Notes on the Practice Exam

This practice exam has three major sections to it: test, answer key with hints, and scoring guide. You'll get the most out of this practice if you make the experience as authentic as possible so carefully follow the directions below. Good luck.

Directions

Find a quiet place to spend the next hour or two. Clear away all distractions and set a timer for 60 minutes. Once you start the timer resist the urge to pause for any reason or to peek ahead at the answers and hints. Once the timer goes off stop all work on test. Use the answer key to correct your test and the scoring guide to estimate your score on this practice exam. Lastly, go back through the exam using the hints to brush up on the ones you missed.

Practice Exam 1

1. Which of these numbers is not equal to the others?

A. 0.016

B. 1.6%

C. 1.6×10^{-3}

D. $\dfrac{16}{1000}$

E. $16(0.001)$

2. At the beginning of January, Molly had $6000 in her savings account. In February she had 25% more than she did in January, and in March she had 30% more than she did in February. How much money did Molly have in her savings account in March?

A. $3300

B. $7500

C. $8250

D. $9300

E. $9750

3. $5 - 6^2 \cdot (-3) - (-4) = ?$

A. -99

B. -107

C. 97

D. 109

E. 117

4. What is the least common denominator of $\dfrac{1}{2xy}$, $\dfrac{1}{x^2yz}$, and $\dfrac{1}{4xy^2}$?

A. 2xyz

B. $4x^2y^2z$

C. xy

D. $8x^4y^4z$

E. 4xy

5. Six different marching bands will be participating in a parade. If the local high school's band must march first and the state's professional band must march last, how many different orders can the bands march in?

A. 4

B. 15

C. 24

D. 360

E. 720

6. Which of the following statements is NOT true?

A. All irrational numbers are real numbers.

B. All prime numbers are whole numbers.

C. All natural numbers are integers.

D. All decimals are rational numbers.

E. All whole numbers are integers.

7. Solve for x: $3x - 5 = 4x + 7$

A. -12

B. -2

C. $\dfrac{12}{7}$

D. 2

E. 12

8. Three-fifths of the students in the school orchestra play the violin. If $\dfrac{2}{3}$ of the violin players are girls and 24 girls play violin, how many students are in the orchestra?

A. 16

B. 27

C. 36

D. 40

E. 60

9. What is the product of 0.00000072 and 98,000 written in scientific notation?
A. 0.07056
B. 7.056×10^2
C. 7.056×10^{-2}
D. 70.56×10^{-3}
E. 7.056×10^{-4}

10. A grocery store sells 3 lbs of apples for $6.27. If Maurice goes to the store with $25 and buys 10 pounds of apples, how much money will he have left over?
A. $4.10
B. $4.78
C. $6.19
D. $20.22
E. $20.90

11. Jessica is getting ready for school and needs a pair of socks. In her sock drawer she has 14 white socks, 10 black socks, and 4 navy socks. If the first sock she pulls out of the drawer is white, what is the probability that the second sock she pulls will also be white?
A. $\dfrac{13}{54}$

B. $\dfrac{13}{28}$

C. $\dfrac{13}{27}$

D. $\dfrac{1}{2}$

E. $\dfrac{14}{28}$

12. What is the median of this set of numbers? {16, 20, 34, 19, 14, 12, 21, 28}
A. 19
B. 19.5
C. 20
D. 20.5
E. 22

13. To make a solution in chemistry lab, Amanda needs to mix together three different components, Ingredients X, Y, and Z. X, Y, and Z need to be in a ratio of 2:5:7 to get the proper results. How many milliliters of Ingredient Y does Amanda need to make a solution that is 250 mL?
A. 35.71
B. 50
C. 89.29
D. 125
E. 178.57

14. Which of the following numbers is the greatest?

A. 2^3

B. $\sqrt{121}$

C. $\left|-15\right|$

D. $\dfrac{350}{25}$

E. 3^2

15. Which of the following equations represents the function given in the table?

x	1	3	5
f(x)	149	153	157

A. f(x) = 2x

B. f(x) = 2x + 147

C. f(x) = 4x

D. f(x) = 2x + 149

E. f(x) = 4x + 145

16. Which of these is a factor of the polynomial $3x^2 - x - 2$?

A. x

B. x - 2

C. x + 1

D. 3x + 2

E. 3x - 2

17. What is the value of $s^2 + 2 \cdot (t - s) - 4t$ if s = -3 and t = 6?

A. -27

B. -15

C. -9

D. 3

E. 23

18. What is the simplified form of $(x - 2)(x^2 + 8x + 5)$?

A. $x^3 + 8x^2 + 5x - 2$

B. $x^3 + 10x^2 + 21x + 10$

C. $x^3 + 6x^2 - 11x - 10$

D. $x^3 - 2x^2 - 16x + 10$

E. $x^3 + 6x^2 - 9x - 10$

19. What is the simplest form of the complex fraction $\dfrac{\dfrac{1}{x}+\dfrac{1}{2}}{\dfrac{x}{3}+\dfrac{2}{x}}$?

A. $\dfrac{6+3x}{2x^2+12}$

B. $\dfrac{6x+3x^2}{2x^3+12x}$

C. $\dfrac{6+3x}{4x}$

D. $\dfrac{x^3+2x^2+6x+12}{6x^2}$

E. $6+2x$

20. Jeremy's father's age is 11 less than Jeremy's age squared. If Jeremy's father is 53, how many years older is Jeremy's father than Jeremy?

A. 8
B. 42
C. 45
D. 51
E. 64

21. Which of these is a solution to $\dfrac{x}{3}=\dfrac{3}{2x+3}$?

A. $\dfrac{2}{3}$

B. $-\dfrac{2}{3}$

C. 3

D. $-\dfrac{3}{2}$

E. $\dfrac{3}{2}$

22. Solve the following equation for x: $6(x+4)=\dfrac{5}{2}(3x-5)$

A. 6

B. $\dfrac{23}{3}$

C. 7

D. $\dfrac{29}{3}$

E. $\dfrac{73}{3}$

23. A number is subtracted from 7, and then this difference is divided by 4. This quotient is 8 less than the square of that number. What is an equation that represents this relationship?

A. $7 - \dfrac{x}{4} = x^2 - 8$

B. $\dfrac{(7-x)}{4} = x^2 - 8$

C. $\dfrac{(x-7)}{4} = x^2 - 8$

D. $\dfrac{(x-7)}{4} = 8 - x^2$

E. $\dfrac{(7-x)}{4} = 8 - x^2$

24. What is the value of f(-1) for the linear function given in the table below?

x	-2	-1	0	1	2
f(x)	-4			5	8

A. -3
B. -1
C. 1
D. 2
E. 3

25. If f(x) = 3x² + x and g(x) = 2x – 1, what is f(g(5))?
A. 9
B. 80
C. 159
D. 243
E. 252

26. Ainsley has 23 coins in her purse. If the total value of all her coins is $1.50 and she only has nickels and dimes, how many dimes does Ainsley have?
A. 5
B. 7
C. 10
D. 15
E. 16

27. Which of these expressions is equivalent to $\dfrac{3x}{x+4} + \dfrac{4}{x}$?

A. $\dfrac{3x+4}{2x+4}$

B. $\dfrac{3x+4}{x^2+4x}$

C. $\dfrac{3x^2+4x+16}{x^2+4x}$

D. $\dfrac{12x}{x^2+4x}$

E. $\dfrac{3x+4}{x+4}$

28. What is the value of (5 + i)(5 - i)?
A. 25 + i
B. 25 - i
C. 24
D. 25
E. 26

29. What is the missing term in the following geometric sequence: 3, ___, 48, 192
A. 6
B. 8
C. 9
D. 12
E. 16

30. What is the solution set for the equation $3|2x-5| - 2 = 4$?

A. $\left\{\dfrac{3}{2}, \dfrac{7}{2}\right\}$

B. $\left\{\dfrac{7}{2}\right\}$

C. $\left\{\dfrac{25}{6}\right\}$

D. $\left\{\dfrac{17}{6}, \dfrac{25}{6}\right\}$

E. $\{-2, 2\}$

31. What is the simplest form of $\dfrac{3}{6 - \sqrt{3}}$?

A. $\dfrac{18 + 3\sqrt{3}}{25}$

B. $\dfrac{6 + \sqrt{3}}{11}$

C. $\dfrac{18 + 3\sqrt{3}}{25}$

D. $\dfrac{18 + 3\sqrt{3}}{33}$

E. This expression is already in simplest form

32. Which of the following is a root of the polynomial $2x^2 - 6x + 3$?

A. $\dfrac{6 + \sqrt{30}}{4}$

B. $\dfrac{3 + \sqrt{3}}{2}$

C. $\dfrac{6 + 3i\sqrt{2}}{4}$

D. $3 + \sqrt{3}$

E. $\dfrac{-3 + \sqrt{3}}{2}$

33. A baseball is hit into the air and follows a trajectory that can be modeled by the equation h = −16t^2+134t+3, where h is the height in feet of the baseball after t seconds. After it is hit, approximately how many seconds will it take the ball to hit the ground?

A. 0.71
B. 8.35
C. 8.40
D. 267.28
E. 268.71

34. What is the slope of any line that is perpendicular to the line 5x – 2y = 3?

A. $-\dfrac{5}{2}$

B. $\dfrac{5}{2}$

C. $-\dfrac{2}{5}$

D. $\dfrac{2}{5}$

E. $-\dfrac{3}{2}$

35. What is the vertex of the parabola with the equation y = 2(x + 4)^2 + 8?
A. (4, 8)
B. (-4, 8)
C. (-8, 8)
D. (8,4)
E. (8, -4)

36. Marta and Janine both start at the point (3, 4). Marta walks 6 units north and 3 units west. Janine walks 5 units south and 8 units east. How many units are the girls from each other when they stop walking?
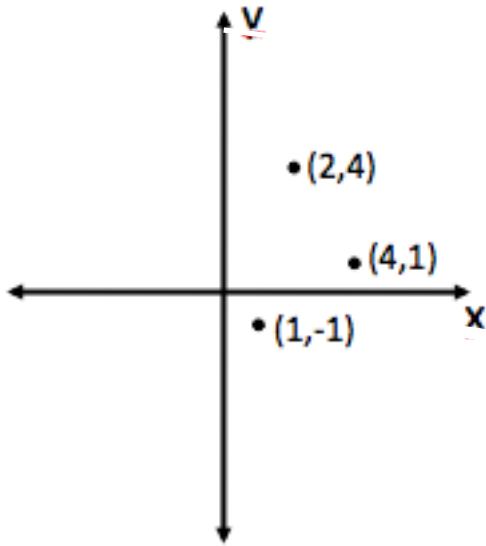
A. $\sqrt{22}$

B. $\sqrt{26}$

C. 11

D. $11\sqrt{2}$

E. $\sqrt{58}$

37. Three of the vertices of a rectangle are shown on the coordinate plane below. What are the coordinates of the fourth vertex?
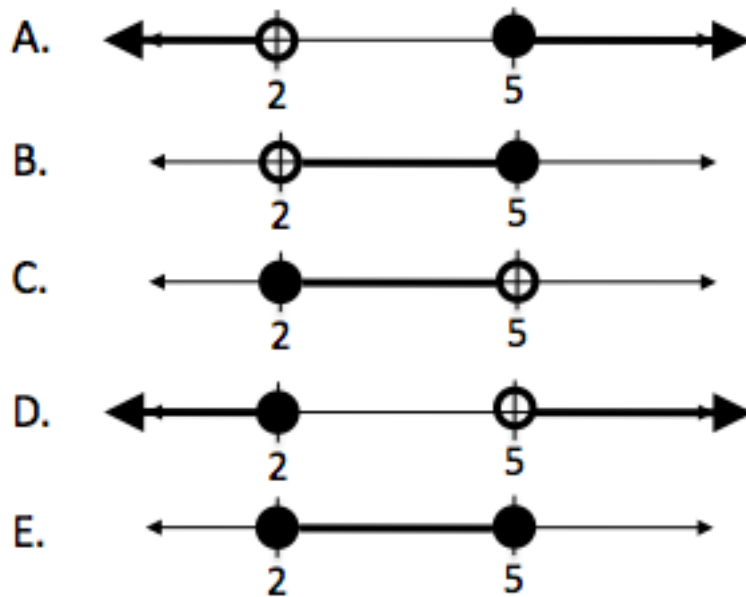

A. (-1, 2)
B. (-1, -4)
C. (0, 1)
D. (0, -1)
E. (3, 2)

38. Martinville is located at the point (7, -3). Geotown is located at the point (-1, 10). There is a filling station exactly halfway between the two cities. What are the coordinates for the filling station?
A. (3, 3.5)
B. (4, 6.5)
C. (5, 5.5)
D. (6, 7)
E. (8, 13)

39. Which of the following graphs represents the inequality 2 < x ≤ 5?

A.

2   5

B.

2   5

C.

2   5

D.

2   5

E.

2   5

40. What is the equation for a circle in the coordinate plane whose center is at (-2, 5) and goes through the point (1, 5)?
A. $(x + 2)^2 + (y - 5)^2 = 1$
B. $(x - 2)^2 + (y + 5)^2 = 3$
C. $(x + 2)^2 + (y - 5)^2 = 3$
D. $(x - 2)^2 + (y + 5)^2 = 9$
E. $(x + 2)^2 + (y - 5)^2 = 9$

41. What is the x-intercept of the line $3x - 5y = 10$?

A. -5
B. -2
C. 2
D. 3
E. $\dfrac{10}{3}$

42. A, B, C, and D are collinear points, where B is between A and C, and C is between B and D. The distance from A to C is 6 units, the distance from B to D is 7 units, and the distance from B to C is 4 units. What is the distance from A to D?
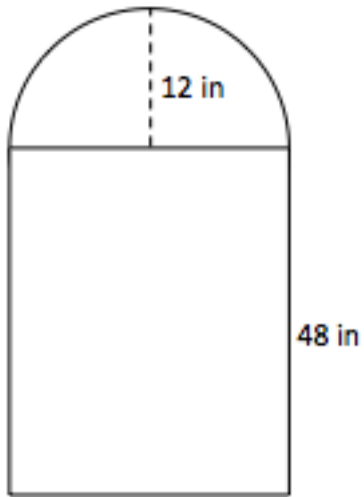
A. 9

B. 10

C. 11

D. 13

E. 17

43. An altitude is drawn to the hypotenuse of triangle ABC. If one leg of ABC measures 5 in, what is the length of its hypotenuse?
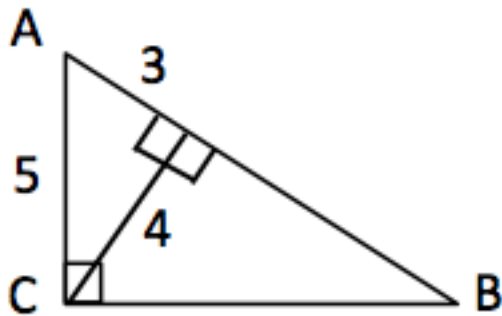
A. 16/3

B. 3

C. 20/3

D. 6

E. 25/3

44. A window has the shape of a semicircle on top of a rectangle. The height of the rectangle is 48 inches and the radius of the semicircle is 12 inches. How many square feet of glass are needed to pane the window?
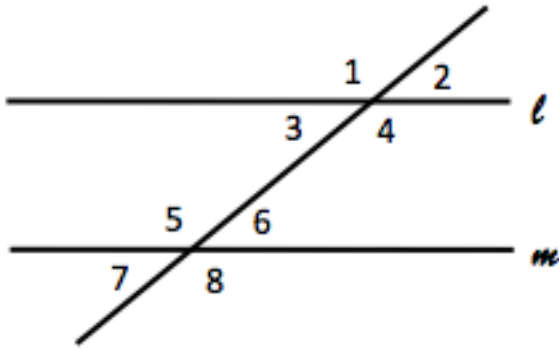

A. 9.57
B. 11.14
C. 114.85
D. 133.70
E. 1378.19

45. A right circular cone has a volume of 156 cm³ and a height of 7 cm. What is the radius of the cone, to the nearest tenth of a centimeter? $V_{cone} = \dfrac{1}{3}\pi r^2 h$

A. 1.5
B. 2.4
C. 3.0
D. 4.6
E. 21.3

46. Which of the following is a pair of alternate interior angles?

A. 1 and 8
B. 3 and 5
C. 6 and 7
D. 1 and 5
E. 3 and 6

47. A circle has a circumference of 36π. What is its area?
A. 12π
B. 18π
C. 81π
D. 324π
E. 1296π

48. Which of the following statements is NOT true?
A. All rectangles are parallelograms.
B. All quadrilaterals are polygons.
C. All trapezoids are parallelograms.
D. All squares are rhombuses.
E. All parallelograms are quadrilaterals.

49. In trapezoid FHKG, FH ⊥HK and FG || HK. What is the perimeter of FHKG?
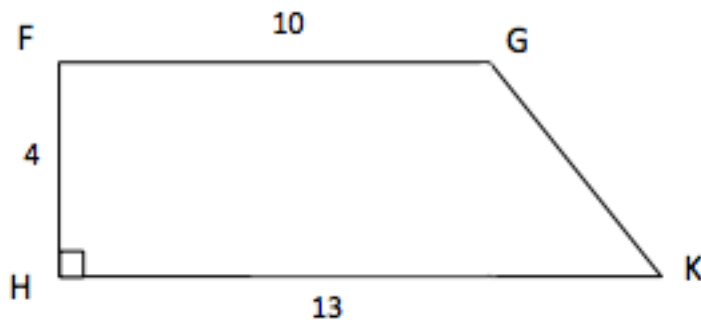
A. 27
B. 29
C. 30
D. 31
E. 32

50. In the given diagram, ∠KNM measures 40° and ∠NKM measures 115°. What is the measure of ∠JLK?
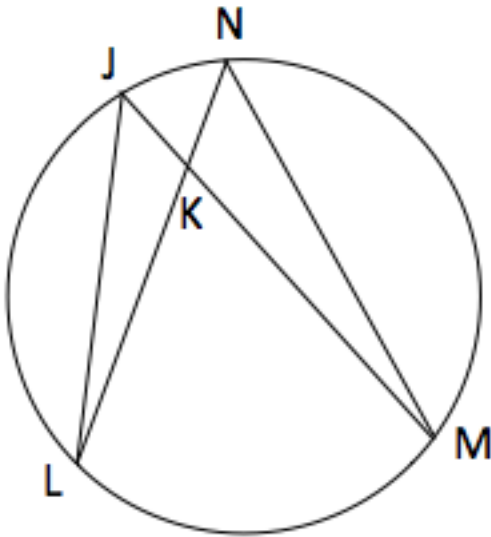
A. 20°
B. 25°
C. 30°
D. 35°
E. 40°

51. One side of an equilateral triangle measures 6 inches. What is the height of the triangle?

A. $\sqrt{3}$

B. $3\sqrt{3}$

C. 6

D. $6\sqrt{3}$

E. 3

52. What is the measurement of one interior angle in a regular octagon?
A. 45°
B. 135°
C. 180°
D. 270°
E. 1080°

53. A spherical ball with a diameter of 12 cm is submerged into a cylindrical can that is completely filled with water, so that some of the water spills out. If the can is 30 cm tall and has a radius of 9 cm, how much water is left in the can when the ball is removed? $V_{Sphere} = \dfrac{4}{3}\pi r^3$

A. 126π cm^3
B. 288π cm^3
C. 2142π cm^3
D. 2304π cm^3
E. 2430π cm^3

54. In the diagram shown, DE || BC, DE measures 4 units, BC measures 6 units, and AC measures 9 units. What is the measurement of EC?
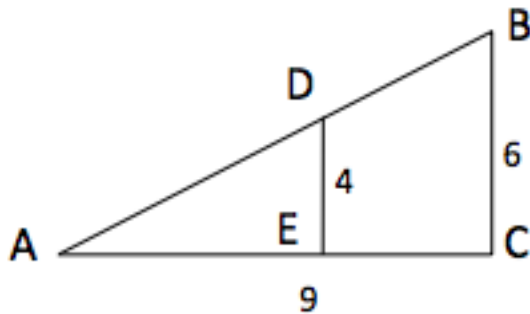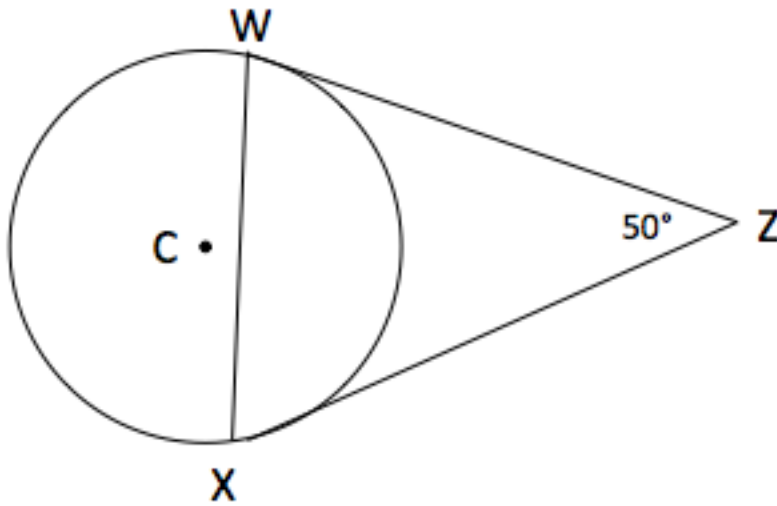

A. 3
B. 5
C. 6
D. $\dfrac{27}{2}$
E. $\dfrac{8}{3}$

55. A circular pizza with a diameter of 16 inches is cut into 8 equal sized slices. If three slices of the pizza are eaten, what is the area of the remaining pizza?
A. 24π
B. 40π
C. 64π
D. 96π
E. 160π

56. In the diagram below, $\overline{WZ}$ and $\overline{XZ}$ are tangent to circle C at points W and X, respectively. If the measure of $\angle WZX$ is 50°, what is the measure of $\angle XWZ$?

A. 25°
B. 50°
C. 65°
D. 130°
E. Cannot be determined from the information given

57. Which of the following is equivalent to cos(θ) • csc(-θ)?
A. –cot(θ)
B. -1
C. –tan(θ)
D. cot(θ)
E. 1

58. An electrical pole casts a shadow that is 15 ft long. If a wire connected to the top of the pole and fastened to the ground at the tip of the shadow makes a 55° angle with the ground, which of the following expressions would represent the height of the pole?

A. $\dfrac{\tan(55^0)}{15}$

B. $\dfrac{\sin(55^0)}{15}$

C. $\dfrac{15}{\tan(55^0)}$

D. $15 \bullet \tan(55^0)$

E. $15 \bullet \sin(55^0)$

59. Which of the following is NOT equivalent to cos(495°)?
A. -cos(45°)
B. –sin(45°)
C. cos(135°)
D. sin(135°)
E. cos(-225°)

60. What is the period of the function f(x) = 4sin(2x) + 2?
A. 2
B. 2π
C. 4
D. 4π
E. π

ANSWER KEY IS ON THE NEXT PAGE

Answer Key

Question #:	Correct Answer	Hint
1	C	Numbers are much easier to compare if they're all in the same form. Try converting all of them to decimals before you try to compare.
2	E	Be careful! You can't just add percents here. Figure out the value for the first month first, then use that value to get the value for the next month.
3	E	Remember your order of operations! Exponents first, then multiplication and division, then addition and subtraction.
4	B	You can find a least common denominator with algebraic fractions the same way you do with numerical fractions – just find the least common multiple of the three denominators.
5	C	Since you know two of the bands must march in specific places, there are only four you really need to worry about ordering.
6	D	Think very carefully about the definitions of each of these terms. See if you can come up with any counterexamples that show that one of these statements is false.
7	A	When you have variables on both sides of an equation, you always want to get all the variable terms on one side and all the constant terms on the other.
8	E	Work backwards on this one. Start by figuring out how many total violin players there are.
9	C	It may be helpful to convert both of these numbers to scientific notation first before trying to multiply.
10	A	You can use a proportion here to figure out how much Maurice spends on apples. But don't forget to read the question and answer what is being asked!
11	C	Be careful! Once she pulls out one white sock, there is one less white sock in the drawer, and the total number of socks is one less as well. Be sure to take that into account when you calculate the probability.
12	B	Remember, when you have an even number of data points, the median is the AVERAGE of the two middle numbers.
13	C	Take a look at the ratio you're given – it splits the solution into 14 parts, 5 of which are Ingredient Y. You can use this information to figure out the portion of 250 mL that needs to be Ingredient Y.
14	C	Again, numbers in the same form are much easier to compare. Simplify each of these numbers before trying to compare.
15	B	Start by looking for a pattern between the numbers in the table. What happens to f(x) as x increases by a certain amount?
16	D	Often you can factor a quadratic expression into two binomials being multiplied together.

17	D	You're given values for s and t, so replace s and t in the expression with those values wherever you see them. Be careful with the negative value for s!
18	C	When you're multiplying a binomial by a trinomial, you want to make sure you multiply EVERY term in the binomial by EVERY term in the trinomial. So before simplifying, you should have 6 terms in your expansion.
19	A	Fraction bars act like grouping symbols in the order of operations, so simplify the numerator and denominator of the big fraction separately first.
20	C	Since we don't know Jeremy's age, pick a variable to represent it. Then you should be able to write an expression for his age based on the information given.
21	E	Remember what happens when you have two fractions equal to each other? You can cross multiply and keep the equality!
22	E	Be careful with order of operations here! Make sure you distribute before trying to do any adding or subtracting.
23	B	Be very careful to read through this problem slowly and determine exactly what each piece is asking. Make sure you're subtracting things in the right order!
24	B	Even though there are a couple points missing, you should still be able to find a pattern here. Make sure you test your pattern to make sure it works for all the given points!
25	E	Be careful with the order in which you evaluate the functions. Start from the inside and work your way out.
26	B	You have two unknown values here, but you have enough information that you should be able to write two equations that can help you find both values.
27	C	Remember rule #1 when you're adding fractions – find a common denominator! This goes for algebraic fractions as well. When in doubt, you can always multiply the denominators together to get a common denominator.
28	E	You can multiply complex numbers like these the same way you multiply binomials. After multiplying, see if anything simplifies.
29	D	In a geometric sequence, the terms are multiplied by the same number each time to get the next term. See if you can use the information given to find that number for this sequence.
30	A	The first step in solving an absolute value equation is getting the absolute value part by itself on one side. Don't try to simplify within it until you do that!
31	D	A radical expression is not in simplest form if there is a radical in the denominator of a fraction, so you'll need to multiply by a conjugate to rationalize the denominator.
32	B	This is a quadratic that doesn't factor easily, so your best bet here is to use the

		quadratic formula.
33	C	When the ball hits the ground, its height will be 0. So determine the value of t when h=0.
34	C	Remember, perpendicular lines have slopes that are opposite or negative reciprocals.
35	B	Recall vertex form of a parabola: y = (x-h)^2 + k, where the vertex is at the point (h,k).
36	D	Try drawing a coordinate plane to start, then figure out the coordinates of the points that each girl ends up at. Distance Formula = $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)}$
37	A	Remember that rectangles have four right angles at their vertices. That means the sides of a rectangle are perpendicular to each other.
38	A	To find the coordinates of midpoint of a line segment in the coordinate plane, just find the average of the x-coordinates and the y-coordinates of the endpoints.
39	B	Remember, when an inequality is written like this with the variable BETWEEN two numbers, the possible values are BETWEEN the given numbers. How would this be represented on a number line?
40	E	To write the equation for a circle, you need to know the center and radius. You're given the center here, but the second point you're given should make it pretty easy to find the radius!
41	E	Remember, the x-intercept is where the graph crosses the x-axis, or where y = 0. So to find the x-intercept, just set y equal to 0 and simplify.
42	A	This looks like a lot of words, but taking it one piece at a time and drawing a diagram will make things seem less confusing.
43	E	When an altitude is drawn to the hypotenuse of a right triangle, it creates a bunch of similar triangles. You should be able to use this property to find the missing length you need.
44	A	Be careful on this one! The measurements are given to you in inches, but the problem wants your answer in FEET.
45	D	Make sure you're careful to plug the right values into the right places in the equation. You're given the VOLUME, v, and the HEIGHT, h, and need to find the RADIUS, r.
46	E	"Interior" here refers to the space in between the two lines that the transversal intersects.

47	D	All you need to know to find the area is the radius of the circle. Circumference is 2πr, so you can use that to find the radius.
48	C	A parallelogram has two pairs of opposite sides that are parallel and congruent. Does that fact conflict with any of the statements here?
49	E	Based on the information given, you can actually split this trapezoid up into a rectangle and a right triangle. The side you're missing is the hypotenuse of this right triangle, therefore the Pythagorean Theorem may help you out here.
50	B	When inscribed angles intercept the same arc, the angles are congruent. You've also got a pair of vertical angles in here, which are also congruent. Two pairs of congruent angles are all you need to determine that two triangles are similar.
51	B	Start by drawing a picture and labeling the information you know about equilateral triangles.
52	B	Remember, the sum of the interior angles in a polygon is (n-2)•180°, where n is the number of sides of the polygon.
53	C	If the spherical ball is completely submerged in the water, the volume of water that spills out will be equal to the volume of the ball. So when the ball is removed, that amount of water will be missing.
54	A	Since $\overline{DE}$ and $\overline{BC}$ are parallel, we actually have some similar triangles here. See if you can spot them.
55	B	Find the area of the whole pizza first. Then think about what portion of the pizza has been eaten and what portion remains, if it's cut into equal slices.
56	C	When two tangent segments like $\overline{WZ}$ and $\overline{XZ}$ meet at a point outside the circle, they are congruent. This should give you some information about ΔWZX that you can use.
57	A	Try rewriting everything in terms of sine and cosine.
58	D	With word problems like this, it's always helpful to draw a picture first and label the information you're given.
59	D	Remember, cosine repeats itself every 360°. So if you subtract 360 from 495, you'll get the same value for cosine.
60	E	The period of a trigonometric function is 2π divided by the value multiplying x.

Scoring Guide*	
Estimated Score	**Number Correct**
36	60
35	58 – 59
34	57
33	55 – 56
32	54
31	52 – 53
30	50 – 51
29	48 – 49
28	47
27	43 – 46
26	41 – 42
25	40
24	37 – 39
23	35 – 36
22	33 – 34
21	31 – 32
20	30
19	27 – 29
18	25 – 26
17	22 – 24
16	18 – 21
15	14 – 17

14	10 - 13
13	8 – 9
12	6 – 7
11	5
10	—
9	4
8	—
7	3
6	—
5	2
4	—
3	1
2	—
1	0

*The scoring guide is an estimate based on Sophia.org's calculations and the ACT® was not involved in the production of this product and does not endorse it.