

**CALIFORNIA HIGH SCHOOL
EXIT EXAM**

**SOLUTIONS FOR MATHEMATICS
PRACTICE TESTS
FORM C AND D
SESSION 1**

Source:

**Standards and Assessment Division
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Solutions to CAHSEE Released Items, Spring 2001

1. $3.6 \times 10^2 =$
The exponent (2) tells us to move the decimal point two places to the right.

The answer is C 360

2. A. $(-7) + (-3) = -10$
B. $(-3) + 7 = 4$
C. $(3) + (7) = 10$
D. $(3) + (-7) + (11) = 7$

The answer is A $(-7) + (-3)$

3. $12.00 - 9.00 = 3.00$ which is the amount of increase

$$\begin{aligned} \text{Percent of increase} &= \frac{\text{amount of increase}}{\text{original amount}} \\ &= \frac{3}{12} \\ &= \frac{1}{4} \\ &= 25\% \end{aligned}$$

The answer is B 25%

4. 180 is about half of 365; the percent for one-half is 50%

The answer is B 50%

5.

$$\begin{aligned} 4^3 \cdot 4^2 &= (4 \cdot 4 \cdot 4) \cdot (4 \cdot 4) \\ &= 4 \cdot 4 \cdot 4 \cdot 4 \cdot 4 \\ &= 4^5 \end{aligned}$$

OR

$$\begin{aligned} 4^3 \cdot 4^2 &= 4^{3+2} \\ &= 4^5 \end{aligned}$$

The answer is A 4^5

6. $25\% = \frac{1}{4}$

$$\frac{1}{4} \text{ of } 24 \text{ is } \frac{1}{4} \cdot 24 = 6$$

The discount is \$6.00

Original price - Discount = Sale Price

$$\$24.00 - \$6.00 = \$18.00$$

The answer is B \$18.00

7. To find the answer, test some possible numbers between 0 and 1. For example:

$$0 \cdot 100 = 0$$

$$\frac{1}{4} \cdot 100 = 25$$

$$\frac{1}{2} \cdot 100 = 50$$

$$\frac{3}{4} \cdot 100 = 75$$

$$1 \cdot 100 = 100$$

} These are between 0 and 100

So, one can conclude that 100 times a number between 0 and 1 will result in a number between 0 and 100.

The answer is D between 0 and 100.

8. 60% means 60 out of 100,
or $\frac{60}{100}$ which simplifies to $\frac{3}{5}$, shown below.

$$\frac{60 \div 20}{100 \div 20} = \frac{3}{5}$$

The answer is C $\frac{3}{5}$

9. $20\% = \frac{1}{5}$ or 0.2

$$\frac{1}{5} \text{ of } 80 \text{ is } \frac{1}{5} \cdot 80 = 16 \quad \text{or} \quad (0.2) \cdot 80 = 16$$

The discount is \$16.00

Original price - Discount = Sale Price

$$\$80.00 - \$16.00 = \$64.00$$

The answer is C \$64

10. The denominators are 10 and 15.

$$10 = 2 \cdot 5$$

$$15 = 3 \cdot 5$$

The lowest common denominator or least common multiple of the denominators 10 and 15 is 30.

$$30 = 2 \cdot 3 \cdot 5$$

The answer is B $2 \times 3 \times 5$

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11. To *square* a number means to multiply it by itself.
For example, 5 *squared* is written as $5 \cdot 5 = 25$

30 squared is $30 \cdot 30 = 900$
35 squared is $35 \cdot 35 = 1225$
40 squared is $40 \cdot 40 = 1600$

The answer is B 35 and 40

12. Absolute value is the magnitude of a number or distance from zero.

-4 is 4 units away from 0

The answer is D 4

13. Multiples of 3 are 0, 3, 6, 9, 12, 15, ..., 27, 30, ...
Multiples of 5 are 0, 5, 10, 15, 20, 25, 30, ...
Multiples of 6 are 0, 6, 12, 18, 24, 30, ...

The answer is C 30

14. To estimate, round the numbers.

$$326 \times 279 \approx 300 \times 300$$

$$300 \times 300 = 90000$$

The answer is C 90,000

15. The mean is an average. To find the average, total the scores and then divide by the number of scores.

$$\text{For Hector: } \frac{6+7+9+10}{4} = \frac{32}{4} = 8$$

The answer is C 8

16. The stock increased between Tuesday and Wednesday and then again between Thursday and Friday. By looking at the steepness of the line segments between Tuesday and Wednesday and also between Thursday and Friday, you can see that the increase is greater between Tuesday and Wednesday. You could also check the actual increase by finding the differences between the pairs of days.

$$\text{E.g. } 30\frac{3}{4} - 30\frac{1}{8} = \frac{3}{8} \text{ (Wednesday - Tuesday)}$$

$$30\frac{7}{8} - 30\frac{3}{4} = \frac{1}{8} \text{ (Friday - Thursday)}$$

The answer is B Wednesday

17. Each time a coin is flipped is an independent event.

Therefore, the probability is $\frac{1}{2}$, one tail out of two sides.

The answer is B $\frac{1}{2}$

18. A box-and-whisker plot basically divides the data into four groups when the data is arranged from least to greatest. The first line segment (whisker) is the bottom fourth of the data. The second and third fourths of the data are denoted by the rectangle (box), and the vertical line inside the rectangle divides those fourths. The line segment on the right shows the top fourth of the data. (whisker) Therefore, the vertical line inside the rectangle is the middle value, or median, of the data.

The answer is B 76

19. Best Drinks had 1000 injuries in 50 years, which averages $\frac{1000}{50} = 20$ injuries per year.

Quality Drinks had 100 injuries in 2 years, which averages $\frac{100}{2} = 50$ injuries per year.

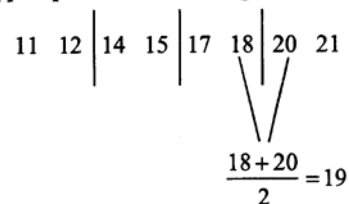
Therefore, Quality Drinks has more injuries *per year* than Best Drinks, even though the total number of injuries is higher.

The answer is D On the average, *Quality Drinks* has more injuries per year.

20. There are three colors that are not red. Therefore, the probability of stopping on one of those is 3 out of 4, or $\frac{3}{4}$, since there are a total of 4 colors.

The answer is C $\frac{3}{4}$

21. Arrange the data from least to greatest and then divide it into four groups. With an even number of data, the quartiles fall between two numbers. The upper quartile is the average of 18 and 20 in this case.



The answer is B 19

22. There is a downward trend for the graph of this data.

The answer is C The cost per ticket decreases as the number of tickets purchased increases.

Solutions to CAHSEE Released Items, Spring 2001

23. In algebra, the phrase *a number* is represented by a variable (letter). In this case, the letter *n* was used. The first part of the sentence says, "divide a number by 5." This looks like a fraction, because a fraction bar between the top number (numerator) and the bottom number (denominator) signifies division. So you start by writing $\frac{n}{5}$. Adding 4 to the result means you add 4 to the fraction you created previously: $\frac{n}{5} + 4$. Since the answer is 9, you set the expression equal to 9: $\frac{n}{5} + 4 = 9$. The reason that D is *not* a solution is because 4 is added to the variable, and then the result is divided by 5, which is not what is stated in the problem.

The answer is B $\frac{n}{5} + 4 = 9$

24. Use the formula $y = mx + b$ where *m* is the slope of the line, and *b* is the *y*-intercept. The *m* value can be determined by choosing any point on the line, and examining the how far the line rises for each horizontal unit to the right. In this case, for each unit to the right, the line has a rise of one unit. This ratio is 1:1, or $\frac{1}{1} = 1$. Since $m = 1$, we know that the line has the equation $y = 1x + b$ or $y = x + b$. To determine the value of *b*, simply examine where the line crosses the *y*-axis. For this line, the *y*-intercept, or *b*, is 3. Since $m = 1$, and $b = 3$, the equation of the line is $y = x + 3$.

(Note: for this problem, all of the answers had the correct slope, so all the test-taker had to do was determine the *y*-intercept by examining the picture of the graph.)

The answer is C $y = x + 3$

25. The graph of a cubic equation has a certain recognizable shape, as do other graphs. Graph A is a linear function such as $y = x$. Graph B is an absolute-value function such as $y = |x|$. Graph D is a quadratic function such as $y = x^2$.

The answer is C

26. $(5x^2z^2)(8xz^3)$ is equivalent to
 $5 \cdot 8 \cdot x^2 \cdot x \cdot z^2 \cdot z^3$
 $= 40 \cdot x^3 \cdot z^5$

The answer is B $40x^3z^5$

27. The steps are as follows:

$$\begin{array}{ll} 2n + 3 < 17 & \text{Subtract 3 from both} \\ 2n < 14 & \text{sides.} \\ \frac{2n}{2} < \frac{14}{2} & \text{Divide both sides by} \\ n < 7 & 2. \end{array}$$

The answer is D $n < 7$

28. The point where the lines intersect represents when Company A's cost is equal to Company B's cost. Company A's line is below Company B's line from 0 to 3 minutes.

The answer is C calls less than 3 minutes.

29. *c* is equal to 3 times the number of tables, *t*.

$c = 3 \cdot t$
or
 $3 \cdot t = c$

The answer is B $3 \cdot t = c$

30. *hk* means *h times k*. Substituting $h = 3$ and $k = 4$, the steps are as follows:

$$\begin{aligned} \frac{hk + 4}{2} - 2 &= \frac{3 \cdot 4 + 4}{2} - 2 \\ &= \frac{12 + 4}{2} - 2 \\ &= \frac{16}{2} - 2 \\ &= 8 - 2 \\ &= 6 \end{aligned}$$

The answer is A 6

31. $(6a^4bc)(7ab^3c)$ is equivalent to

$$\begin{aligned} 6 \cdot 7 \cdot a^4 \cdot a \cdot b \cdot b^3 \cdot c \cdot c \\ = 42a^5b^4c^2 \end{aligned}$$

The answer is D $42a^5b^4c^2$

32. From (2, 3) to (5, 5), you travel right 3 (run), and up

2 (rise). Therefore the slope $\left(\frac{\text{rise}}{\text{run}}\right)$ is $\frac{2}{3}$.

The answer is C $\frac{2}{3}$

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33. $\frac{\text{gallons}}{\text{min}} \times \text{min} = \text{gallons}$

So, at 1.5 gallons per minute (gpm), how long will it take to fill a 45-gallon tub?

1.5 multiplied by what number is equal to 45?
or, in algebra: $1.5x = 45$
Dividing both sides by 1.5, $x = 30$.

$$\begin{array}{r} 30 \\ 1.5 \overline{)45} \Rightarrow 15 \overline{)450} \\ \underline{-45} \\ 0 \\ \underline{-0} \\ 0 \end{array}$$

The answer is A 30.0 minutes

34. Starting in 1994, the stock values go up \$20 every two years, or \$10 per year. Working backwards for 1994 to 1992, the stock value should be \$20 less than in 1994: $30 - 20 = 10$.

The answer is C \$10

35. To determine the gallons of gas needed, you need to know two things: how far the van is traveling, and also how far it can go per gallon.

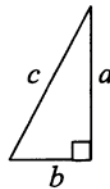
The answer is C The average number of miles per gallon for the van.

36. The plane travels 678 miles in 1.5 hours. To get the average speed, divide the distance (miles) by the time (hours).

$$\begin{array}{r} 452 \\ 1.5 \overline{)678} \Rightarrow 15 \overline{)6780} \\ \underline{-60} \\ 78 \\ \underline{-75} \\ 30 \\ \underline{-30} \\ 0 \end{array}$$

The answer is D 452 miles per hour

37. Pythagorean Theorem states the following:



In a right triangle, $leg^2 + leg^2 = hypotenuse^2$.
In this drawing, we have $a^2 + b^2 = c^2$.

$$\begin{aligned} a^2 + b^2 &= c^2 \\ 5^2 + 12^2 &= x^2 \\ 25 + 144 &= x^2 \\ 169 &= x^2 \\ 13 &= x \end{aligned}$$

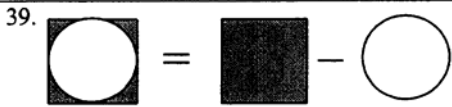
Substitute a and b values.
Square a and b .
Add.
Take the square root.
 $\sqrt{169} = 13$

The answer is B 13

38.
$$\begin{aligned} \text{Area of shaded region} &= \text{Area of outer triangle} - \text{Area of small square} \\ &= \frac{1}{2} b \cdot h - s \cdot s \\ &= \frac{1}{2} \cdot 4 \cdot 4 - 2 \cdot 2 \\ &= 8 - 4 = 4 \end{aligned}$$

The answer is A 4 cm^2

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Area of shaded region = Area of outer square - Area of circle

$$A = s \cdot s$$

$$= 10 \cdot 10$$

$$= 100$$

$$A = \pi r^2$$

$$\approx 3.14 \cdot 5^2$$

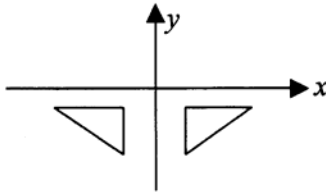
$$\approx 3 \cdot 25$$

$$\text{about } 75$$

The approximate answer is $100 - 75 = 25 \text{ ft.}^2$. There are two choices, 20 or 30, that seem reasonable. However, since $(3.14)(25)$ is more than $(3)(25)$, we are really subtracting a number larger than 75 from 100. Therefore, the exact answer is less than 25, probably closer to 20.

The answer is A 20

40. Using the y -axis as a "mirror," you would see:



The answer is B

41. $A = \frac{1}{2}bh$

base = 15
height = 8
 $A = \frac{1}{2} \cdot 15 \cdot 8$
 $= \frac{1}{2} \cdot 120$
 $= 60$

(Note: 11 is there as a distracter, to see if you know which information is relevant to the problem.)

The answer is B 60 square units

42. 1 cubic inch \approx 16.38 cubic centimeters
3 cubic inches \approx (?) cubic centimeters

$$(3)(16.38) = 49.14$$

The answer is D 49.14

43. The ratio of any two linear measurements in two similar shapes is equal to the ratio of any other two linear measurements in those two similar shapes.

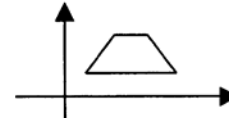
In other words, the ratio of radii of the two circles is equal to the ratio of their circumferences:

Ratio of radii = $\frac{3}{6} = \frac{1}{2}$, therefore the ratio of their circumferences is also equal to $\frac{1}{2}$.

The answer is B $\frac{1}{2}$

44. Since there are four points in the problem, the polygon must be a parallelogram or trapezoid. (Choice A, the triangle, would have three points, and choice D, the pentagon, would have five points.) The distance from (1, 1) to (5, 1) is 4 units, and the distance from (2, 3) to (4, 3) is only 2 units. It can't be a parallelogram, because opposite sides have the same length. Therefore, it must be a trapezoid.

Another way to get the answer is to make a quick sketch:



The answer is B Trapezoid

45. 1 inch = 24 feet
 $4\frac{3}{4}$ inches = (?) feet

$$(4\frac{3}{4})(24) = (\frac{19}{4})(24)$$

$$= (\frac{19}{\cancel{4}^1})(\cancel{24}^4)$$

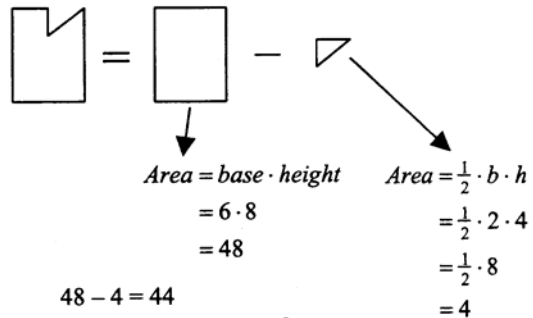
$$= (\frac{19}{1})(6)$$

$$= (19)(6)$$

$$= 114$$

The answer is C 114 ft

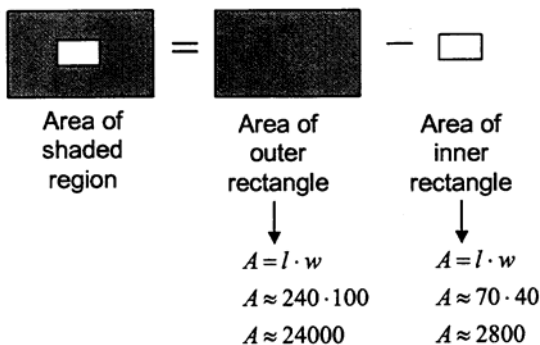
46.



$48 - 4 = 44$
The answer is B 44 in^2

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47.



Area of shaded region \square $24000 - 2800$
 $24000 - 2800 = 21200$

Therefore, the area of the shaded region is approximately 21000.

The answer is C 21,000

48. The volume of a box (rectangular prism) is $length \times width \times height$. So, for this box,

$$V = l \cdot w \cdot h$$

$$= 15 \cdot 5 \cdot 9$$

$$= 675$$

The answer is D 675

49. Area of a circle = πr^2 where $\pi \approx 3.14$ and r (radius) = 40.2. If you round 3.14 down to 3 and 40.2 down to 40, then the approximate area of the circle is 3×40^2 or $3 \times 40 \times 40 = 4800$

The answer is D $3 \times 40 \times 40 = 4800$

50.

Leave S.F. Time	Arrive N.Y. Time	Change arrival time to S.F. Time	Length of flight (comparing S.F. times)
8:30 A.M.	4:50 P.M.	1:50 P.M.	5 hrs. 20 mins.
12:00 noon	8:25 P.M.	5:25 P.M.	5 hrs. 25 mins.
3:30 P.M.	11:40 P.M.	8:40 P.M.	5 hrs. 10 mins.
9:45 P.M.	5:50 A.M.	2:50 A.M.	5 hrs. 5 mins.

The longest flight is 5 hours and 25 minutes.

The answer is B The flight leaving 12:00 noon.

51. The y -intercept of a line is the point where the line intersects the y -axis. For any point on the y -axis, the value of x is 0. Therefore, let $x = 0$, substitute it into the equation, and then solve for y .

$$2x - 3y = 12$$

$$2(0) - 3y = 12$$

$$0 - 3y = 12$$

$$-3y = 12$$

$$y = -4$$

The coordinate of the y -intercept is $(0, -4)$.

The answer is A $(0, -4)$

52. Parallel lines have the same slope $\left(\frac{\text{rise}}{\text{run}}\right)$. The only choice with this option is B.

The answer is B Same slope but different y -intercepts.

53. This is an absolute-value equation. In this statement, the quantity $y + 2$ could be 9 or -9 .

Algebraically, this means:

$$y + 2 = 9 \quad \text{or} \quad y + 2 = -9$$

$$y = 7 \quad \quad \quad y = -11$$

The answer is A $\{-11, 7\}$

54.

$$\begin{aligned} \text{Area} &= \text{length} \cdot \text{width} \\ &= x(x + 6) \\ &= x \cdot x + x \cdot 6 \\ &= x^2 + 6x \end{aligned}$$

The answer is A $x^2 + 6x$

55. In any proportion $\frac{a}{b} = \frac{c}{d}$, the product of the extremes is equal to the product of the means (aka cross-products are equal): $a \cdot d = b \cdot c$. Therefore,

$$\frac{20}{x} = \frac{4}{x - 5}$$

$$20(x - 5) = x \cdot 4$$

$$20(x - 5) = 4x$$

The answer is B $20(x - 5) = 4x$

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56. This is an absolute-value equation.

$$3|x| = 15$$

$$|x| = 5$$

$$x = 5 \text{ or } x = -5$$

The answer is B $\{-5, 5\}$

57. This problem is similar to #51. The x -intercept of a line is the point where the line intersects the x -axis. For any point on the x -axis, the value of y is 0. Therefore, let $y = 0$, substitute it into the equation, and then solve for x .

$$3x + 4y = 12$$

$$3x + 4(0) = 12$$

$$3x + 0 = 12$$

$$3x = 12$$

$$x = 4$$

The coordinates of the x -intercept are $(4, 0)$.

The answer is D $(4, 0)$

58. Distributing the coefficient 3 on the right side generates:

$$1 - 2x > 3 \cdot x - 3 \cdot 2$$

$$\text{or } 1 - 2x > 3x - 6$$

The answer is C $1 - 2x > 3x - 6$

59. This linear equation is in the form $y = mx + b$ where m is the slope and b is the y -intercept. Parallel lines have the same slope, and the slope $m = 4$. The only choice with $m = 4$ is $y = 4x + 3$.

The answer is B $y = 4x + 3$

60. One way to find the intersection point of these two lines is to graph them and look for the common point. A more efficient way is to solve the system algebraically. This system can be solved using substitution: replacing the y in the first equation with the quantity $2x$ from the second equation.

$$\begin{cases} y = 3x - 5 \\ y = 2x \end{cases}$$

becomes

$$2x = 3x - 5 \quad \text{Subtract } 3x \text{ from both sides}$$

$$-x = -5$$

$$x = 5 \quad \text{The opposite of } -5 \text{ is } 5$$

Then, replace 5 for x in either equation (This shows the second equation.)

$$y = 2x$$

$$= 2(5)$$

$$= 10$$

Therefore, the point of intersection, which is the solution to the system of equations, is $(5, 10)$.

The answer is C $(5, 10)$