

UPCAT REVIEWER

(with Answer Key)

PRACTICE TEST 1

MATHEMATICS (60 ITEMS)

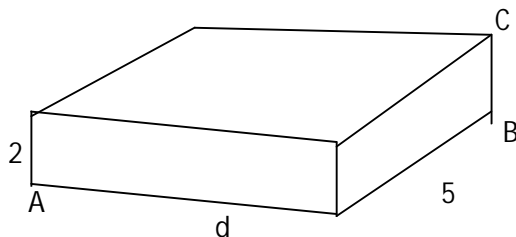
1. Find the contrapositive of the following statement. "If a figure has three sides, it is a triangle."

- (A) If a figure does not have three sides, it is a triangle.
- (B) If a figure is a triangle, then it does not have three sides
- (C) If a figure is not a triangle, then it does not have three sides.
- (D) If a figure has three sides, it is not a triangle.

2. Solve for x: $\sqrt{x+6} + \sqrt{x} = 4$

- (A) no solution
- (B) 100
- (C) 5
- (D) $\frac{25}{16}$

3. Find the length of diagonal \overline{AC} in the rectangular solid shown. Dimensions are in feet.



- (A) $29 + d^2$ ft
- (B) $7 + d$ ft
- (C) $\sqrt{29 + d^2}$ ft
- (D) $\sqrt{7 + d}$ ft

4. The area of a regular octagon is 30 cm^2 . What is the area of a regular octagon with sides four times as large?

- (A) 545 cm^2
- (B) 480 cm^2
- (C) 3600 cm^2
- (D) 120 cm^2

5. Simplify: $(\sqrt{3} - \sqrt{7})(\sqrt{3} + \sqrt{7})$

- (A) -4
- (B) 58
- (C) 10
- (D) -40

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6. If the sum of the roots of $x^2 + 3x - 5 = 0$ is added to the product of its roots, the result is
- (A) -2 (B) -8 (C) -15 (D) 15
7. The roots of the equation $2x^2 - x = 4$ are
- (A) real, rational, and unequal
(B) real and irrational
(C) real, rational, and equal
(D) imaginary
8. Which statement must be true if a parabola represented by the equation $y = ax^2 + bx + c$ does not intersect the x-axis?
- (A) $b^2 - 4ac > 0$, and $b^2 - 4ac$ is not a perfect square
(B) $b^2 - 4ac > 0$, and $b^2 - 4ac$ is a perfect square
(C) $b^2 - 4ac < 0$
(D) $b^2 - 4ac = 0$
9. The value of $\left(\frac{3^0}{27^{\frac{2}{3}}}\right)^{-1}$ is
- (A) -9 (B) $-\frac{1}{9}$ (C) 9 (D) $\frac{1}{9}$
10. What is the last term in the expansion of $(x + 2y)^5$?
- (A) $2y^5$ (B) $32y^5$ (C) y^5 (D) $10y^5$
11. The larger root of the equation $(x + 3)(x - 4) = 0$ is
- (A) -3 (B) -4 (C) 4 (D) 3
12. Express $\frac{1}{x+1} + \frac{1}{x}$ as a single fraction.
- (A) $\frac{2x+3}{x^2+x}$ (B) $\frac{2x+1}{x^2+x}$ (C) $\frac{2}{2x+1}$ (D) $\frac{3}{x^2}$

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13. Ano ang kabuuan ng walang katapusang geometric series na

$$3.1 + 1.86 + 1.116 + 0.6696 + \dots ?$$

- (A) 8.75 (B) 9.75 (C) 4.75 (D) 7.75

14. Which equation represents a hyperbola?

- (A) $y = 16x^2$ (B) $y = 16 - x^2$ (C) $y^2 = 16 - x^2$ (D) $y = \frac{16}{x}$

15. Which expression is equivalent to the complex fraction $\frac{\frac{x}{x+2}}{1 - \frac{x}{x+2}}$?

- (A) $\frac{x}{2}$ (B) $\frac{2x}{x+2}$ (C) $\frac{2x}{x^2+4}$ (D) $\frac{2}{x}$

16. What is the radian measure of the angle formed by the hands of the clock at 2:00 pm?

- (A) $\frac{\pi}{2}$ (B) $\frac{\pi}{3}$ (C) $\frac{\pi}{4}$ (D) $\frac{\pi}{6}$

17. The expression $15 - 3[2 + 6(-3)]$ simplifies to

- (A) -45 (B) -33 (C) 63 (D) 192

18. Ano ang halaga ng $\sum_{m=1}^3 (2m+1)^{m-1}$?

- (A) 15 (B) 55 (C) 57 (D) 245

19. Ang pagsusulit sa asignaturang HEKASI ay may 10 katanungan na nagkakahalaga ng 5 puntos bawat isa, 7 mga katanungan na nagkakahalaga ng 6 na puntos sa bawat isa, at 4 na mga katanungan na nagkakahalaga ng 2 puntos sa bawat isa. Wala sa mga tanong na ito ang bibigyan ng bahagyang kredito. Gaano karaming mga puntos sa pagitan ng 0 at 100 ang imposibleng iskor?

- (A) 3 (B) 2 (C) 4 (D) 7

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20. Ang isang malaking istante ng libro ay maaaring naglalaman sa pagitan ng 57 at 564 na mga libro. Eksaktong $\frac{1}{6}$ ay librong matematika at eksaktong $\frac{1}{9}$ ay librong physics. Ano ang positibong kaibahan sa pagitan ng pinakamataas at ang pinakamaliit na posibleng bilang ng mga libro na maaaring naka-imbak sa istante?

- (A) 468 (B) 486 (C) 504 (D) 522

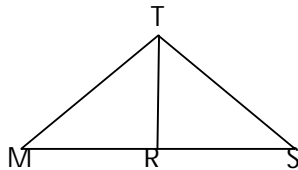
21. Simplify: $2\sqrt{\frac{5}{3}} - \sqrt{60} - 5\sqrt{\frac{3}{5}}$

- (A) $-\frac{29\sqrt{15}}{15}$ (B) $-\frac{7\sqrt{15}}{3}$ (C) $-\frac{7\sqrt{15}}{15}$ (D) $-\frac{29\sqrt{15}}{3}$

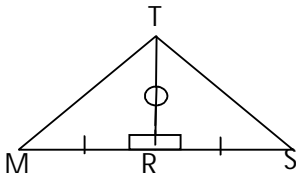
22. Given: R is the midpoint of \overline{MS}

$$\overline{TR} \perp \overline{MS}$$

If you outlined a proof that shows $\overline{TM} \cong \overline{TS}$, which would **NOT** be used?



- (A) $\triangle TMR \cong \triangle TSR$ by the SAS congruency postulate
(B) $\overline{TM} \cong \overline{TS}$ by CPCTC
(C) $\triangle TMR \cong \triangle TSR$ by the ASA congruency postulate
(D)



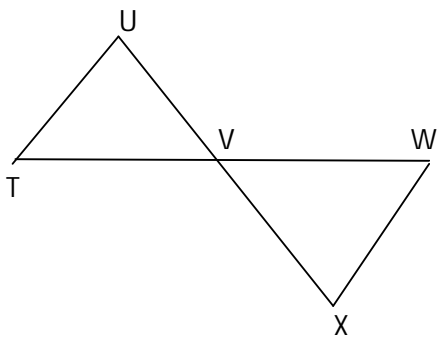
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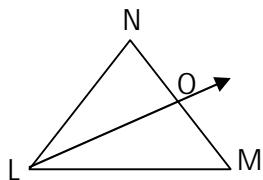
23. Refer to the figure shown. State the congruency postulate that can be used to prove that $\triangle TUV \cong \triangle WXV$.

Given: $\overline{TV} \cong \overline{WV}$ and $\overline{UV} \cong \overline{XV}$



- (A) SSS (B) SAS (C) ASA (D) AAS

24. Find OM if \overrightarrow{LO} bisects $\angle NLM$, $LM = 20$, $NO = 3$, and $LN = 5$.



- (A) 10.23 (B) 0.75 (C) 12 (D) 33.33

25. What value of x will give the maximum value for $-7x^2 + 7x + 3$?

- (A) 0 (B) 1 (C) $\frac{1}{2}$ (D) $\frac{3}{2}$

26. Written in simplest form $\frac{x^2y - 4}{4 - x^2y}$ is

- (A) 1 (B) 0 (C) $\frac{x^2y - 4}{4 - x^2y}$ (D) -1

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27. Which expression is equivalent to $\frac{\sqrt{7} + \sqrt{2}}{\sqrt{7} - \sqrt{2}}$?

- (A) $\frac{9}{5}$ (B) -1 (C) $\frac{9 + 2\sqrt{14}}{5}$ (D) $\frac{11 + \sqrt{2}}{14}$

28. Given two lines whose equations are $3x + y - 8 = 0$ and $-2x + ky + 9 = 0$, determine the value of k such that the two lines are perpendicular.

- (A) $-\frac{2}{3}$ (B) 6 (C) 8 (D) -9

29. Solve for x: $256^{2x} = 64^{x-2}$

- (A) $-\frac{6}{11}$ (B) $-\frac{6}{5}$ (C) $-\frac{1}{5}$ (D) 0

30. Find the square root of $x^4 + 2x^3 + 5x^2 + 4x + 4$.

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

31. The product of the square roots of two consecutive positive numbers is $2\sqrt{14}$, what is their sum?

- (A) 15 (B) 17 (C) 19 (D) 21

32. Given the formula $C = \frac{5}{9}(F - 32)$; find F when C is 20.

- (A) 15 (B) 17 (C) 68 (D) 21

33. What number added to 6% of itself equals 31.8?

- (A) 29.892 (B) 31.74 (C) 30 (D) 31

34. Perform the indicated operations: $(2a - 3)^2 - 3a(a - 2) - (3 - a)^2$

- (A) 2 (B) 0 (C) -3 (D) $2a$

35. What must be the value of m if $x - 5$ is a factor of $2x^2 - mx - 35$?

- (A) 3 (B) 5 (C) 7 (D) 10

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36. Reduce $\frac{b+a}{b-a} - 2\left(\frac{b}{a} - \frac{b}{a-b}\right)$ to a single fraction in its lowest terms.

- (A) $\frac{a+2b}{b}$ (B) $\frac{-2a-b}{a}$ (C) $\frac{-a-2b}{a}$ (D) $\frac{2a+b}{b}$

37. Find the quotient if $2x^3 - 3x^2 - 5x + 6$ is divided by $x^2 - 3x + 2$.

- (A) $2x - 3$ (B) $2x + 3$ (C) $-2x + 3$ (D) $-2x - 3$

38. Ang mga bahay sa Tinio Street ay may sunud-sunod na bilang mula 1 hanggang 447. Ilang tanso na numero ang kailangan upang magawa ang lahat ng bilang ng mga bahay?

- (A) 1232 (B) 1231 (C) 1236 (D) 1233

39. Solve for x: $\frac{7x}{5} - \frac{1}{14}(x-11) = \frac{3}{7}(x-25) + 34$

- (A) 4 (B) 11 (C) 18 (D) 25

40. The length of a room is 8 feet greater than its width; if each dimension is increased by 2 feet, the area will be increased by 60 square feet. Find the area of the floor.

- (A) 65 (B) 105 (C) 153 (D) 180

41. Find the greatest common factor of $3x^2 + 6x - 9$, $6x^2 - 21x + 15$, and $6x^3 - 6$.

- (A) $3(x-1)$ (B) $3(x+3)$ (C) $3(x+1)$ (D) $3(x-3)$

42. Find the equation of the line that passes through the point $(-2, -5)$ and is parallel to the line $5x - 4y = 2$.

- (A) $5x - 4y = -17$ (B) $-2x - 5y = 2$ (C) $5x + 4y = 2$ (D) $5x - 4y = 10$

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43. Simplify: $\left(\frac{4x^{-3}p^2}{y^{-2}}\right)^{-2}\left(\frac{y^3p^5}{x^2}\right)^{-3}$

(A) $\frac{x^6y^4}{16p^{14}}$

(B) $\frac{-16x^{12}}{y^{11}p^{15}}$

(C) $\frac{x^6}{4y^{10}p^{19}}$

(D) $\frac{x^{12}}{16y^{13}p^{19}}$

44. Simplify: $\left(6x^{1/2} - 7y^{7/2}\right)\left(6x^{1/2} + 7y^{7/2}\right)$

(A) $36x - 42xy + 49y^7$

(B) $36x - 49y^7$

(C) $36x + 42xy - 49y^7$

(D) $36x + 49y^7$

45. Simplify: $\frac{\sqrt[3]{x^6y^3}xy^4}{\sqrt{x^2y^8}(xy)^{-3}}$

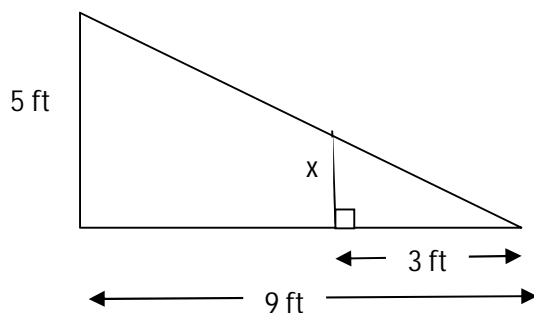
(A) x^4y^3

(B) xy

(C) x^5y^6

(D) x^5y^4

46. Use similar triangles to find x.



(A) $8/9$ ft

(B) 5.4 ft

(C) 15 ft

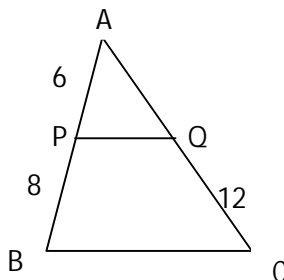
(D) $1\frac{2}{3}$ ft

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47. Given: $\overline{PQ} \parallel \overline{BC}$. Find the length of \overline{AC} .

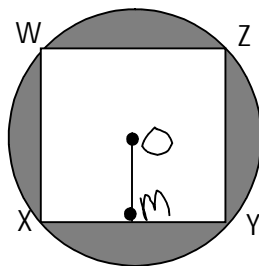


- (A) 17 (B) 21 (C) 23 (D) 18

48. The numbers 27, 36, and 45 represents the length of the sides of a/an

- (A) acute triangle (B) obtuse triangle (C) no triangle (D) right triangle

49. In the figure shown, square WXYZ is inscribed in circle O. Also, $\overline{OM} \perp \overline{XY}$ and $OM = 7$. Find the area of the shaded region.



- (A) $49\pi - 49$ (B) $49\sqrt{2}\pi - 49$ (C) $98\pi - 196$ (D) $147\pi - 196$

50. Simplify: $\frac{\frac{5}{6} + \frac{1}{3}}{2 - \left(\frac{7}{8} - \frac{1}{3}\right)}$

- (A) $\frac{3}{8}$ (B) $\frac{4}{5}$ (C) $\frac{2}{3}$ (D) $\frac{1}{6}$

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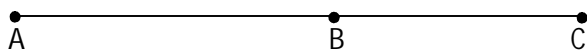
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51. Evaluate $x^2 - 2y^2 + 4(x - y)(2x^5 + 4xy^5 + 3y^5)^0$ if $x = 3$ and $y = 4$.

- (A) -45 (B) -81 (C) -36 (D) -27

52. The length of \overline{AC} is $5\frac{1}{6}$ meters. The length of \overline{BC} is $2\frac{1}{2}$ meters. Find AB.



- (A) 2 m (B) $7\frac{1}{4}$ m (C) $7\frac{2}{3}$ m (D) $2\frac{2}{3}$ m

53. What is the sum of $\sqrt{-2}$ and $\sqrt{-18}$?

- (A) $2i\sqrt{5}$ (B) $5i\sqrt{2}$ (C) $4i\sqrt{2}$ (D) $6i$

54. Ano ang ika-7-term sa isang geometric sequence kung ang unang term ay 81 at ang ika-11-term ay $\frac{1}{729}$?

- (A) $\frac{1}{27}$ (B) $\frac{1}{9}$ (C) $\frac{1}{3}$ (D) 1

55. Kung ang 25% ng isang numero ay 75. Ano naman ang 30% ng numero?

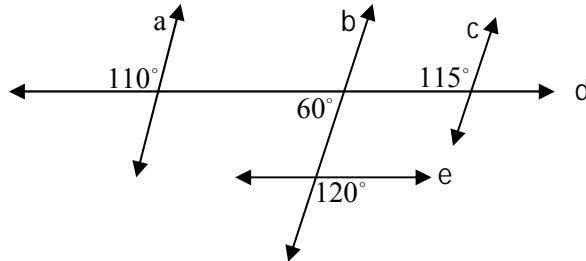
- (A) 80 (B) 90 (C) 100 (D) 85^1

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56. Based on the diagram below, which statement is true?



- (A) $a \parallel b$ (B) $a \parallel c$ (C) $b \parallel c$ (D) $d \parallel e$

57. Ayon sa isang sinaunang paniniwala, kapag ang isang kaibigan ay dumalaw sa isang may sakit na tao, $\frac{1}{30}$ ng kanyang pagkakasakit ay nawawala. Ano ang pinakamababang bilang ng kaibigan ang kailangang bumisita sa may sakit upang maalis ang 98% o higit pa ng kanyang pagkakasakit?

- (A) 114 (B) 115 (C) 116 (D) 117

58. Si Sarah ay gagawa ng isang keyk at ilang mga cookies. Ang keyk ay nangangailangan ng $\frac{3}{8}$ tasa ng asukal at ang mga cookies ay nangangailangan ng $\frac{3}{5}$ tasa ng asukal. Si Sarah ay may $\frac{15}{16}$ tasa ng asukal. Siya ba ay may sapat na asukal?

- (A) Siya ay may sapat na asukal
(B) Kailangan pa niya ng $\frac{1}{8}$ tasa ng asukal.
(C) Kailangan pa niya ng $\frac{3}{80}$ tasa ng asukal.
(D) Kailangan pa niya ng $\frac{4}{19}$ tasa ng asukal.

59. Find the distance from the point (2,3) to the line $x - y = 5$.

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

60. If $x + \frac{1}{x} = 4$, what is the value of $x^2 + \frac{1}{x^2}$?

- (A) 16 (B) 15 (C) 14 (D) 12

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SCIENCE

1. Which list of particles is in increasing order of mass?

- (A) proton → electron → alpha particle
- (B) proton → alpha particle → electron
- (C) electron → proton → alpha particle
- (D) alpha particle → electron → proton

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Practice Test in UPCAT Science
Reviewer, COMING SOON...

ANSWER KEY IN MATHEMATICS

- | | | |
|------|------|------|
| 1 C | 21 B | 41 A |
| 2 D | 22 C | 42 D |
| 3 C | 23 C | 43 D |
| 4 B | 24 C | 44 B |
| 5 A | 25 C | 45 D |
| 6 B | 26 D | 46 D |
| 7 B | 27 C | 47 B |
| 8 C | 28 B | 48 D |
| 9 C | 29 B | 49 C |
| 10 B | 30 A | 50 B |
| 11 C | 31 A | 51 D |
| 12 B | 32 C | 52 D |
| 13 D | 33 C | 53 C |
| 14 D | 34 B | 54 B |
| 15 A | 35 A | 55 B |
| 16 B | 36 C | 56 D |
| 17 C | 37 B | 57 C |
| 18 B | 38 D | 58 C |
| 19 C | 39 D | 59 D |
| 20 B | 40 D | 60 C |

e-mail reviewermath@yahoo.com if
you want clarification for any answer.