

You are NOT to use a calculator on this part of the exam.

1. (a) Evaluate each of the following. For any that do not exist, write DNE.

$(-5)^2 = 25$ $-2^3 = -8$ $\left(\frac{2}{3}\right)^2 = \frac{4}{9}$ $-2^4 = -16$

- (b) Evaluate each expression. Circle or box your answers.

$8 - 5(4 + 1) = -17$ $5x^2 + 3x - 1$ for $x = -2 = 13$

- (f) Evaluate each of the following. For any that do not exist, write DNE.

$3^{-1} = \frac{1}{3}$ $(-5)^{-2} = \frac{1}{25}$ $(5)^0 = 1$ $\left(\frac{3}{5}\right)^{-2} = \frac{25}{9}$

- (g) • Change 4300 to scientific notation form: 4.3×10^3
 • Change 1.67×10^{-3} to decimal form: 0.00167

4. (a) Evaluate each of the following. For any that do not exist, write DNE.

$\sqrt{-16} = \text{DNE}$ $-\sqrt{-16} = \text{DNE}$ $\sqrt[3]{\frac{27}{8}} = \frac{3}{2}$ $\sqrt[3]{-1} = -1$

You MAY use a calculator for this part of the exam. Circle or box your answers when a blank is not provided.

1. (c) Evaluate $\frac{1 - (0.043)(5)}{0.006}$. Round to the hundredth's place. 130.83

(d) Simplify $(x - 7) + [3x - (x + 2)] = x - 7 + 3x - x - 2 = 3x - 9$

- (e) Simplify the expressions. Give your answers without negative exponents.

$(2xy^5)^3 = 8x^3y^{15}$ $(4x)(3x^7) = 12x^8$ $\frac{x^5}{x^9} = \frac{1}{x^4}$
 $-4 - 8 = -10 + 2$

2. (a) Determine whether $x = -2$ is a solution to $\frac{8}{x} + x^3 = 5x + 2$. To receive credit, you must show correct work supporting your answer. Circle one of the following.

Yes, it is a solution. **No, it is not a solution.** $-12 \neq -8$

- (b) Solve each equation.

$-\frac{1}{3}x + 2 = \frac{5}{2}$ $5 = 7 - 2(3x - 1) + 4x$ $x = 2$
 $-2x + 12 = 15$ $-2x = 3$ $5 = 7 - 6x + 2 + 4x$
 $x = -\frac{3}{2}$ $5 = 9 - 2x$
 $2x = 4$
 $x = 2$

- (c) Simplify $(-2a^2 + 4a - 5) + (7a^2 + a + 9)$

$a^2 + 5a + 4$

(d) Multiply and simplify each of the following.

$$(3x + 5)(3x - 5)$$

$$9x^2 - 25$$

$$(2x - 3)(x^2 - 5x + 1)$$

$$2x^3 - 13x^2 + 17x - 3$$

$$(x - 4)^2$$

$$x^2 - 8x + 16$$

(e) Factor each expression completely.

$$5x^3 - 5x$$

$$5x(x+1)(x-1)$$

$$4x^2 + 12x + 9$$

$$(2x+3)(2x+3)$$

(f) Solve each equation showing clearly how you do it.

$$4(x^2 - 5x + 6) = 0$$

$$4x^2 + 24 = 20x$$

$$x = 2, 3$$

$$16x^2 = 9$$

$$x^2 = \frac{9}{16}$$

$$x = \frac{3}{4}, -\frac{3}{4}$$

$$\frac{1}{5}y^2 - 2 = -\frac{3}{10}y$$

$$2y^2 - 20 = -3y$$

$$2y^2 + 3y - 20 = 0$$

$$(2y-5)(y+4) = 0$$

$$y = -4, \frac{5}{2}$$

$$(x+1)^2 = 3x+7$$

$$x^2 + 2x + 1 = 3x + 7$$

$$x^2 - x - 6 = 0$$

$$(x-3)(x+2) = 0$$

$$x = -2, 3$$

3. (a) Give any value or values that x is not allowed to have in the expression:

$$\frac{(x-5)(x+2)}{x^2 - 3x - 10}$$

$$x \neq 2, -2$$

$$(x+2)(x-2)$$

(b) Simplify the expression from the previous exercise.

$$\frac{x-5}{x-2}$$

(c) Multiply $\frac{(x-3)(x+1)}{x^2 - 2x - 3} \cdot \frac{x-4}{x-3}$

$$x+1$$

$$-\frac{3}{10} + \frac{4}{10} = \frac{5}{50} = \frac{1}{10}$$

(d) Solve each equation, showing clearly how it is done.

$$2x \left(\frac{5}{2x} \right) = \left(\frac{2}{x} - \frac{1}{12} \right) 12x$$

$$30 = 24 - x$$

$$x = -6$$

$$\frac{3}{y-4} - \frac{2}{y+1} = \frac{5}{y^2 - 3y - 4}$$

$$y = -6$$

4. (b) Simplify $\sqrt{20}$

$$2\sqrt{5}$$

(c) Multiply $(3 - 2\sqrt{5})(2 + \sqrt{3})$

$$6 + 3\sqrt{3} - 4\sqrt{5} - 2\sqrt{15}$$

(d) Solve $x^2 - 4x + 2 = 0$ using the quadratic formula. Show your work and give your answer as two separate numbers. Give your answers as exact values, not decimals.

(e) Solve each equation, showing clearly how you do it.

$$t - 1 = \sqrt{t + 11}$$

$$\sqrt{5x - 1} + 3 = 7$$

$$x = \frac{4 \pm \sqrt{16 - 4(2)}}{2}$$

$$x = \frac{4 \pm 2\sqrt{2}}{2}$$

$$x = 2 + \sqrt{2}$$

$$x = 2 - \sqrt{2}$$

$$x = \frac{17}{5}$$