D	002	Equations and Inequalities
24	MC	C	002	Equations and Inequalities

Test Sequence Number	Item Type: Multiple Choice (MC) or Technology Enhanced Item (TEI)	Correct Answer	Reporting Category	Reporting Category Description
25	TEI	<p>Typed Response: 6 (and all equivalent answers)</p> <div style="border: 1px solid black; padding: 10px;"> <p>Directions: Type your answer in the box.</p> <p>If $x \neq 0$, what is the solution to the following equation?</p> $\frac{1-x}{x} + 2 = \frac{7}{x}$ <p style="text-align: center;">$x = \boxed{6}$</p> </div>	002	Equations and Inequalities
26	MC	D	002	Equations and Inequalities
27	MC	D	003	Functions and Statistics

Test Sequence Number	Item Type: Multiple Choice (MC) or Technology Enhanced Item (TEI)	Correct Answer	Reporting Category	Reporting Category Description
28	TEI	<p>Typed Response: 250 (and all equivalent answers)</p> <p>Directions: Type your answer in the box.</p> <p>What is the sum of this infinite series?</p> $100 + 60 + 36 + \frac{108}{5} + \dots$ <p style="text-align: center;">250</p>	003	Functions and Statistics
29	MC	D	003	Functions and Statistics
30	MC	C	003	Functions and Statistics
31	MC	C	003	Functions and Statistics
32	MC	D	003	Functions and Statistics
33	MC	B	003	Functions and Statistics
34	MC	D	003	Functions and Statistics
35	MC	A	003	Functions and Statistics
36	MC	A	003	Functions and Statistics
37	MC	D	003	Functions and Statistics
38	MC	A	003	Functions and Statistics
39	MC	B	003	Functions and Statistics

Test Sequence Number	Item Type: Multiple Choice (MC) or Technology Enhanced Item (TEI)	Correct Answer	Reporting Category	Reporting Category Description
40	MC	C	003	Functions and Statistics
41	TEI	$(-3,0)$, $(-2,0)$, $(0,-12)$, and $(2,0)$ All four ordered pairs, and only these ordered pairs, must be selected.	003	Functions and Statistics
<p>Directions: Click on a box to choose each ordered pair you want to select. You must select all correct ordered pairs.</p> <p>Identify each of the x- and y-intercepts of the function $f(x) = x^3 + 3x^2 - 4x - 12$.</p> 				
42	MC	B	003	Functions and Statistics
43	MC	B	003	Functions and Statistics
44	MC	B	003	Functions and Statistics
45	MC	C	003	Functions and Statistics
46	MC	C	003	Functions and Statistics
47	MC	D	003	Functions and Statistics
48	MC	D	003	Functions and Statistics
49	MC	C	003	Functions and Statistics
50	MC	A	003	Functions and Statistics

Spring 2014 Released
Algebra II Standards of Learning Test
Total Raw Score to Scaled Score Conversion Table

Total Raw Score If you get this many items correct:	Total Scaled Score Then your converted scaled score is:
0	0
1	159
2	198
3	222
4	239
5	253
6	265
7	275
8	284
9	293
10	300
11	307
12	314
13	321
14	327
15	333
16	338
17	344
18	349
19	355
20	360
21	365
22	370
23	375
24	380
25	385
26	390
27	395
28	400
29	405
30	411
31	416
32	421
33	427
34	433
35	439
36	445
37	451
38	458
39	465
40	473
41	481
42	490
43	499
44	510
45	523
46	538
47	557
48	582
49	600
50	600

A total raw score (left column) is converted to a total scaled score (right column). The total scaled score may range from 0 to 600.

A scaled score of 400 or more means the student passed the SOL test, while a scaled score of 399 or less means the student did not pass the test. A scaled score of 500 or more indicates the student passed the SOL test at an advanced level.

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