Math 9 Final Review

Multiple Choice

Identify the choice that best completes the statement or answers the question.

 1.	List all the whole num	bers bet	tween 63 and 101	that	are perfect squares		
	a. 64, 81, 96			c.	64, 81, 100		
	b. 64, 81			d.	64, 72, 81, 100		
2.	Calculate the number	whose so	quare root is 0.9.				
	a. 0.81	b. 0.	0081	c.	0.081	d.	0.09
 3.	Which decimal has a s	square ro	oot between 14 an	d 15	5?		
	i) 240.3						
	ii) 169						
	iii) 14.5						
	iv) 204.5						
	a. ii	b. iii	ĺ	c.	i	d.	iv
 4.	Which fraction has a s	quare ro	pot between 3 and	4?			
	i) $\frac{52}{3}$						
	ii) $\frac{61}{3}$						
	iii) $\frac{37}{4}$						
	iv) $\frac{79}{4}$						
	a. iv	b. ii		c.	iii	d.	i
5.	Estimate the value of	$\sqrt{0.15}$.	to the nearest ten	nth.			
 	a. 0.3	b. 0.4	4	c.	0.39	d.	0.2
6	The lengths of the two	legs of	`a right triangle ar	е 6	5 cm and 3 4 cm		
 0.	Determine the length of	of the hv	vpotenuse to 1 dec	cima	l place.		
	a. 53.8 cm	b. 7.	3 cm	C.	5.5 cm	d.	3.1 cm
7	This composite object	is made	e using centimetre	cub	es Determine its su	rfac	e area
 7.		15 muut		out	es. Determine its su	inuc	c urcu.



a. 24 cm²
b. 20 cm²
c. 15 cm²
d. 18 cm²
8. This composite object is made using centimetre cubes. Determine its surface area.





9. This object is made from 9 centimetre cubes. Determine its surface area.



a. 30 cm²
b. 28 cm²
c. 34 cm²
d. 54 cm²
10. This composite object is made of a 10-cm cube on top of a 20-cm cube. Determine its surface area.



a.	2800 cm^2	b.	2500 cm^2	c.	2900 cm^2	d.	3000 cm^2
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 This object is made of a right rectangular prism of length 12 cm, width 6 cm, and height 4 cm. A cube of side length 2 cm has been removed from one corner. Determine the surface area of the object.



a. 312 cm^2 b. 264 cm^2 c. 288 cm^2 d. 280 cm^2

12. This object is composed of two right triangular prisms and a right rectangular prism. Determine the surface area of the object.



13. This birdhouse is to be hung from the branch of a tree. The circular hole has diameter 8 cm. Determine the surface area of the birdhouse, to the nearest square centimetre.



14. Each layer of a two-layer cake is a right rectangular prism.
 The bottom layer has a square base of side length 26 cm and height 8 cm.
 The top layer has a square base of side length 18 cm and height 6 cm.
 The surface of the cake is frosted. What area of the cake is frosted?

	a.	2616 cm^2	b.	2264 cm^2	c.	1940 cm ²	d.	2588 cm ²
15	. W	Trite the base of $-(-5)$) ³ .					
	a.	-5	b.	5	c.	-5 x 3	d.	3
16	. W	rite 7 ⁵ as repeated m	ultij	plication.				
	a.	5×7			c.	7x7x7x7x7		
	b.	7+7+7+7+7			d.	$7 \times 7 \times 7 \times 7 \times 7 \times 7 \times 7$	7	
17	. Ev	valuate: б ⁵						
	a.	30	b.	7776	c.	15 625	d.	11
18	. W	hich answer is negat	ive?					
	i)	(-6) ⁶						
	ii)	$-(6)^{6}$						
	iii) -(-6) ⁶						
	a.	i and ii	b.	ii and iii	c.	i only	d.	i and iii

 19.	Evaluate: 10 ⁷ a. 100 000 000	b.	10 000 000	c.	1 000 000	d.	70
 20.	Write $(5 \times 10^4) + (8 \times 10^4)$	10 ¹ b.) + (9 × 10 ²) + (6 × 1 50 986	0 ⁰) c.	in standard form. 50 981	d.	5986
 21.	Which number is the g i) $(5 \times 10^3) + (6 \times 10^3)$ ii) 5645 iii) $(5 \times 10^3) + (7 \times 10^3)$	$(1^{2})^{2}$	est? $(4 \times 10^{1}) + (7 \times 10^{0})$ (8×10^{0}))			
	iv) 5780 a. iv	b.	i	c.	iii	d.	Ii
 22.	Evaluate: 4 – 6 ² a. –8	b.	16	c.	-32	d.	
 23.	Evaluate: $2^3 - (-3)^3$ a. 15	b.	-19	c.	-3	d.	35
 24.	Evaluate: $(3+4)^2 - (3+4)^2 = (3+4)^2 - (3+4)^2 = (3+4$	2 – 4 b.) ³ 57	c.	20	d.	41
 25.	Write the quotient of	$\frac{6^{10}}{6^5}$	as a single power.				
 26.	a. 6^{5} Express $\frac{(-5)^{9} \times (-5)}{(-5)^{3}}$	b. _ ^б а	6 ¹⁵ s a single power.	c.	6 ²	d.	2
	a. (-5) ⁵	b.	(-5) ⁵¹	c.	(-5) ¹²	d.	(-5) ¹⁸
 27.	Evaluate: $(-2)^{-3} \times (-2)^{-2}$ a. -128	b.	(-2)° -256	c.	256	d.	-32 768
 28.	Evaluate: $10^2 \times 10^5 + a$. 10 100 000 b. 1 000 000 000 000	· 10 ⁵)		c. d.	120 10 000 100 000		
 29.	Write $\left[(-4) \times (-5) \right]^3$	as	a product of powers				
30	a. $3(-4) + 3(-5)$ b. $(-4)^3 \times (-5)^3$ Evaluate: $[(-5)^0]^3$			c. d.	$(-4)^3 + (-5)^3$ $4^3 \times 5^3$		
 50.	a3	b.	-1	c.	3	d.	1

31. Which expressions have negative values?

i)
$$\left[-(-4)^3\right]^3$$

ii) $\left(-4^3\right)^3$
iii) $\left[(-4)^3\right]^3$
iv) $-\left[(-4)^3\right]^3$
a. ii and iii b. i and iv c. i and ii d. iii and iv

32. Which numbers are rational numbers?

$$\frac{2}{11}$$
, 3.6, $0.8\overline{3}$, $\frac{11}{2}$

 a. $\frac{2}{11}$ and 3.6

 b. $\frac{2}{11}$ and $\frac{11}{2}$

 c. All of them

 d. $\frac{2}{11}$, 3.6, and

33. Identify the number that is NOT equal to the other three numbers.

$$\frac{-5}{8}, \frac{5}{-8}, \frac{-5}{-8}, \frac{-5}{8}$$

a. $\frac{5}{-8}$ b. $\frac{-5}{-8}$ c. $\frac{5}{8}$ d. $\frac{-5}{8}$

 $\frac{11}{2}$

34. Identify equal rational numbers in this list:

35. Which rational number is represented by the letter A on the number line?

36. Write the addition statement that this number line represents.

-2 -1.3 -2.5 a. -2.5 + (-1.2) = -1.3c. -1.3 + (-1.2) = -2.5d. -1.3 + 2.5 = -1.2b. -2.5 + 1.2 = -1.337. Which expression has the least sum? i) 9.43 + 6.05 ii) -9.43 + 6.05 iii) 9.43 + (-6.05) iv) -9.43 + (-6.05) c. iii a. ii b. i d. iv 38. Yesterday, the temperature of a freezer was -4.4°C. When the technician checked the freezer today, its temperature had decreased by 9.8°C. Determine the temperature of the freezer today. a. -5,4°C b. 5.4°C c. 14.2°C d. −14.2°C 39. Which expressions have the same answer as $-1\frac{2}{3} - (-5)$? i) $5 + 1\frac{2}{3}$ ii) $-5 + 1\frac{2}{3}$ iii) $-1\frac{2}{3} + 5$ iv) $5 - 1\frac{2}{3}$ a. iii and iv b. ii and iv c. i and ii d. i and iii 40. The temperature at the top of a mountain is 10.5°C less than the temperature at the base of the mountain. If the temperature at the base is -4.4°C, what is the temperature at the top? a. 6.1°C b. -14.9°C d. 14.9°C c. -6.1°C 41. Determine this product. $\left(-\frac{3}{2}\right)\left(-\frac{5}{4}\right)$ b. $-\frac{15}{8}$ c. $\frac{15}{8}$ d. 11 42. The price of a share changed by -\$1.45. A person owns 190 shares. By how much did his shares change in value? a. -\$85.50 b. -\$275.50 c. +\$275.50 d. -\$131.03

43.	Which	quotients	are	less	than	0?

i)	$\left(\frac{-7}{8}\right) \div \left(\frac{9}{-8}\right)$						
ii)	$\left(-\frac{7}{8}\right) \div \left(\frac{9}{8}\right)$						
iii)	$\left(\frac{-7}{-8}\right) \div \left(\frac{-9}{8}\right)$						
iv)	$\left(-\frac{7}{8}\right) \div \left(-\frac{9}{8}\right)$						
a.	ii and iii	b.	i and iii	c.	i and iv	d.	ii and iv

44. Which operation would you do first to evaluate this expression?

8.8	6 – 1.6 ÷ 0.2 × 2.2 + 3.7		
a.	Divide 1.6 by 0.2.	с.	Add 3.7 to 2.2.
b.	Subtract 1.6 from 8.8.	d.	Multiply 0.2 by 2.2.

45. Evaluate.

$\frac{5}{6}$ ÷	$\left(\frac{4}{3}+\frac{1}{6}\right)$						
a.	25	b.	8	c.	5	d.	19
	54		15		9		24

46. A pattern can be represented by the equation H = 6n - 1. Which equations could represent the same pattern? i) H = 6(n - 1) + 5ii) H = 5(n + 1) + niii) H = 7n - (n + 1)iv) H = 5n - (1 - n)a. i, ii, and iii b. i, iii, and iv c. i, ii, and iv d. All of these

47. Which graphs represent a linear relation?



b. Q, R, and S

c. Q and S d. Q and R





d. Line R

- 51. Which equation describes the graph below?

y = 2xi)

- ii) y = 2x + 2
- iii) y = -x + 2
- iv) y = -2x + 2

0 1 2 3 6 5 4 3

x	0	1	2	3
у	0	-6	-12	-18

c.
$$d = 5t$$
 d. $t = 5d$







53. This graph represents a linear relation. Determine the value of y when x = 3.





d. 6

c. 10

c. 3.5

d. 10

.1 1



55. A large white square represents an x^2 -tile, a large black square represents a $-x^2$ -tile, a small white square represents a 1-tile, and a small black square represents a -1-tile.

How would you model the polynomial $-3x^2 - 4$ with algebra tiles? a. c.



d. $4x^2$ -tiles, 4-x-tiles, and 6-1-tiles

- 59. Combine like terms. Sketch algebra tiles if it helps. 3x + 8 + 7x - 2a. 10x + 6 b. 11x + 5 c. 16x d. 10x - 660. Combine like terms. Sketch algebra tiles if it helps. $9x^2 - 7x + 2x - 6x^2$ a. $-2x^2$ b. $3x^2 - 5x$ c. $2x^2 - 4x$ d. $3x^2 + 5x$ 61. A large white severe represents on x^2 tile a large black severe represents a x^2 tile a with the severe represents on x^2 tile a large black severe represents a x^2 tile a with the severe represents x^2 tile $x^$
- 61. A large white square represents an x^2 -tile, a large black square represents a $-x^2$ -tile, a white rectangle represents an *x*-tile, a black rectangle represents a -x-tile, a small white square represents a 1-tile, and a small black square represents a -1-tile.

Write the simplified polynomial.



67. What is the missing value in this arrow diagram?



68. What are the missing values in this arrow diagram?



 $\begin{array}{c} \hline & 74. \\ a. \\ w \ge 6 \\ \end{array} \begin{array}{c} w > 6 \\ b. \\ w > 6 \\ \end{array} \begin{array}{c} w > -6 \\ c. \\ w > -6 \\ \end{array} \begin{array}{c} w > -6 \\ c. \\ w > -6 \\ \end{array} \begin{array}{c} w \ge -6 \\ \end{array}$

75. Write the inequality whose solution is graphed on the number line.

-5 -4 -3 -2 -1 0 1 2 3 4 5 d. x > 1a. $x \ge 1$ b. x > -1c. $x \ge -1$ 76. Which of these inequalities has 7 as a solution? i) c+3>10 ii) d+2≥9 iii) e-3<4 iv) $f - 4 \le 3$ b. i and ii a. i and iii c. ii and iv d. iii and iv 77. Which of these inequalities has -4 as a solution? i) $p + 1 \le -2$ ii) q + 2 > -2iii) *r*−1 <−4 iv) $s-4 \ge -4$ b. i and ii c. i and iii d. i and iv a. ii and iv 78. Solve: 12t - 8 < 16 + 13tb. *t* < −3 a. t > -24c. t < -24d. t > 8

79. Which of these graphs represent the solution of the inequality $5x \ge -10$? i)





- $\begin{array}{c} 81. & \text{Which of these numbers are solutions of the inequality } 11 > 3 2w? \\ -4, -3, -5, -2 \\ a. & -3, -2 \\ b. & -4, -3, -2 \\ c. & -3, -5 \\ d. & -4, -5 \end{array}$
 - 82. O is the centre of this circle. Which line is a tangent?



83. O is the centre of this circle and point Q is a point of tangency. Determine the value of x° .



a. 139° b. 49° c. 41° d. 90°

84. O is the centre of this circle and point G is a point of tangency. Determine the value of *a*. If necessary, give your answer to the nearest tenth.



85. O is the centre of this circle and point A is a point of tangency. Determine the value of *b*. If necessary, give your answer to the nearest tenth.



a. 5.5 b. 11 c. 23.2 d. 35.5

86. O is the centre of this circle and point Q is a point of tangency. Determine the value of *c*. If necessary, give your answer to the nearest tenth.





87. O is the centre of this circle and point A is a point of tangency. Determine the value of *m*. If necessary, give your answer to the nearest tenth.





88. O is the centre of this circle and point T is a point of tangency. Determine the value of *n*. If necessary, give your answer to the nearest tenth.



89. O is the centre of the circle. Determine the value of a° .



90. O is the centre of the circle.Determine the value of *z* to the nearest tenth, if necessary.



a. 4.5 b. 3.6 c. 5 d. 1

91. O is the centre of this circle. Determine the value of q° .



a.	60°	c.	180°
b.	90°	d.	45°

92. The last three days Alexa had a test and ate an energy bar on her way to school that morning, she did well on the test. Today she had a test, so she ate an energy bar on her way to school.

Was her decision based on theoretical probability, experimental probability, or subjective judgment?

- a. A combination of theoretical probability and subjective judgment
- b. Theoretical probability
- c. Subjective judgment
- d. Experimental probability
- 93. According to the weather forecast, there is a 90% chance of rain.
 Martin had planned to go running but decides to go to the gym instead so he doesn't get wet.
 Is his decision based on theoretical probability, experimental probability, or subjective judgment?
 - a. Experimental probability
 - b. Theoretical probability
 - c. A combination of theoretical probability and subjective judgment
 - d. Subjective judgment
 - 94. In an anonymous survey, students were asked:

"Do you agree that everyone should become a vegetarian?"

In this survey, which of the following might be a problem?

- i) Cultural sensitivity
- ii) Ethics
- iii) Privacy
- iv) Use of Language

a. iv b. i c. ii d. iii

- 95. Marjorie wanted to collect information about the sports her classmates were interested in. She prepared a 10 min questionnaire which she gave to her classmates the day before the final math exam. In this survey, which of the following might be a problem with this question?
 - i) Privacy
 - ii) Timing
 - iii) Cost
 - iv) Cultural sensitivity
 - a. i b. iv c. ii d. Iii

96. Alec decided to survey all the library patrons in his city to see how often they downloaded e-books from the library's Web site.

Which of the following might be a problem with his survey?

- i) Timing
- ii) Bias
- iii) Ethics
- iv) Cost

b. iii c. i d. ii a. iv

- 97. A cosmetics company wants to determine which eye shadow colours are preferred by the readers of a certain fashion magazine. What is the population they are interested in surveying?
 - i) People who purchase the magazine
 - ii) People who wear eye shadow
 - iii) People who read the magazine
 - iv) Fashion experts featured in the magazine
 - a. i b. ii d. iii c. iv

98. To determine the favourite TV shows of grade 9 students at a school, which of the following data collection methods would provide the most accurate information?

- i) Survey a sample of students in one grade 9 class
- ii) Survey all students in one grade 9 class
- iii) Survey a sample of students from each grade 9 class
- iv) Survey all students in each grade 9 class
- a. iv b. ii c. i d. iii

99. A specialty craft store wants to know if customers are satisfied with the product selection. To find out, they interview every 20th person leaving the store for 1 week. Which sampling method does the store use?

- a. Simple random sampling c. Cluster sampling b. Systematic sampling
 - d. Self-selected sampling
- 100. The administrator of a dance and fitness studio wants to know if there is interest in having more evening classes available. He surveys everyone who participates in yoga classes to see what they think. Which sampling method does he use?
 - a. Self-selected sampling

- c. Simple random sampling
- d. Cluster sampling
- b. Stratified random sampling

Final Review Answer Section

MULTIPLE CHOICE

1.	ANS:	C PT	S: 1 D: Number	DIF:	Easy Concentual U	REF:	1.1 Square Roots of Perfect Squares
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3.	ANS:	D PI	5: I	DIF:	Moderate	LOC	0.116
	KEF:	1.2 Square Koots	of Non-Perfec	t Squares	u din a	LUC:	9.No
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1.	ANS:	D PI	5. 1 of Objects M	DIF.	Easy	r Driana	
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10.	RFF.	1 3 Surface Areas	of Objects M	ade from Ri	oht Rectangula	r Prism	s
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12.	ANS:	B PT	S: 1	DIF:	Easv		
	REF:	1.4 Surface Areas	of Other Con	nposite Obje	ects	LOC:	9.SS2
	TOP:	Shape and Space	(3-D Objects a	and 2-D Sha	pes)	KEY:	Procedural Knowledge
13.	ANS:	D PT	S: 1	DIF:	Easy		c
-	REF:	1.4 Surface Areas	of Other Con	nposite Obie	ects	LOC:	9.SS2
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	KEY:	Procedural Kr	nowledg	ge Problem-So	lving S	kills		
14.	ANS:	С	PTS:	1	DIF:	Easy		
	REF:	1.4 Surface A	reas of	Other Composi	te Obje	ects	LOC:	9.SS2
	TOP:	Shape and Spa	ace (3-I	Objects and 2	-D Sha	pes)		
	KEY:	Procedural Kr	nowledg	ge Problem-So	lving S	kills		
15.	ANS:	А	PTS:	1	DIF:	Easy	REF:	2.1 What Is a Power?
	LOC:	9.N1	TOP:	Number	KEY:	Conceptual Un	ndersta	nding
16.	ANS:	С	PTS:	1	DIF:	Easy	REF:	2.1 What Is a Power?
	LOC:	9.N1	TOP:	Number	KEY:	Procedural Kn	owledg	ge
17.	ANS:	В	PTS:	1	DIF:	Moderate	REF:	2.1 What Is a Power?
	LOC:	9.N1	TOP:	Number	KEY:	Procedural Kn	nowledg	ge
18.	ANS:	В	PTS:	1	DIF:	Moderate	REF:	2.1 What Is a Power?
	LOC:	9.N1	TOP:	Number	KEY:	Conceptual Un	ndersta	nding
19.	ANS:	В	PTS:	1	DIF:	Easy		
	REF:	2.2 Powers of	Ten an	d the Zero Exp	onent		LOC:	9.N1
	TOP:	Number	KEY:	Procedural Kn	lowledg	ge		
20.	ANS:	В	PTS:	1	DIF:	Moderate		
	REF:	2.2 Powers of	Ten an	d the Zero Exp	onent		LOC:	9.N1
	TOP:	Number	KEY:	Procedural Kn	lowledg	ge		
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25.	ANS:	А	PTS:	1	DIF:	Easy	REF:	2.4 Exponent Laws I
	LOC:	9.N2	TOP:	Number	KEY:	Procedural Kn	nowledg	ge
26.	ANS:	С	PTS:	1	DIF:	Moderate	REF:	2.4 Exponent Laws I
	LOC:	9.N2	TOP:	Number	KEY:	Procedural Kn	nowledg	ge
27.	ANS:	С	PTS:	1	DIF:	Moderate	REF:	2.4 Exponent Laws I
	LOC:	9.N2	TOP:	Number	KEY:	Procedural Kn	nowledg	ge
28.	ANS:	А	PTS:	1	DIF:	Moderate	REF:	2.4 Exponent Laws I
	LOC:	9.N2	TOP:	Number	KEY:	Procedural Kn	nowledg	ge
29.	ANS:	В	PTS:	1	DIF:	Easy	REF:	2.5 Exponent Laws II
	LOC:	9.N2	TOP:	Number	KEY:	Procedural Kn	owledg	ge
30.	ANS:	D	PTS:	1	DIF:	Moderate	REF:	2.5 Exponent Laws II
	LOC:	9.N2	TOP:	Number	KEY:	Procedural Kn	nowledg	ge
31.	ANS:	А	PTS:	1	DIF:	Moderate	REF:	2.5 Exponent Laws II
	LOC:	9.N2	TOP:	Number	KEY:	Conceptual Un	ndersta	nding
32.	ANS:	C	PTS:	1	DIF:	Easy	REF:	3.1 What Is a Rational Number?
	LOC:	9.N3	TOP:	Number	KEY:	Conceptual Un	ndersta	nding
33.	ANS:	В	PTS:	1	DIF:	Easy	REF:	3.1 What Is a Rational Number?
	LOC:	9.N3	TOP:	Number	KEY:	Conceptual Un	ndersta	nding

34.	ANS:	В	PTS:	1	DIF:	Easy	REF:	3.1 What Is a Rational Number?
	LOC:	9.N3	TOP:	Number	KEY:	Conceptual Un	ndersta	nding
35.	ANS:	D	PTS:	1	DIF:	Easy	REF:	3.1 What Is a Rational Number?
	LOC:	9.N3	TOP:	Number	KEY:	Conceptual Un	ndersta	nding
36.	ANS:	С	PTS:	1	DIF:	Easy	REF:	3.2 Adding Rational Numbers
	LOC:	9.N3	TOP:	Number	KEY:	Conceptual Un	ndersta	nding
37.	ANS:	D	PTS:	1	DIF:	Moderate	REF:	3.2 Adding Rational Numbers
	LOC:	9.N3	TOP:	Number	KEY:	Conceptual Un	ndersta	nding
38.	ANS:	D	PTS:	1	DIF:	Moderate	REF:	3.2 Adding Rational Numbers
	LOC:	9.N3	TOP:	Number	KEY:	Problem-Solv	ing Skil	lls
39.	ANS:	А	PTS:	1	DIF:	Easy	REF:	3.3 Subtracting Rational Numbers
	LOC:	9.N3	TOP:	Number	KEY:	Conceptual Un	ndersta	nding
40.	ANS:	В	PTS:	1	DIF:	Moderate	REF:	3.3 Subtracting Rational Numbers
	LOC:	9.N3	TOP:	Number	KEY:	Procedural Kr	nowledg	ge Problem-Solving Skills
41.	ANS:	С	PTS:	1	DIF:	Moderate	REF:	3.4 Multiplying Rational Numbers
	LOC:	9.N3	TOP:	Number	KEY:	Procedural Kr	nowledg	ge
42.	ANS:	В	PTS:	1	DIF:	Moderate	REF:	3.4 Multiplying Rational Numbers
	LOC:	9.N3	TOP:	Number	KEY:	Problem-Solv	ing Skil	lls
43.	ANS:	А	PTS:	1	DIF:	Easy	REF:	3.5 Dividing Rational Numbers
	LOC:	9.N3	TOP:	Number	KEY:	Conceptual U	ndersta	nding
44.	ANS:	А	PTS:	1	DIF:	Easy		5
	REF:	3.6 Order of C	Operatio	ns with Ration	nal Num	bers	LOC:	9.N4
	TOP:	Number	KEY:	Conceptual U	Jnderstai	nding		
45.	ANS:	С	PTS:	1	DIF:	Moderate		
	REF:	3.6 Order of C	Operatio	ns with Ration	nal Num	bers	LOC:	9.N4
	TOP:	Number	KEY:	Procedural K	nowledg	e		
46.	ANS:	В	PTS:	1	DIF:	Moderate		
	REF:	4.1 Writing Ed	quations	s to Describe I	Patterns		LOC:	9.PR1
	TOP:	Patterns and R	elation	s (Patterns)	KEY:	Conceptual Un	ndersta	nding
47.	ANS:	В	PTS:	1	DIF:	Easy	REF:	4.2 Linear Relations
	LOC:	9.PR2	TOP:	Patterns and	Relation	s (Patterns)	KEY:	Conceptual Understanding
48.	ANS:	В	PTS:	1	DIF:	Moderate	REF:	4.2 Linear Relations
	LOC:	9.PR2	TOP:	Patterns and	Relation	s (Patterns)	KEY:	Procedural Knowledge
49.	ANS:	С	PTS:	1	DIF:	Moderate	REF:	4.2 Linear Relations
	LOC:	9.PR2	TOP:	Patterns and	Relation	s (Patterns)	KEY:	Procedural Knowledge
50.	ANS:	С	PTS:	1	DIF:	Moderate	REF:	4.2 Linear Relations
	LOC:	9.PR2	TOP:	Patterns and	Relation	s (Patterns)	KEY:	Conceptual Understanding
51.	ANS:	С	PTS:	1	DIF:	Moderate	REF:	4.4 Matching Equations and Graphs
	LOC:	9.PR2	TOP:	Patterns and	Relation	s (Patterns)	KEY:	Procedural Knowledge
52.	ANS:	В	PTS:	1	DIF:	Easy		C C
	REF:	4.5 Using Gra	phs to H	Estimate Value	es	5	LOC:	9.PR2
	TOP:	Patterns and R	Relation	s (Patterns)	KEY:	Procedural Kr	nowledg	ge
53.	ANS:	С	PTS:	1	DIF:	Easy		-
	REF:	4.5 Using Gra	phs to H	Estimate Value	es	2	LOC:	9.PR2
	TOP:	Patterns and R	elation	s (Patterns)	KEY:	Procedural Kr	nowledg	ge
54.	ANS:	В	PTS:	1	DIF:	Moderate		
	REF:	4.5 Using Gra	phs to I	Estimate Value	es		LOC:	9.PR2
	TOP:	Patterns and R	elation	s (Patterns)	KEY:	Procedural Kr	nowledg	ge
55.	ANS:	В	PTS:	1	DIF:	Easy	REF:	5.1 Modelling Polynomials
						-		C ,

	LOC:	P.PR5 TOP: Patterns and Relations (Variables and Equations)							
	KEY:	Conceptual Understanding							
56.	ANS:	D PTS: 1 DIF: Easy	REF: 5.1 Modelling Polynomials						
	LOC:	9.PR5 TOP: Patterns and Relations (Variable	es and Equations)						
	KEY:	Conceptual Understanding							
57.	ANS:	A PTS: 1 DIF: Easy	REF: 5.1 Modelling Polynomials						
	LOC:	9.PR5 TOP: Patterns and Relations (Variable	es and Equations)						
	KEY:	Conceptual Understanding							
58.	ANS:	C PTS: 1 DIF: Moderate	REF: 5.1 Modelling Polynomials						
	LOC:	9.PR5 TOP: Patterns and Relations (Variable	es and Equations)						
	KEY:	Conceptual Understanding							
59.	ANS:	A PTS: 1 DIF: Easy	REF: 5.2 Like Terms and Unlike Terms						
	LOC:	9.PR5 TOP: Patterns and Relations (Variable	es and Equations)						
	KEY:	Procedural Knowledge							
60.	ANS:	B PTS: 1 DIF: Easy	REF: 5.2 Like Terms and Unlike Terms						
	LOC:	9.PR5 TOP: Patterns and Relations (Variable	es and Equations)						
	KEY:	Procedural Knowledge							
61.	ANS:	D PTS: 1 DIF: Moderate	REF: 5.2 Like Terms and Unlike Terms						
	LOC:	9.PR5 TOP: Patterns and Relations (Variable	es and Equations)						
	KEY:	Procedural Knowledge							
62.	ANS:	C PTS: 1 DIF: Easy	REF: 5.2 Like Terms and Unlike Terms						
	LOC:	9.PR5 TOP: Patterns and Relations (Variable	es and Equations)						
	KEY:	Conceptual Understanding							
63.	ANS:	A PTS: 1 DIF: Moderate	REF: 5.3 Adding Polynomials						
	LOC:	9.PR6 TOP: Patterns and Relations (Variable	es and Equations)						
	KEY:	Procedural Knowledge							
64.	ANS:	B PTS: 1 DIF: Moderate							
	REF: 5.5 Multiplying and Dividing a Polynomial by a Constant								
	LOC:	9.PR7 TOP: Patterns and Relations (Variables and Equations)							
	KEY:	Procedural Knowledge							
65.	ANS:	D PTS: 1 DIF: Moderate							
	REF:	5.5 Multiplying and Dividing a Polynomial by a Cons	tant						
	LOC:	9.PR7 TOP: Patterns and Relations (Variables and Equations)							
	KEY:	Procedural Knowledge							
66.	ANS:	A PIS: I DIF: Moderate	• •						
	KEF:	5.6 Multiplying and Dividing a Polynomial by a Mond	omial						
	LOC:	9.PK/ IOP: Patterns and Kelations (Variables and Equations)							
$(\neg$	KEY:	Procedural Knowledge							
6/.	ANS:	B PIS: I DIF: Easy							
	KEF:	6.1 Solving Equations by Using Inverse Operations	LUC: 9.PK3 KEV: Dracadural Knowledge						
60	TOP:	Patterns and Relations (variables and Equations)	KEY: Procedural Knowledge						
68.	ANS:	D PIS: I DIF: Easy							
	KEF:	0.1 Solving Equations by Using Inverse Operations	LUC: 9.PK3 KEV: Dresedural Knowledge						
(0)	TOP:	Patterns and Relations (variables and Equations)	KEY: Procedural Knowledge						
69.	ANS:	D PIS: 1 DIF: Easy							
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70	ANC.	D DTS: 1 DE: Earry	KL1. HOUCUUIAI KIIOWICUge						
70.	AND: DEE	6 1 Solving Equations by Using Inverse Operations							
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	TOP:	Patterns and Relations (Variables an	d Equations)	KEY: Procedural Knowledge						
71.	ANS:	C PTS: 1	DIF: Easy							
	REF:	6.2 Solving Equations by Using Bala	ance Strategies	LOC: 9.PR3						
	TOP:	Patterns and Relations (Variables an	d Equations)	KEY: Procedural Knowledge						
72.	ANS:	B PTS: 1	DIF: Moderate							
	REF:	6.2 Solving Equations by Using Bala	ance Strategies	LOC: 9.PR3						
	TOP:	Patterns and Relations (Variables an	d Equations)	KEY: Procedural Knowledge						
73.	ANS:	D PTS: 1	DIF: Difficult							
	REF:	6.2 Solving Equations by Using Bala	ance Strategies	LOC: 9.PR3						
	TOP:	Patterns and Relations (Variables an	KEY: Procedural Knowledge							
74.	ANS:	C PTS: 1	DIF: Easy							
	REF:	6.3 Introduction to Linear Inequalitie	LOC: 9.PR4							
	TOP:	Patterns and Relations (Variables an	d Equations)	KEY: Conceptual Understanding						
75.	ANS:	C PTS: 1	DIF: Easy							
	REF:	6.3 Introduction to Linear Inequalitie	es	LOC: 9.PR4						
	TOP:	Patterns and Relations (Variables an	d Equations)	KEY: Procedural Knowledge						
76.	ANS:	C PTS: 1	DIF: Easy							
	REF:	6.4 Solving Linear Inequalities by Using Addition and Subtraction								
	LOC:	9.PR4 TOP: Patterns and Relations (Variables and Equations)								
	KEY:	: Procedural Knowledge								
77.	ANS:	C PTS: 1	DIF: Easy							
	REF:	6.4 Solving Linear Inequalities by Using Addition and Subtraction								
	LOC:	9.PR4 TOP: Patterns and Relations (Variables and Equations)								
	KEY:	Procedural Knowledge								
78.	ANS:	A PTS: 1	DIF: Moderate							
	REF:	6.4 Solving Linear Inequalities by Using Addition and Subtraction								
	LOC:	9.PK4 IOP: Patterns and Kelations (Variables and Equations)								
-	KEY:	Procedural Knowledge								
79.	ANS:	A PIS: I	DIF: Easy							
	KEF:	6.5 Solving Linear Inequalities by Using Multiplication and Division								
	LUC:	9.PR4 IOP: Patterns and R	celations (variables ar	id Equations)						
00	ANC.	C DTS: 1	DIE. East							
80.	ANS:	C PID: I 65 Solving Linear Inequalities by II	DIF: Easy	d Division						
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81	ANS.	Λ DTS 1	DIE: Fasy							
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	LOC	9 PR4 TOP: Patterns and Relations (Variables and Equations)								
	KEY.	· Procedural Knowledge								
82	ANS	$C = PTS^{-1}$	DIF Easy							
0	REF:	8.1 Properties of Tangents to a Circl	e	LOC: 9.SS1						
	TOP:	Shape and Space (Measurement)	KEY: Conceptual U	inderstanding						
83.	ANS:	B PTS: 1	DIF: Easy	e						
	REF:	8.1 Properties of Tangents to a Circl	e	LOC: 9.SS1						
	TOP:	Shape and Space (Measurement)	KEY: Conceptual U	nderstanding						
84.	ANS:	D PTS: 1	DIF: Easy	-						
	REF:	8.1 Properties of Tangents to a Circl	e	LOC: 9.SS1						
	TOP:	Shape and Space (Measurement)	KEY: Conceptual U	nderstanding						

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perties of Tangents to a Circle	e		LOC:	9.SS1
nd Space (Measurement)	KEY:	Conceptual U	nderstar	nding
PTS: 1	DIF:	Easy	REF:	8.2 Properties of Chords in a Circle
TOP: Shape and Spa	ace (Mea	asurement)	KEY:	Conceptual Understanding
PTS: 1	DIF:	Easy	REF:	8.2 Properties of Chords in a Circle
TOP: Shape and Spa	ace (Mea	asurement)	KEY:	Conceptual Understanding
PTS: 1	DIF:	Easy	REF:	8.3 Properties of Angles in a Circle
TOP: Shape and Spa	ace (Mea	asurement)	KEY:	Conceptual Understanding
PTS: 1	DIF:	Easy	REF:	9.1 Probability in Society
TOP: Statistics and I	Probabil	lity (Chance an	nd Unce	ertainty)
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ng Samples and Populations t	to Collec	ct Data	LOC:	9.SP2
s and Probability (Data Anal	ysis)		KEY:	Conceptual Understanding
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TOP: Statistics and I	Probabil	lity (Data Anal	ysis)	
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