INSTRUCTIONS: Books, notes, and electronic devices are not permitted. Write (1) your full name, (2) 1340/Exam 1, (3) lecture number/instructor name and (4) FALL 2021 on the front of your bluebook. Do all problems. Start each problem on a new page. Box your answers. A correct answer with incorrect or no supporting work may receive no credit, while an incorrect answer with relevant work may receive partial credit. Justify your answers, show all work.

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1. (28pts) The following problems are not related. Show all work. Simplify your answers.

   (a)(20pts)(*i*)(10pts) Assume x is a positive real number and nd the product: $(x^{1=2} \quad x^{3=2})^2$

   (*ii*)(10pts) Assume p 2 R and $p > 0$ and perform the indicated operation (write your answer with positive exponents only): $(p + 4)^{-3=2} + (p + 4)^{1=2}$

   (b)(8pts) Use the Quadratic Formula to solve the equation: $x^2 \quad x = 1$

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2. (24pts) The following problems are not related. Show all work. Simplify your answers

   (a)(10pts) Assuming all the variables are positive, simplify the rational expression: $\dfrac{p^{-1} + q^{-1}}{(pq)^{-1}}$

   (b)(10pts) Solve the equation by factoring the polynomial: $18x^2 + 9x \quad 2 = 0$

   (c)(4pts) Which choice below is equivalent to $\sqrt{\dfrac{g^3h^5}{r^3}}$ if all the variables are positive? Choose only one answer. *No justi cation necessary, copy down the entire answer. If you do not copy down the entire answer, points will be deducted.*

   (A) $\dfrac{g^6h^{10}}{r^6}$ (B) $\dfrac{g^{3:2}h^{5:2}}{r^{3:2}}$ (C) $\dfrac{gh^2\sqrt{ghr}}{r^2}$ (D) $\dfrac{gh^2\sqrt{gh}}{r}$ (E) None of these

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3. (20pts) The following problems are not related. Show all work. Simplify your answers.

(a)(10pts) Find all solutions of the equation $\sin^2(\ )\cos(2\ ) = \cos(2\ )$ that are in the interval $0 \quad < 2$:

(b)(10pts) Write down the *piecewise* de nition of the function $f(x) = 1 + |x^2 \quad 4|$.

4. (28pts) The following problems are not related. Show all work. Simplify your answers

(a)(12pts) Use the formula $\cos(A + B) = \cos(A)\cos(B) \quad \sin(A)\sin(B)$ and the fact that $75^\circ = 30^\circ + 45^\circ$ to nd the exact value of $\cos(75^\circ)$:

(b)(12pts) Suppose $\frac{}{2}$, nd $\tan(\ )$ given that $\sin(\ ) = \frac{1}{3}$:

(c)(4pts) If we solve the equation $1 + x + xy = y \quad xy$ for variable x then which choice below is equal to x? Choose only one answer. *No justi cation necessary, copy down the entire answer. If you do not copy down the entire answer, points will be deducted.*

(A) $x = y \quad 1$ (B) $x = \frac{y \quad 1}{2y + 1}$ (C) $x = \frac{y}{1 + 2y}$ (D) $x = \frac{2y \quad 1}{1 + y}$ (E) None of these

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