

SHOW ALL WORK ON THIS TEST OR ON SEPARATE PAPER. Circle answers.
TURN IN ALL WORKSHEETS. GRAPHING CALCULATORS ARE REQUIRED ON THIS
TEST. EXPLAIN ALL CALCULATOR METHODS AND SHOW GRAPHS IF USED.

In 1 - 3, factor completely and simplify if possible:

1. $x^3y - 64xy^3$

2. $x^3 - 8x^2 - 4x + 32$

3. $x^2 + 8x^{-1}$

In 4 - 7, use your calculator to find the value in scientific notation
or rounded to the nearest hundredth.

4 a) $(3\sqrt{6} - 5\sqrt{3})^2$

5 a) $\frac{25 + 5i}{5i}$

6 a) $\sqrt{10,000,000}$

b) $\frac{13 - \sqrt{5}}{6 - \sqrt{5}}$

b) $(1 + i)^3$

b) $\sqrt[3]{10,000,000}$

7.a) $\frac{72,000^2}{\sqrt[5]{0.035}}$

b) $\frac{4.0 \times 10^{12}}{8.5 \times 10^{-20}}$

In 8 - 9, simplify:

8. $\frac{x}{x-2} - \frac{x-4}{x^2-4}$

9. $\frac{x^{-1} - y^{-1}}{x^{-1} + y^{-1}}$

10. Use the definitions or the calculator to find the values (give fractional form):

a) $-8^{\frac{2}{3}}$

b) $32^{\frac{4}{5}}$

In 11 - 13, simplify the radical expressions completely:

11. $\sqrt{72x^{15}y^{25}}$

12. $\sqrt[3]{72x^{15}y^{25}}$

13. $(3\sqrt{6} - 5\sqrt{3})^2$

In 14 - 18, solve for X, use complex numbers if necessary. Give exact radical form for irrational answers.

14. $x(x - 30) = 64$

15. $2x(x - 2) = 5$

16. $x^2 + 8x + 52 = 0$

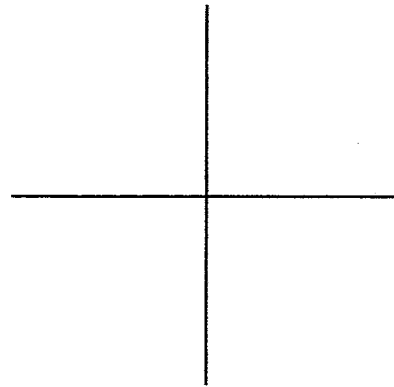
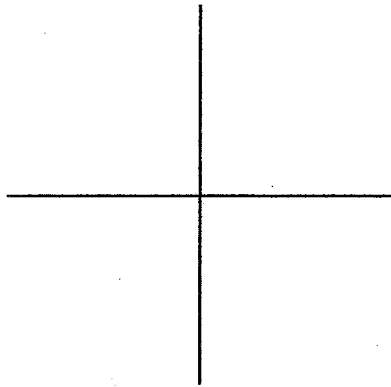
17. $\frac{x + 5}{x} + \frac{24x}{x + 5} = 10$

18. $\sqrt{5 - x} = \sqrt{x + 20} - 1$

In 19 - 20, sketch the graphs (standard zoom) of

19. $y = x^2 - 4x - 5$

20. $y = |3x - 2|$



COLLEGE ALGEBRA EXAM 1 JGR Solutions

1. $x^3y - 64xy^3$

$xy(x^2 - 64y^2)$

$xy(x - 8y)(x + 8y)$

2. $x^3 - 8x^2 - 4x + 32$

$x^2(x - 8) - 4(x - 8)$

$(x - 8)(x^2 - 4)$

$(x - 8)(x - 2)(x + 2)$

3. $x^2 + 8x^{-1}$

$x^{-1}(x^3 + 8)$

$x^{-1}(x + 2)(x^2 - 2x + 4)$

$\frac{(x + 2)(x^2 - 2x + 4)}{x}$

4a) 1.72

b) 2.86

5a) $(25 + 5) \div (5i) = 1 - 5i$

b) $(1 + i)^{13} = -2 + 2i$

6a) 3162.28

b) 215.44

7a) 1.01×10^{10}

b) 4.70×10^{31}

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

$\frac{x^2 + 2x - x + 4}{(x-2)(x+2)}$

$\frac{x^2 + x + 4}{(x-2)(x+2)}$

9. $\frac{x^{-1} - y^{-1}}{x^{-1} + y^{-1}}$

$= \frac{xy(\frac{1}{x} - \frac{1}{y})}{xy(\frac{1}{x} + \frac{1}{y})}$

$= \frac{y - x}{y + x}$

10a) $-8^{(2/3)} = -(\sqrt[3]{8})^2 = -2^2 = -4$

b) $32^{-4/5} = (\sqrt[5]{32})^{-4} = 2^{-4} = \frac{1}{2^4} = \frac{1}{16}$

4 or Calculator

$32 \sqrt[5]{\square} \square \square \square \square 4 \div 5 \square$

Enter .0625

MATH FRAC

ENTER

$\frac{1}{16}$

11. $\sqrt{72x^{15}y^{25}}$

$\frac{\sqrt{36x^{12}y^{24}} \sqrt{2xy}}{6x^7y^{12} \sqrt{2xy}}$

12. $\sqrt[3]{72x^{15}y^{25}}$

$\frac{\sqrt[3]{8x^{12}y^{24}} \sqrt[3]{9xy}}{2x^5y^8 \sqrt[3]{9xy}}$

13. $(3\sqrt{6} - 5\sqrt{3})^2$

$9 \cdot 6 - 30\sqrt{18} + 25 \cdot 3$

$54 - 30 \cdot 3\sqrt{2} + 75$

$129 - 90\sqrt{2}$

Compare to #4a) 1.72.

14. $x(x - 30) = 64$

$x^2 - 30x - 64 = 0$

$(x - 32)(x + 2) = 0$

$x = 32 \quad x = -2$

15. $2x(x - 2) = 5$

$2x^2 - 4x - 5 = 0$

$a = 2 \quad b = -4 \quad c = -5$

$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$= \frac{4 \pm \sqrt{16 - 4(2)(-5)}}{2(2)}$

$= \frac{4 \pm \sqrt{56}}{4}$

$= \frac{4 \pm 2\sqrt{14}}{4}$

$= \frac{2 \pm \sqrt{14}}{2}$

16. $x^2 + 8x + 52 = 0$

2nd Poly Order = 2.

$a_2 = 1 \quad a_1 = 8 \quad a_0 = 52$

$x = -4 \pm 6i$

-OR- Complete Square:

$x^2 + 8x + 16 = -52 + 16$

$(x + 4)^2 = -36$

$x + 4 = \pm 6i$

$x = -4 \pm 6i$

17. $\frac{x+5}{x} + 24 \frac{x}{x+5} = 10$

Let $u = \frac{x+5}{x} \quad \frac{1}{u} = \frac{x}{x+5}$

$u(u + 24 \cdot \frac{1}{u}) = 10$

$u^2 + 24 = 10u$

$u^2 - 10u + 24 = 0$

$(u - 6)(u - 4) = 0$

$u = 6 \quad u = 4$

$\frac{x+5}{x} = 6 \quad \frac{x+5}{x} = 4$

$x + 5 = 6x \quad x + 5 = 4x$

$5 = 5x \quad 5 = 3x$

$x = 1 \quad x = \frac{5}{3}$

$x^2 + 15x + 44 = 0$

$(x + 4)(x + 11) = 0$

$x = -4 \quad x = -11$

$\sqrt{16} = 4 \quad \sqrt{16} = \sqrt{9} = 3$

$3 = 4 - 1 \quad 4 \neq 3 - 1$

18. $(\sqrt{5-x})^2 = (\sqrt{x+20} - 1)^2$

$5 - x = x + 20 - 2\sqrt{x+20} + 1$

$-21 - x = -2\sqrt{x+20} + 1$

$(x + 8) = (\sqrt{x+20})^2$

$x^2 + 16x + 64 = x + 20$

