

Final Exam Review #1

1. Which expression is equivalent to $(x+2)^3 - 3x(x-5)$?

A. $x^3 - 3x^2 + 15x + 8$

B. $x^3 + 3x^2 + 3x + 8$

C. $x^3 + 3x^2 + 27x + 8$

D. $x^3 - 3x^2 + 15x - 8$

2. Which is an equation of a parabola that has a directrix of $y = -3$ and a focus at $(3, -1)$?

A. $y = \frac{1}{4}(x+3)^2 - 5$

B. $y = \frac{1}{4}(x-3)^2 - 2$

C. $y = \frac{1}{4}(x-3)^2 + 8$

D. $y = \frac{1}{4}(x+3)^2 - 2$

3. The graph of the function $f(x) = \sqrt{x}$ will be shifted left 4 units and up 23 units.

Which is the function that corresponds to the resulting graph? }

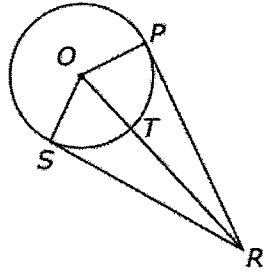
A. $f(x) = \sqrt{x+4} + 23$

B. $f(x) = \sqrt{x-4} + 23$

C. $f(x) = \sqrt{x+4} - 23$

D. $f(x) = \sqrt{x-4} - 23$

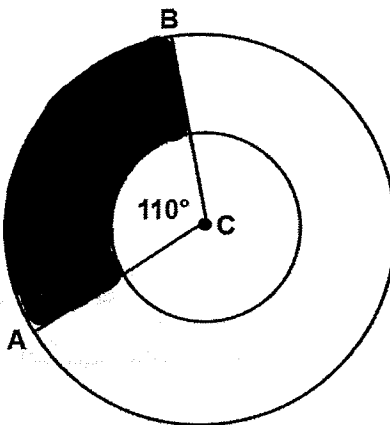
4. In the figure below, \overline{PR} and \overline{SR} are tangent to circle O.



If $OT = 10$ cm and $PR = 32$ cm, what is the length of \overline{OR} ?

- A. 30.40 cm
- B. 43.17 cm
- C. 32 cm
- D. 33.53 cm

5. In the figure below, the larger circle has a radius of 6 cm, and the smaller circle has a radius of 2 cm.



What is the approximate area of the shaded region?

- A. 34.56 cm^2
- B. 3.84 cm^2
- C. 30.72 cm^2
- D. 38.40 cm^2

6. Which choice shows the solution to the equation $5x^2 + 7x = -6$?

A $\frac{7 \pm i\sqrt{71}}{10}$

B $\frac{-7 \pm \sqrt{71}}{10}$

C $\frac{7 \pm \sqrt{71}}{10}$

D $\frac{-7 \pm i\sqrt{71}}{10}$

7. What value of h is needed to complete the square for the equation

$$x^2 + 16x + 20 = (x - h)^2 - 44?$$

A -8

B 8

C 64

D -64

8. Which expression is equivalent to $\frac{\csc \theta}{\sin \theta + \cos \theta \cot \theta}$?

A $\tan \theta$

B $\cos \theta$

C $\sec \theta$

D 1

9. Which expression is equivalent to $(5 - 4i)^2 + (4 + 2i)$

A $45 + 2i$

B $13 + 2i$

C $13 - 38i$

D $13 + 38i$

10. William put the tip of his pencil on the outer edge of a graph of the unit circle at the point $(-1, 0)$. He moved his pencil tip through an angle of $\frac{5\pi}{3}$ radians in a clockwise direction along the edge of the circle. At what angle of the unit circle did William's pencil tip stop?

- A $\frac{\pi}{3}$
- B $\frac{5\pi}{6}$
- C $\frac{7\pi}{6}$
- D $\frac{4\pi}{3}$

11. What is the inverse of $f(x) = 7 - 4^x$?

- A $f^{-1}(x) = \frac{7-x}{4}$
- B $f^{-1}(x) = \frac{\log(7) - x}{\log(4)}$
- C $f^{-1}(x) = \frac{\log(7-x)}{\log(4)}$
- D $f^{-1}(x) = \frac{\log(7-x)}{4}$

12. The volume of a rectangular prism is represented by the expression $(x^3 + 4x^2 - 11x - 30)$. If the length is $(x + 2)$, which of the following could be an expression for the width?

- A $x - 5$
- B $x - 3$
- C $x + 3$
- D $x - 2$

Final Exam Review #2

- 1) What is the solution set of the equation $\sqrt{2x - 4} = x - 2$?
- $\{-2, -4\}$
 - $\{2, 4\}$
 - $\{4\}$
 - $\{ \}$

- 2) What is the period of the graph $y = \frac{1}{2}\sin 6x$?
- $\pi/6$
 - $\pi/3$
 - $\pi/2$
 - 6π

- 3) What is the solution set of the equation $\frac{30}{x^2-9} + 1 = \frac{5}{x-3}$?
- $\{2, 3\}$
 - $\{2\}$
 - $\{3\}$
 - $\{ \}$

- 4) Max solves a quadratic equation by completing the square. He shows a correct step:

$$(x + 2)^2 = -9$$

What are the solutions to his equation?

- $2 \pm 3i$
 - $-2 \pm 3i$
 - $3 \pm 2i$
 - $-3 \pm 2i$
- 5) If $g(x) = \frac{1}{2}x + 8$ and $h(x) = \frac{1}{2}x - 2$, what is the value of $g(h(-8))$?
- 0
 - 9
 - 5
 - 4

Final Exam Review #3

Name: _____

(Color by Number)

- 1) Given $\triangle ABC$ with a perpendicular bisector \overline{AD} . $CD = 4x + 9$ and $DB = 6x + 4$. Find the length of \overline{CB} .
- 2) The battery lifetime is normally distributed for large samples with a standard deviation of 70 days. If 16% of the batteries have a lifetime of 850 or higher, what is the average battery life?
- 3) The volume of a rectangular prism is represented by the expression $(x^3 + 3x^2 - 10x - 24)$. If the length is $(x + 4)$, and the width is greater than the height, find the width.
- 4) Solve for x : $\frac{x-3}{x+1} = \frac{2x-3}{2x+1}$
- 5) Given the circumference of a circle is 40π , find the area of a 60° sector of this circle.
- 6) Express in degrees an angle of $\frac{2\pi}{15}$ radians.

Color by Number Answers:

780 (WHITE)

$x + 2$ (BLACK)

24 (TAN)

209.44 (YELLOW)

38 (RED)

0 (GREEN)

*You may color #'s 7-9 any color you wish!

Final Exam Review #4

1. Which expression is equivalent to $(x + 6)^3 - 4x(x - 2)$?

A. $x^3 + 18x^2 + 108x + 216$

B. $x^3 + 14x^2 + 100x + 216$

C. $x^3 + 14x^2 + 116x + 216$

D. $x^3 + 22x^2 + 116x + 216$

2. Suppose $p(x) = x^3 - 5x^2 - 8x + k$. The remainder of the division of $p(x)$ by $(x - 2)$ is -24 . What is the remainder of the division of $p(x)$ by $(x + 3)$?

A. 44

B. -25

C. -44

D. -35

3. In 2004, Samantha wanted to invest some money into an account that would earn 4.36% interest, compounded continuously. What is the earliest year in which the value of her account would be at least doubled?

A. 2005

B. 2014

C. 2020

D. 2030

4. Which is an equation of a parabola that has a directrix of $y = 3$ and a focus at $(1, 1)$?

A. $y = \frac{1}{4}(x + 1)^2 - 2$

B. $y = \frac{1}{-4}(x + 1)^2 + 2$

C. $y = \frac{1}{-4}(x - 1)^2 + 2$

D. $y = \frac{1}{4}(x - 1)^2 + 2$

5. What value of h is needed to complete the square for the equation

$$x^2 + 8x + 32 = (x - h)^2 + 16?$$

- A 8
- B 4
- C -4
- D 16

6. Which expression is equivalent to $\frac{\cos \theta \sec \theta}{\tan \theta \csc \theta}$?

- A $\cos \theta$
- B $\tan \theta$
- C 1
- D $\sec \theta$

7. William put the tip of his pencil on the outer edge of a graph of the unit circle at the point $(0, -1)$. He moved his pencil tip through an angle of $\frac{5\pi}{3}$ radians in a clockwise direction along the edge of the circle. At what angle of the unit circle did William's pencil tip stop?

- A $\frac{\pi}{6}$
- B $\frac{11\pi}{6}$
- C $\frac{7\pi}{6}$
- D $\frac{4\pi}{3}$

8. What is the inverse of $f(x) = 5 - 2^x$?

- A $f^{-1}(x) = \frac{5-x}{2}$
- B $f^{-1}(x) = \frac{\log(5) - x}{\log(2)}$
- C $f^{-1}(x) = \frac{\log(5-x)}{\log(2)}$
- D $f^{-1}(x) = \frac{\log(5-x)}{2}$

Final Exam Review #5

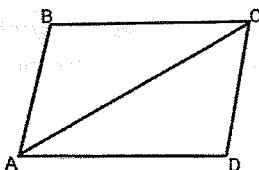
1) Given $\triangle ABC$ and $\triangle EDC$, with $\overline{AB} \cong \overline{EC}$, $m\angle ABC \cong m\angle CED$, and $\overline{BC} \cong \overline{ED}$. Which of the following is the reason for $\triangle ABC \cong \triangle CED$?

- a. Side-Side-Angle Postulate
- b. Angle-Angle-Side Postulate
- c. Side-Side-Side Postulate
- d. Side-Angle-Side Postulate

2) Fill in the (1) and (2) blanks of the two column proof.

Given: $\overline{BC} \cong \overline{DA}$; $\overline{BC} \parallel \overline{AD}$

Prove: $\triangle ABC \cong \triangle CDA$



Statements	Reasons
<ol style="list-style-type: none"> 1. $\overline{BC} \cong \overline{DA}$; $\overline{BC} \parallel \overline{AD}$ 2. $\overline{AC} \cong \overline{AC}$ 3. $\angle BCA \cong \angle CAD$ 4. $\triangle ABC \cong \triangle CDA$ 	<ol style="list-style-type: none"> 1. Given 2. _____ (1) _____ 3. Alternate interior angles are congruent 4. _____ (2) _____

- a. (1) = reflexive property ; (2) = SSA
- b. (1) = alternate interior angles; (2) = SAS
- c. (1) = reflexive property; (2) = SAS
- d. (1) = symmetric property; (2) = ASA

3) You want to paint a wall that is in the shape of a rhombus. The wall has diagonals that are 5 meters and 15 meters. Deelux Matt Emulsion paint costs \$7.50 per meter square. How much will it cost to paint this rhombus-shaped wall?

- a. \$75
- b. \$562.50
- c. \$281.25
- d. \$140.63

4) What are the radius and the coordinates of the center for the equation $(x + 2)^2 + (y - 5)^2 = 100$.

- a. center: (2, -5); radius = 100
- b. center: (-2, 5); radius = 100
- c. center: (2, -5); radius = 10
- d. center: (-2, 5); radius = 10

<p>5) A boomerang follows the trajectory of a parabola with the equation $y = 2(x + 6)^2 + 3$. What is the focus of this parabola?</p> <p>a. (-6, 3)</p> <p>b. (-6, 11)</p> <p>c. (-6, 3.125)</p> <p>d. (-3, 6)</p>	<p>6) If the equation of a circle is given by $(x + 6)^2 + (y - 3)^2 = 64$, what is the approximate length of an 80° sector?</p> <p>a. 8</p> <p>b. 201.1</p> <p>c. 44.7</p> <p>d. 11.2</p>
<p>7) If $f(-1) = -5$ and $f(2) = 1$, which of the following must be the function?</p> <p>a. $f(x) = x^2 - 6$</p> <p>b. $f(x) = x^2 - 7$</p> <p>c. $f(x) = 2x - 3$</p> <p>d. $f(x) = 9x + 20$</p>	<p>8) A system of equations is shown below.</p> $y = x - 3 $ $y = \frac{1}{2}x$ <p>What is the distance between the points of intersection of the system?</p> <p>a. $\sqrt{6}$</p> <p>b. $\sqrt{20}$</p> <p>c. $\sqrt{48}$</p> <p>d. $\sqrt{80}$</p>
<p>9) A function is shown below.</p> $\begin{cases} x + 2, & x < -1 \\ x^2, & -1 \leq x \leq 2 \\ 3x, & x > 2 \end{cases}$ <p>What is the value of the expression $f(2) + 2f(-5) - f(7)$?</p> <p>a. -15</p> <p>b. -45</p> <p>c. 19</p> <p>d. -23</p>	<p>10) Let $f(x) = 14x^3 + 28x^2 - 46x$ and $g(x) = 2x + 7$. What is the solution set to the equation $\frac{1}{12}f(x) = g(x)$?</p> <p>a. $\{-3, 0, 1\}$</p> <p>b. $\{-3, -1, 2\}$</p> <p>c. $\{-2, 1, 3\}$</p> <p>d. $\{1, 5, 11\}$</p>

Final Exam Review #6

1. Simplify $x^2 + 3x^3 - (2x^2 + 1)$

- a. $3x^3 - x^2 - 1$
- b. $3x^3 - x^2 + 1$
- c. $3x^3 + x^2 - 1$
- d. $3x^3 + x^2 + 1$

2. Simplify $(6x^3 + 8x - 10) \div (2x - 2)$ using long division.

- a. $6x^2 + 12x + 32 + \frac{54}{2x-2}$
- b. $3x + 7 + \frac{4}{2x-2}$
- c. $6x^2 - 12x - 4 + \frac{2}{2x-2}$
- d. $3x^2 + 3x + 7 + \frac{4}{2x-2}$

3. What is the equation of a polynomial with zeros $x = 2$, $x = -3$, and $x = 1$?

- a. $x^3 - 5x^2 - 2x^2 - 6$
- b. $x^3 - 2x^2 - 5x + 6$
- c. $x^3 - 7x + 6$
- d. $x^3 - 2x^2 + 5x + 6$

4. Describe the transformation of $x^2 + y^2 = 9$ to $(x + 2)^2 + (y - 3)^2 = 9$.

- a. Right 2, Down 3
- b. Left 2, Up 3
- c. Left 2, Down 3
- d. Right 2, Up 3

5. Simplify and state the restrictions: $\frac{x^2-4}{x^2+6x+9} \div \frac{x^2+4x+4}{x^2-9}$

- a. $\frac{(x-2)(x-3)}{(x+3)(x+2)}$; $x \neq -3, -2, 3$
- b. $\frac{(x-2)(x-3)}{(x+3)}$; $x \neq -3$,
- c. $\frac{(x-2)(x+2)}{(x+3)(x-3)}$; $x \neq -3, 3$
- d. $\frac{(x-2)(x+2)}{(x+3)(x-3)}$; $x \neq -3, -2, 3$

6. Simplify and state the restrictions: $\frac{x-1}{x^2+6x+5} - \frac{x}{x+5}$

Final Exam Review #6

a. $\frac{-1}{x+5}; x \neq -5, -1$

b. $\frac{-x^2-1}{(x+5)(x+1)}; x \neq -5, -1$

c. $\frac{-1}{(x+5)(x+1)}; x \neq -5, -1$

d. $\frac{-x^2-1}{x+5}; x \neq -5, -1$

7. Solve for x : $\frac{2}{x+2} + \frac{3}{x^2+5x+6} = \frac{1}{x+3}$

a. $x = 3$

b. $x = -4$

c. $x = -7$

d. no solution

8. Simplify $\frac{2+3i}{6+7i}$

a. $\frac{8}{13}$

b. $\frac{33}{85}$

c. $\frac{33+4i}{85}$

d. $\frac{-13+4i}{85}$

9. Write $y = x^2 - 16x + 3$ in vertex form.

a. $y = (x - 8)^2 - 67$

b. $y = (x - 4)^2 - 1$

c. $y = (x - 16)^2 + 3$

d. $y = (x - 8)^2 - 61$

10. State the center and radius of the circle: $x^2 + y^2 + 8x - 6y - 11 = 0$.

a. $C = (-4, 3), r = 6$

b. $C = (4, -3), r = 6$

c. $C = (8, -6), r = 11$

d. $C = (-4, 3), r = 36$