Math 8 Enriched

Final Exam Review

Name _____ Date _____

1. What is the largest 3-digit number divisible by both 9 and 7?

2. For what digit(s) x will the 4-digit number 5*xx*8 be divisible by 9?

3. In the number 34,5t8, t is the tens digit. What value of t makes the number a multiple of 11?

4. How many positive integral factors does N have if $N = 6^2 \cdot 15$?

5. How many factors of 21,600 are perfect squares?

6. For any three consecutive positive integers, if x is the smallest prime factor of their sum and y is the smallest prime factor of their product, what is $x + y$?

7. What is the sum of all the divisors of 91?

8. How many times does the factor 5 occur in the prime factorization of 65!?

9. What is the least common multiple of $12a^2b$ and $30ab^2$?

10. The least common multiple of two numbers is $2^3 \cdot 3^4 \cdot 5 \cdot 7$. The greatest common divisor of the same two numbers is $2 \cdot 3 \cdot 5$. One of the numbers is 210. What is the other?

11. The largest circle possible is cut from a square piece of paper. The largest square possible is the cut from this circular piece. Find the ratio of the area of the smaller square to the area of the larger square. Express your answer in the form $a : b$.

12. Two numbers in the ratio $3 : 7$ have a sum of 30. What is the greater of the two numbers?

13. The population of a city decreased from 500,000 to 496,250. What was the percent of decrease in the population?

14. The ratio of boys to girls at a summer camp is 4 to 5. If the total number of girls at the camp is 90, how many boys are at the camp?

15. At $90\,\text{km}$ per hour, how many seconds does it take to travel $1\,\text{km}$?

16. Points A, B, C, and D lie on a line in alphabetical order. If $AB:BD = 5:7$ and $AC:CD = 13:11$, determine the ratio $AB:BC:CD$.

17. The length, width, and height of a rectangular solid are in the ratio $3:4:12$. If the length of a diagonal of the solid is $26\,\text{cm}$, find the number of centimeters in the height of the solid.

18. The average age of a group of doctors and lawyers is 40. If the doctors' average is 35 and the lawyers' average age is 50, what is the ratio, expressed in the form $a:b$, of the number of doctors to the number of lawyers?

19. The ratio of beans to peas in a jar is $2:5$ and there are a total of 840 peas and beans. How many beans should be added to make the ratio $1:2$?

20. If 10 kids can mow 20 yards in 3 hours, how many hours will it take 5 kids to mow 10 yards at the same rate?

21. The ratio of boys to girls in Jamal's class is $3:2$. If four more girls join the class, there will be the same number of boys and girls. What is the number of boys in the class?

22. If $\overline{EB} \parallel \overline{DC}$, $AE = 3$, and $AD = 5$, find the ratio of the area of $\triangle ABE$ to the area of $\triangle ACD$.
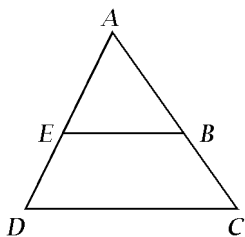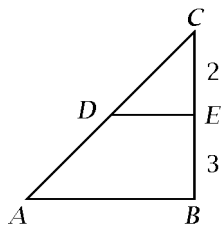
23. If $AB = AC$, $DB = CB$, $AB = 12$ and $BC = 5$, find the measure of $\overline{DC}$. Express your answer as a mixed number.
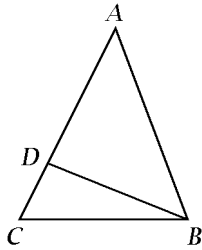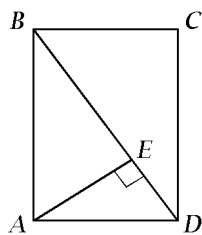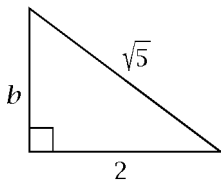
24. Find AC in the right triangle shown.
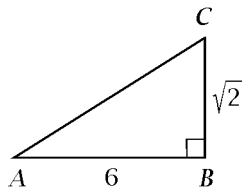
25. In right triangle ABC, $\overline{DE}$ is parallel to $\overline{AB}$, $CE = 2\,\text{cm}$, and $EB = 3\,\text{cm}$. If the area of $\triangle ABC$ is $30\,\text{cm}^2$, what is the number of square centimeters in the area of $\triangle CDE$? Express your answer as a decimal number.
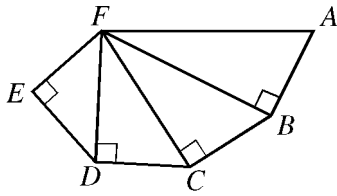
26. In rectangle $ABCD$, E lies on $\overline{BD}$, $\overline{AE} \perp \overline{BD}$, $AE = 4$ and $AD = 5$. Find BD. Express your answer as a mixed number.
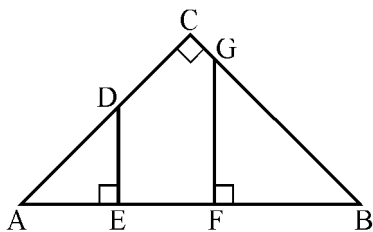
27. What is the length of side b in the figure shown?

28. In the diagram all the triangles are right triangles and all the segments AB, BC, CD, DE, and EF have length 3. How many units are in the length of segment AF?

29. If $\dfrac{x-2}{y-1} = \dfrac{3}{5}$ and $\dfrac{x-1}{y} = \dfrac{2}{3}$, what is the product of x and y?

30. In the figure, $m\angle ADE = 30°$. What is the number of degrees in $m\angle CGF$?

31. An equilateral triangle has sides of length 8. Find the ratio of the area of the inscribed circle to the area of the circumscribed circle. Express your answer in the form $a:b$.

32. What is the total surface area of the resulting figure if a cube whose edge measures $8\,\text{cm}$ is cut from a cube whose edge measures $10\,\text{cm}$ as illustrated?

8 cm

10 cm
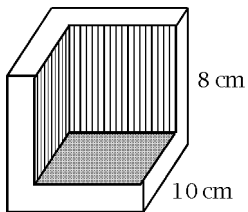
33. A rectangular solid has surfaces of areas $15\,\text{sq cm}$, $18\,\text{sq cm}$, and $30\,\text{sq cm}$. Find the number of centimeters in the smallest linear dimension of the solid.
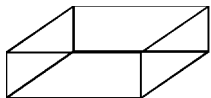
34. Find the distance between $(-9\sqrt{2}, 4\sqrt{7})$ and $(-2\sqrt{2}, 4\sqrt{7})$.
35. Find the midpoint of the segment whose endpoints are $(-12, 4)$ and $(-4, 0)$.
36. What is the slope of the line which contains $(-9, 4)$ and $(-5, 9)$?

37. Find the slope of the line that contains $(2m, -5n)$ and $(12m, 3n)$.

38. A line contains the points $(j + 2k, 3k)$ and $(k, 2k - j)$. What is the slope of the line?

39. What are the slope and y-intercept for the line $\dfrac{7y}{4} - 7 = \dfrac{-3x}{4}$?

40. Given $P(4, 6c)$ and $Q(-5c, -1)$. Find the value of c if the slope of $\overleftrightarrow{PQ}$ is $\frac{2}{3}$.

41. A line contains the points $(2y - 1, 3y + 1)$ and $(-4, -2)$ and has slope 2. What is the value of y?

42. A triangle has vertices at $(0, 18)$, $(2, 2)$ and $(5, 8)$. Graph the triangle and find its area.

43. A rectangle has vertices at $A(4, 5)$, $B(6, 3)$, $C(2, -1)$, and $D(0, 1)$.

    a) Graph the rectangle, then find the length of the diagonals.

    b) M is the point where the diagonals intersect. What are the coordinates of M?

    c) What is the area of $\triangle BCM$?

    d) Write the equation of the line that contains M and is parallel to $\overline{BC}$.

44. A triangle has side lengths of $x + 2$, $2x$ and $2x + 2$. What are the numerical values of x that would make this triangle a right triangle?

45. In the diagram, $r = 35$ and $t = 12$. Find the value of x.
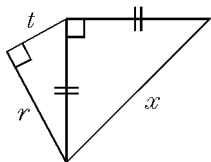
46. Write a polynomial for the surface area of this figure.
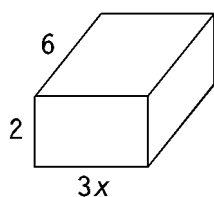
47. Factor: $a^2 + 3a + 2$

48. Factor: $x^4 - 49$

49. Factor: $25 - a^4$

50. Factor: $k(k+5)(k-3) - 10(k+5)$

51. Simplify: $\sqrt{x^2 - 12xy + 36y^2}$

52. Multiply: $(\sqrt{2} + 1)(\sqrt{2} + 1)$

53. Add: $-2\sqrt{40} + \sqrt{90}$

54. Find the length AB.
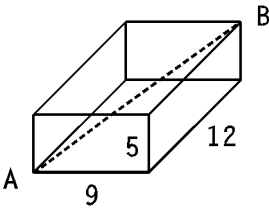
55. For what value(s) of p are the points $(2p, 5)$, $(p+1, 3)$, and $(-p, p+3)$ collinear?

56. A triangle has vertices at $A(-6, 0)$, $B(6, 1)$, and $C(4, -4)$. Write the equation of the line that is perpendicular to $\overline{AB}$ and passes through C.

57. For what value(s) of p are the points $(2p, 5)$, $(p+1, 3)$, and $(-p, p+3)$ collinear?

58. If the center of the semicircle is the midpoint of the side of the square and the side of the square measures $20\,\text{cm}$, find the area of the shaded region. Let $\pi = 3.14$.
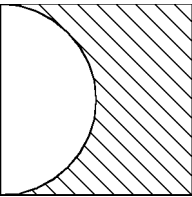
59. A square with sides $10\,\text{cm}$ has four quarter circles drawn with centers at the four corners and with radii 5. Find the number of square centimeters in the area of the shaded region. Express in terms of π.
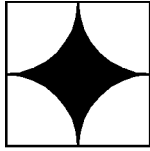
60. $ABCD$ is a rectangle with $AB = 2AD$. $\overline{AD}$ and $\overline{BC}$ are diameters of semicircles AED and BFC. If $AD = 6$, what is the number of square units in the area of $ABFCDE$?
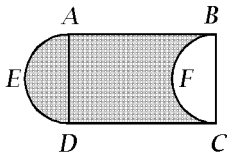
61. Dimensions and right angles are shown on the figure. Find the number of square units in the area of this polygonal region.
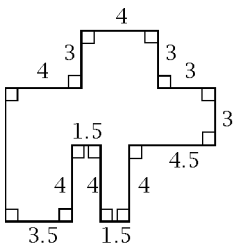
62. The circle shown has its center at point O and a radius of $6\,\text{cm}$. $AOBC$ is a square. Find the area of the shaded part to the nearest tenth of a square centimeter. use $\pi = 3.14$. Express your answer as a decimal.
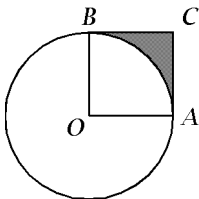
63. In the diagram, the two circles enclosed in the rectangle are tangent to each other, and each circle is tangent to three sides of the rectangle. What is the ratio of the area of the shaded region to the area of the rectangle? Express your answer as a fraction in terms of π.

Math 8 Enriched   Final Exam Review   Mr. Young   2015-06-09
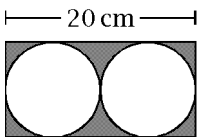
Answer List

1. 945	2. 7	3. 1
4. 24	5. 12 (factors)	6. 5
7. 112	8. 15 (times)	9. $60a^2b^2$
10. 3,240	11. $1:2$	12. 21
13. 0.75 (%)	14. 72 (boys)	15. 40 (seconds)
16. $10:3:11$	17. 24 (cm)	18. $2:1$
19. 60 (beans)	20. 3 (hours)	21. 12 (boys)
22. $\frac{9}{25}$	23. $2\frac{1}{12}$ units	24. $\sqrt{38}$
25. 4.8	26. $8\frac{1}{3}$ units	27. 1
28. $3\sqrt{5}$	29. 30	30. 120
31. $1:4$	32. $600\,\text{cm}^2$	33. 3
34. $7\sqrt{2}$	35. $(-8,2)$	36. $\frac{5}{4}$
37. $\frac{4n}{5m}$	38. -1	39. $\frac{-3}{7}$ and 4
40. $\frac{5}{8}$	41. -3	42. $\frac{75}{2}$
43. $2\sqrt{10}$; $(3,2)$; 4; $y=x-1$	44. 4 only	45. $37\sqrt{2}$
46. $A=48x+24$	47. $(a+2)(a+1)$	48. $(x^2-7)(x^2+7)$
49. $(5-a^2)(5+a^2)$	50. $(k+5)(k-5)(k+2)$	51. $x-6y$
52. $3+2\sqrt{2}$	53. $-\sqrt{10}$	54. $5\sqrt{10}$
55. $-2,-1$	56. $y=-12x+44$	57. $-2,-1$
58. $243\,\text{cm}^2$	59. $100-25\pi$	60. 72
61. 65	62. 7.7 sq cm	63. $\frac{4-\pi}{4}$

Catalog List

1. MCC DD 1	2. MCC DD 18	3. MCC DD 61
4. MCC DE 15	5. MCC DE 8	6. MCC DE 34
7. MCC DE 54	8. MCC DE 94	9. MCC DF 12
10. MCC DF 74	11. MCC FA 1	12. MCC FA 12
13. MCC FA 16	14. MCC FA 39	15. MCC FA 62
16. MCC FA 81	17. MCC FA 87	18. MCC FA 120
19. MCC FA 197	20. MCC FA 247	21. MCC FA 256
22. MCH CE 18	23. MCH CE 17	24. MCH CE 22
25. MCH CE 33	26. MCH CE 51	27. MCH CE 68
28. MCH CE 80	29. MCH CE 111	30. MCH CE 117
31. MCH CD 2	32. MCH CH 9	33. MCH CH 19
34. TRI EA 8	35. TRI EA 52	36. TRI EB 8
37. TRI EB 36	38. TRI EB 38	39. TRI EB 94
40. TRI EB 114	41. TRI EB 124	42. TRI EF 21
43. TRI EF 133	44. GEO HE 32	45. GEO HG 49

46. SMP AB 49	47. SMP AB 84	48. SMP AB 87
49. SMP AB 88	50. SMP AB 92	51. SMP AB 117
52. SMP AB 124	53. SMP AB 121	54. SMP AB 127
55. SMP AD 34	56. SMP AD 36	57. SMP AD 34
58. MCH CB 4	59. MCH CB 8	60. MCH CB 10
61. MCH CB 12	62. MCH CB 23	63. MCH CB 29