# *Virtual* Praxis Review Workshop : Core Mathematics Exam Part II

Jonathan D. Watkins, Ph.D.
REACH Math Resources

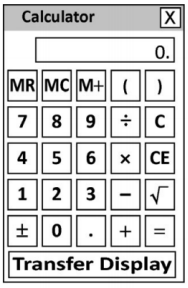
UNIVERSITY OF LOUISVILLE

REACH

1

## Exam Overview – "Old" (5732)

- Core Academic Skills for Educators: Mathematics
- **85** minutes to complete **56** questions (about 1.5 minutes per question!)
- Multiple-choice, selected-response (with one or more answers), and short-answer questions
- On-screen calculator



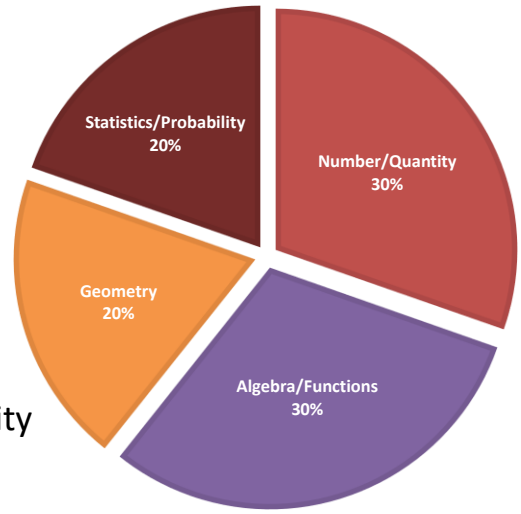

2

2

# Exam Overview – "Old" (5732)

**CONTENT AREAS**

- Number & Quantity (17 questions)
- Algebra & Functions (17 questions)
- Geometry (11 questions)
- Statistics & Probability (11 questions)

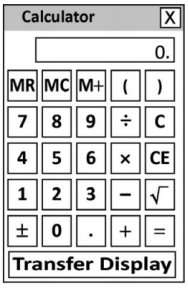



3

3

# Exam Overview – "New" (5733)

- Core Academic Skills for Educators: Mathematics
- **90** minutes to complete **56** questions (about 1.6 minutes per question!)
- Multiple-choice, selected-response (with one or more answers), and short-answer questions
- On-screen calculator




4

4

# Exam Overview – "New" (5733)

**CONTENT AREAS**

I. Number & Quantity: +3

(20 questions)

II. Data, Statistics, & Probability: +7

(18 questions)

III. Algebra & Geometry: –10

(18 questions)


5

5

# Algebra & Functions: Major Topics

- Simplifying expressions (using the distributive property)
- Working with expressions/equations (e.g., evaluating and manipulating them)
- Solving linear equations and inequalities
- Working with functions (including tables of values)
- Solving problems involving ratios/proportions
- Understanding linear equations and their graphs
- Interpreting graphs of equations/functions
- Understanding and solving word problems

6

6

# Algebra & Functions

1. Solve the following linear equation: $3x - 9 = 12$.

A. x = 1
B. x = 7
C. x = 9
D. x = 21
E. x = 63

**Follow-Up Exercise:**

**Solve the following:** $\frac{1}{5}x + 4 = -6$.

Tip: Work Backwards

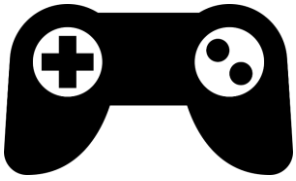
7

7

# Algebra & Functions

2. Marcus purchases a video game with a price tag of *d* dollars. If the sales tax on the item is 6%, which expression represents the **final cost** of the game?

A. 0.06*d*
*B.* *d* + 0.06
*C.* *d* – 0.06
*D.* *d* + 0.06*d*
*E.* *d* – 0.06*d*



8

8

# Algebra & Functions

3. Which of these functions will produce the table of values shown below.

| *x* | *f(x)* |
|---|---|
| 1 | 1 |
| 2 | 3 |
| 3 | 5 |
| 4 | 7 |
| 5 | 9 |

A. $f(x) = x$
B. $f(x) = x + 2$
C. $f(x) = x - 2$
D. $f(x) = 2x + 1$
E. $f(x) = 2x - 1$

9

9

# Algebra & Functions

4. Which of the following expressions is equivalent to

$$-3(x - 5) - (2 - x)?$$

A. $-4x - 17$
B. $-4x + 13$
C. $-2x - 17$
D. $-2x + 13$
E. $-3x^2 + 21x - 30$

10

10

# Algebra & Functions

5. If $\frac{2}{3}a - b = \frac{1}{4}c$, $b = -1$, and $c = 20$, find $a$.

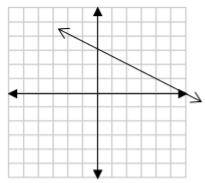
A. a = 8/3
B. a = 4
C. a = 6
D. a = 9
E. a = 12

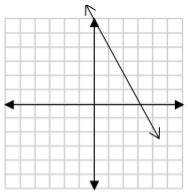
11

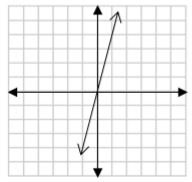
11

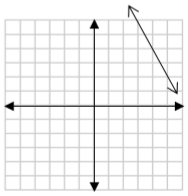
# Algebra & Functions

6. Which of the following is the graph of the linear equation $y = -\frac{1}{2}x + 3$ ?

A. 

B. 

C. 

D. 

E. It is impossible to draw the graph with the given information.

12

12

# Algebra & Functions

7. Translate the following phrase into an algebraic expression: Five less than twice a number.

A. $5 - 2n$
B. $2n - 5$
C. $5 - (2 + n)$
D. $(2 + n) - 5$
E. $5 - \frac{2}{n}$

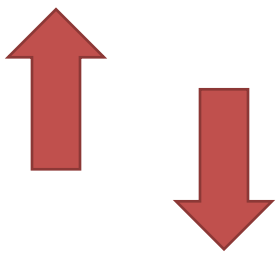
13

13

# Algebra & Functions

8. The relationship between $x$ and $y$ is given by the following equation: $3x + y = 7$. If $x$ increases by 2, then $y$…

A. Increases by 3.
B. Increases by 6.
C. Increases by 7.
D. Decreases by 3.
E. Decreases by 6.



14

14

# Algebra & Functions

9. There are 25 animals (chickens and goats) on a farm. If these farm animals have a total of 66 legs, how many goats are on the farm?


A. 8 goats
B. 9 goats
C. 12 goats
D. 16 goats
E. 17 goats

Tip: Answer the Right Question

15

15

# Algebra & Functions

10. Solve the following inequality: $2x + 1 > 4x - 5$.

A. $x < -3$
B. $x > -3$
C. $x < 3$
D. $x > 3$
E. All real numbers

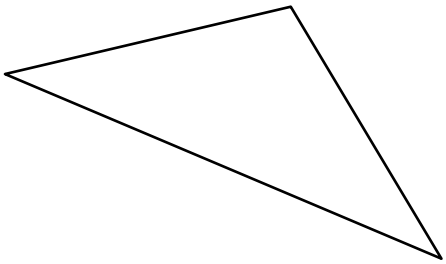
16

16

# Algebra & Functions

11. The second angle of a triangle is twice as large as the first, and the third angle is 20° less than the first angle. Given that the sum of the measures of the interior angles of a triangle is 180°, find the measure of the third angle.

A. 30°
B. 50°
C. 60°
D. 80°
E. 100°



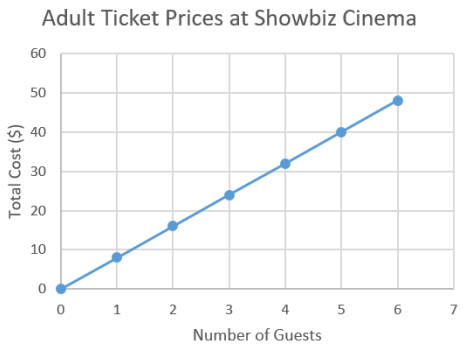
17

17

# Algebra & Functions

12. The cost of movie tickets for adults at Showbiz Cinema is shown in the graph below. Based on this information, what is the cost of two movie tickets?

A. $8
B. $15
C. $16
D. $17
E. $18




18

18

# Geometry: Major Topics

- Perimeter, area, and volume of various shapes
- Transformations in the *xy*-plane (e.g., translations, rotations, reflections)
- Classifying triangles and quadrilaterals
- Triangle Inequality Theorem
- Pythagorean Theorem
- Parallel lines cut by a transversal (angle relationships)
- Circles (Circumference, arc length, area, and sector area)

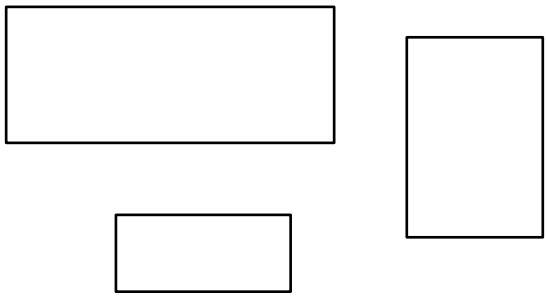
19

19

# Geometry

1. The dimensions of five rectangles are given below. Which rectangle has an area of 12 $in^2$ and a perimeter of 16 in?

A. 1” × 12”
B. 2” × 6”
C. 3” × 4”
D. 4” × 8”
E. 6” × 6”



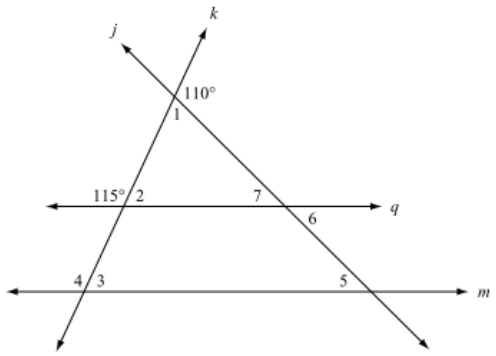
20

20

# Geometry

2. Given that lines *q* and *m* are parallel, find the measure of ∠5.

A. 35°
B. 45°
C. 65°
D. 70°
E. 110°

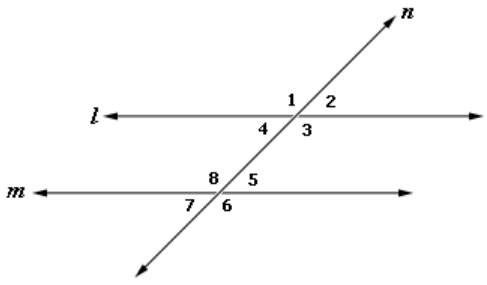



21

21

# Geometry

## Parallel Lines Cut by a Transversal



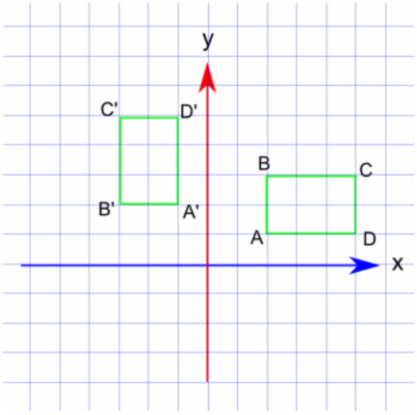

22

22

# Geometry

3. Which geometric transformation is illustrated in the figure below?

A. Translation
B. Dilation
C. Rotation
D. Reflection
E. None of these




23

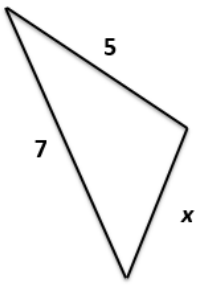
23

# Geometry

4. Two sides of a triangle measure 5 cm and 7 cm. Which of the following side lengths are possible for the third side?

i. 1 cm
ii. 3 cm
iii. 7 cm
iv. 11 cm
v. 13 cm

A. *i, ii,* and *iii*
B. *ii*, *iii*, and *iv*
C. *iii, iv, and v*
D. *i, ii, iii and iv*
E. All of them

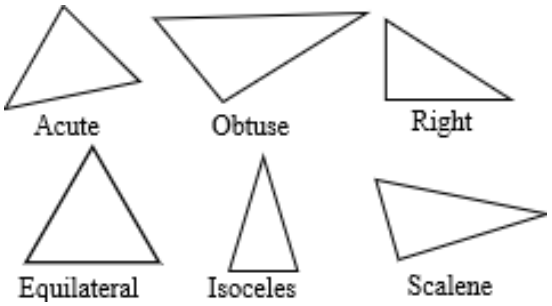



24

24

# Geometry

## Classifying Triangles




25

25

# Geometry

5. The volume of a package (in the shape of a rectangular prism) is 4,692 $in^3$. If the length of the package is 23 in and the width is 17 in, what is the height of the package?

A. 12 in
B. 17 in
C. 23 in
D. 4,301 in
E. 4,652 in

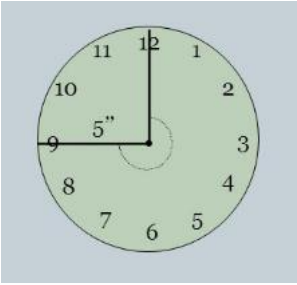
26

26

# Geometry

6. The second hand of a clock is 5 inches long. Approximately how far does the tip of the hand travel in 45 seconds?

A. 3.9 in
B. 7.5 in
C. 11.8 in
D. 23.6 in
E. 31.4 in



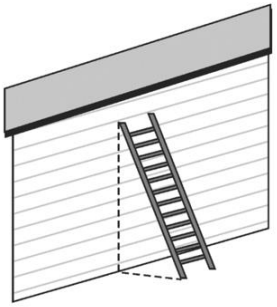

27

27

# Geometry

7. A 26-foot ladder is leaned against a wall in such a way that the base of the ladder is 10 feet from the wall. At what height does the top of the latter touch the wall? (If necessary, round your answer to the nearest foot.)

A. 16 ft
B. 20 ft
C. 24 ft
D. 28 ft
E. 36 ft



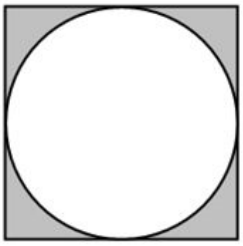
28

28

# Geometry

8. A circle with a radius of 5 cm is inscribed in a square. What is the area of the shaded region (in cm)?

A. $10\pi - 25$
B. $25 - 10\pi$
C. $25\pi - 25$
D. $100 - 25\pi$
E. $100 - 10\pi$



29

29

# Some Formulas to Know

- Percent increase/decrease
- Slope-intercept form of a linear equation
- Pythagorean Theorem
- Area of a triangle and rectangle
- Circumference and area of a circle
- Volume of a rectangular prism/cylinder
- Distance-rate-time formula

30

30

# Tips/Strategies from Week 1

1. Review important mathematical terminology.
2. Memorize key formulas. (See handout.)
3. Take time to understand the problem.
4. Read all of the questions very carefully, and be sure to answer the question that is being asked.
5. Read all of the choices before answering.
6. Pace yourself (≈ 1.5 minutes per question).
7. If you don't know how to answer a question, skip it and return to it later.

31

31

# Tips/Strategies from Week 1

8. If you get stuck, try to work backwards.
9. To find the probability of two or more events, use the multiplication rule:

   $$P(A \text{ and } B) = P(A) \times P(B \text{ given } A).$$

10. Review the most common representations of data, including dot plots, scatterplots, box plots, and histograms.
11. Sometimes, creating an organized list or table can help you solve a problem.

32

32

# Tips/Strategies from Week 2

12. If necessary, make an educated guess.
13. Whenever possible, check your answers.
14. Be skeptical of answer choices that are "too good to be true." Don't fall into a trap!
15. If a problem is too abstract, try plugging in some numbers to make it more concrete.
16. Skip the "textbook approach" on some problems. Ideally, you want to use the fastest approach that works!

33

33

# Tips/Strategies from Week 2

17. It never hurts to draw a picture.
18. Algebra is a powerful tool. Use it!
19. Sometimes, you can use estimation to eliminate answer choices.
20. Sometimes, you may want to convert your answer choices to decimal numbers. (See Additional Problem # 10.)

34

34

# Homework

- Check out the great resources available from ETS!
  - Google: "Praxis Core Math"
  - Direct link: https://www.ets.org/praxis/prepare/materials/**5732** (or **5733**)
  - Link to free Khan Academy prep course (NEW!)
- Attempt the sample mathematics problems **in the handout** and from the *Praxis* Study Companion.

35

35

# Homework

Solutions to **last** week's additional exercises (Part I)

| | |
|---|---|
| 1. C | 7. B |
| 2. C | 8. E |
| 3. C | 9. A |
| 4. E | 10. E |
| 5. A | 11. D |
| 6. E | 12. E |

36

36

# Homework

Solutions to **this** week's additional exercises (Part II)

1. C
2. B
3. D
4. A
5. D
6. D
7. A
8. D
9. A
10. C
11. C
12. Answers will vary

37

37

# Math Resource Center

**UofL student? Need additional help?**

Visit the REACH Math Resource Center!

https://reach.louisville.edu/tutoring/

Belknap Academic Building, Room 241

REACH

38

38

# Closing Thoughts

- You can pass the Praxis Core in Math! Stay positive.
- Practice, practice, practice! (Rework all of the problems that we have discussed.)
- Use the free resources that are available on the ETS website! (Google *Praxis CASE Math*.)
- Find other good resources online.
- Use the REACH Math Resource Center. (We're on MS Teams!)

39

39

# Additional Practice

Here are some additional practice problems related to **Algebra & Functions** and **Geometry**!


40

40

# Algebra & Functions

1. Horizon Wireless charges a flat monthly fee of $20 per month and an additional 8 cents ($0.08) per minute to make cell-phone calls using its service. If $m$ is the total number of minutes a customer used his/her phone during a particular monthly billing cycle, which of the following expressions represents the total cost of the customer's bill?

A. $(20 + 0.08)m$
B. $20m + 0.08$
C. $20 + 0.08m$
D. $20 + 0.08 + m$
E. None of these

41

41

# Algebra & Functions

2. Which of the following statements about the linear equation $y = 4x - 1$ is **false**?

A. The slope ($m$) of the line is 4.
B. The $x$-intercept of the line is –1.
C. The point (2, 7) is on the line.
D. The point (–1, 2) is above the line.
E. The point (3, 0) is below the line.

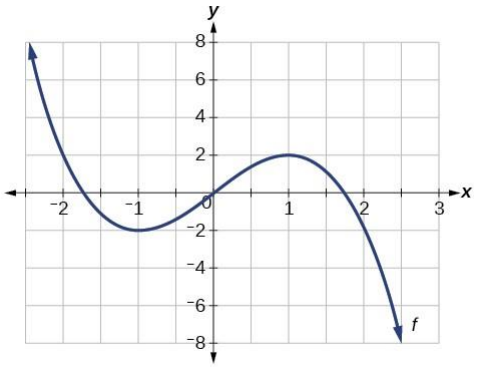
42

42

# Algebra & Functions

3. The graph $y = f(x)$ is given below. For which value(s) of $x$ is/are $f(x) = 2$?

A. –2
B. 1
C. 2
D. –2 and 1
E. –2 and 2




43

43

# Algebra & Functions

4. The perimeter ($P$) of a rectangle is given by the following formula: $P = 2l + 2w$. Which of the following gives the length ($l$) of a rectangle in terms in its perimeter and width ($w$)?

*A.* $\frac{P-2w}{2}$
*B.* $\frac{P+2w}{2}$
*C.* $P - w$
*D.* $P + w$
*E.* $2(P - 2w)$

44

44

# Geometry

5. Which of the following quadrilaterals has **at least** one pair of opposite sides that are parallel?

| | |
|---|---|
| i. Rectangle | A. *i* and *iii* |
| ii. Rhombus | B. *ii* and *iv* |
| iii. Parallelogram | C. *ii, iii, and iv* |
| iv. Trapezoid | D. *i, ii, iii and iv* |
| v. Kite | E. *i, ii, iii and v* |

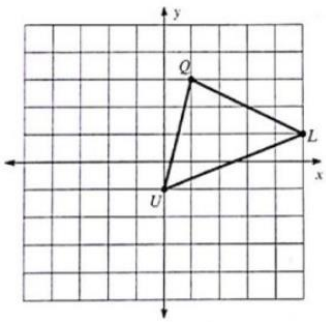
45

45

# Geometry

6. The vertices of triangle LQU are as follows: L(5, 1), Q(1, 3), and U(0, –1). If triangle LQU is reflected about the x-axis, what is the image of the point Q?

A. Q'(1, 3)
B. Q'(–1, –3)
C. Q'(–1, 3)
D. Q'(1, –3)
E. None of these




46

46

# Geometry

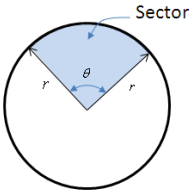
7. Which of the following statements about circles is **false**?

A. The relationship between the diameter ($d$) and radius ($r$) of a circle is given by $r = 2d$.

B. The area of a circle is given by $A = \pi r^2$.

C. The circumference of a circle is given by $C = 2\pi r$.

D. The area of a sector is given by $A = \frac{\theta}{360}\pi r^2$, where $\theta$ is the measure of the central angle in degrees.




E. Arc length is given by $s = \frac{\theta}{180}\pi r$, where $\theta$ is the measure of the central angle in degrees.

47

47

# Geometry

8. The side view of a truss bridge is shown below. If the legs of the isosceles triangles in the design are 12 feet long, what is the area of this portion of the bridge? Note: The area of a trapezoid with bases $b_1$ and $b_2$ is given by $A = \frac{1}{2}(b_1 + b_2)h$.

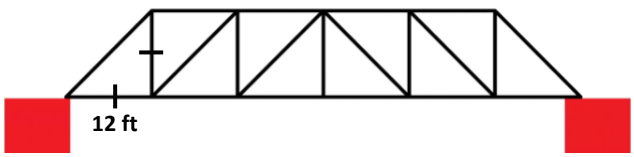
A. 60 ft$^2$

B. 72 ft$^2$

C. 144 ft$^2$

D. 720 ft$^2$

E. 1,440 ft$^2$



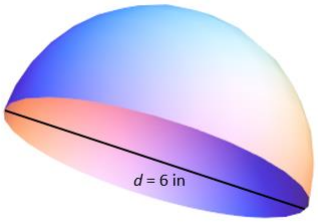

48

48

# Geometry

9. The volume of a sphere is given by the formula $V = \frac{4}{3}\pi r^2$. What is the volume of a hemisphere with a diameter of 6 in?

A. 6π in$^3$
B. 12π in$^3$
C. 24π in$^3$
D. 36π in$^3$
E. 48π in$^3$



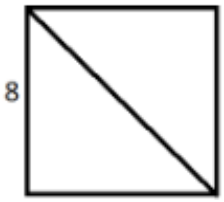

49

49

# Geometry

10. What is the length of a diagonal of a square with a side length of 8 centimeters?

*A.* 4 cm
*B.* 8 cm
*C.* $8\sqrt{2}$ cm
*D.* $8\sqrt{3}$ cm
*E.* 64 cm



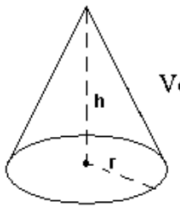

50

50

# Geometry

11. A right circular cone has a height of 6 inches and a radius of 3 inches. If a second right circular cone has the same height but **twice** the volume of the first cone, what is the radius of the second cone?

*A.* $\sqrt{3}$ in
*B.* 3 in
*C.* $3\sqrt{2}$ in
*D.* 6 in
*E.* 9 in



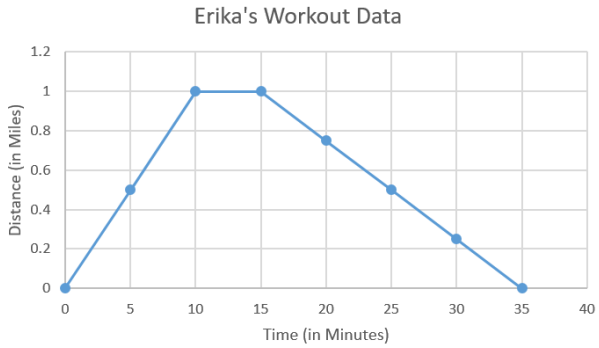

$$\text{Volume} = \frac{1}{3}\pi r^2 h$$

51

51

# Bonus Problem!

12. BONUS: Data from Erika's jogging workout are shown in the graph below. The y-axis gives Erika's **distance from the starting point** in miles. What does this graph tell us?




52

52