

SHOW ALL WORK ON THIS TEST OR ON SEPARATE PAPER. Circle answers.
TURN IN ALL WORKSHEETS. GRAPHING CALCULATORS ARE REQUIRED ON
THIS TEST. (WHEN CALCULATORS ARE USED, SKETCH THE GRAPH,
DESCRIBE THE WINDOW, OR OTHERWISE INDICATE WHAT YOU DID!!)

In 1 - 5, factor completely and simplify if possible: (5 points each)

1. $x^4 - 64x^2$

2. $27x^3 - 125y^3$

3. $x^3 - 4x^2 - 9x + 36$

4. $(x^2 - 2x)^2 - 7(x^2 - 2x) - 8$

5. $x^{\frac{3}{2}} - 25x^{-\frac{1}{2}}$

6. Simplify the fraction: $\frac{x^3 - 27}{x^2 - 6x + 9}$

7. Find the LCD and perform
the indicated operations:

$$\frac{x}{x^2 - 4} - \frac{2}{x - 2} + 1$$

8. Simplify: $[3x^{-2} - (3y)^{-2}]^{-1}$

In 9 – 11, give simplest radical form (2 points each part):

9a) $\sqrt{300x^5y^{10}}$

b) $\sqrt[4]{160x^5y^{10}}$

c) $4\sqrt[3]{81x^5} + 3x\sqrt[3]{375x^2}$

10a) Give radical form: $(4\sqrt{6} - 5\sqrt{2})^2$

b) Calculate the decimal value of $(4\sqrt{6} - 5\sqrt{2})^2$

Rationalize the denominators:

11a) $\frac{36x^3}{\sqrt{9x^2y}}$

b) $\frac{36x^3}{\sqrt[3]{9x^2y}}$

In 12 – 15, solve the equations for x. (Give complex numbers and/or radical form.)

12. $x^2 = 2(3x - 5)$

13. $3x^2 = 2(3x + 1)$

14. $\sqrt{2x+15} = 2x+3$

15. $\left(x + \frac{12}{x}\right)^2 - 15\left(x + \frac{12}{x}\right) + 56 = 0$

In 16 – 18, use a calculator to calculate the value. Give scientific notation or round to nearest hundredth.

16a) $\sqrt{42} + \sqrt{58}$

17a) $\frac{6.3 \times 10^{-8}}{8.4 \times 10^{14}}$

18. Give in the form a+bi:

a) i^7

b) $\sqrt[3]{100}$

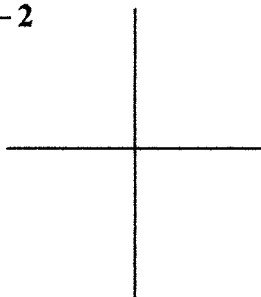
b) $32^{-\frac{4}{5}}$ (Give frac. form!)

b) $\frac{6-4i}{5+4i}$ (Give frac. form!)

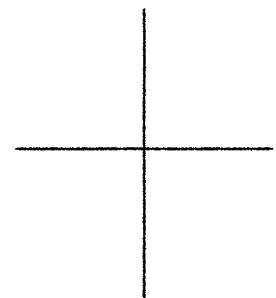
c) $\sqrt[5]{100}$

In 19 – 20, graph each of the following.

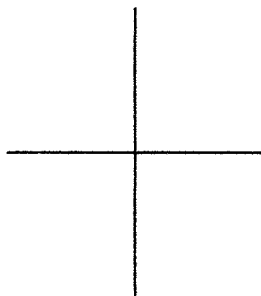
19a) $y = (x-4)^2 - 2$



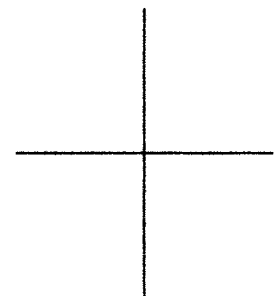
20a) $y = \sqrt{x} + 4$



b) $y = -x^3 + 4x$



b) $y = |x-4|$



COLLEGE ALGEBRA EXAM 1 XG Solutions

1. $x^4 - 64x^2$

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

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

2. $27x^3 - 125y^3$

$$(3x-5y)(9x^2 + 15xy + 25y^2)$$

3. $x^3 - 4x^2 - 9x + 36$

$$x^2(x-4) - 9(x-4)$$

$$(x-4)(x^2-9)$$

$$(x-4)(x-3)(x+3)$$

4. $(x^2 - 2x)^2 - 7(x^2 - 2x) - 8$

$$[(x^2 - 2x) - 8][(x^2 - 2x) + 1]$$

$$(x^2 - 2x - 8)(x^2 - 2x + 1)$$

$$(x-4)(x+2)(x-1)$$

5. $x^{3/2} - 25x^{-1/2}$

$$x^{-1/2}(x^2 - 25)$$

$$\frac{(x-5)(x+5)}{x^{1/2}}$$

6. $\frac{x^3 - 27}{x^2 - 6x + 9} = \frac{(x-3)(x^2 + 3x + 9)}{(x-3)(x-3)}$

$$= \frac{x^2 + 3x + 9}{x-3}$$

7. $\frac{x}{(x-2)(x+2)} - \frac{2}{x-2} + \frac{1}{1}$

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

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

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

8. $[3x^{-2} - (3y)^{-2}]^{-1}$

$$\left[\frac{3}{x^2} - \frac{1}{(3y)^2} \right]$$

$$\left[\frac{3}{x^2} - \frac{1}{9y^2} \right]$$

$$\left[\frac{27y^2 - x^2}{9x^2y^2} \right]^{-1}$$

$$\frac{9x^2y^2}{27y^2 - x^2}$$

9a) $\sqrt{300x^5y^{10}}$

$$\sqrt{100x^4y^{10}} \sqrt{3x}$$

$$10x^2y^5\sqrt{3x}$$

A) $\sqrt[4]{160x^5y^{10}}$

$$\sqrt[4]{16x^4y^8} \sqrt[4]{10xy^2}$$

$$2xy^2\sqrt[4]{10xy^2}$$

C) $4\sqrt[3]{81x^5} + 3x\sqrt[3]{375x^2}$

$$4\sqrt[3]{27x^3} \sqrt[3]{3x^2} + 3x\sqrt[3]{125} \sqrt[3]{3x^2}$$

$$4 \cdot 3x \sqrt[3]{3x^2} + 3x \cdot 5 \sqrt[3]{3x^2}$$

$$12x \sqrt[3]{3x^2} + 15x \sqrt[3]{3x^2}$$

$$27x \sqrt[3]{3x^2}$$

10. $(4\sqrt{6} - 5\sqrt{2})^2$

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

$$= 16 \cdot 6 - 40\sqrt{12} + 25 \cdot 2$$

$$= 96 - 40\sqrt{4\sqrt{3}} + 50$$

$$= 146 - 80\sqrt{3} = 7.44$$

11a) $\frac{36x^3}{\sqrt{9x^2y}} = \frac{36x^3}{3x\sqrt{y}} \sqrt{y}$

$$= \frac{12x^2\sqrt{y}}{y}$$

b) $\frac{36x^3}{\sqrt[3]{9x^2y}} \sqrt[3]{3xy^2}$

$$= \frac{12x^2\sqrt[3]{3xy^2}}{y}$$

12. $x^2 = 2(3x-5)$

$$x^2 = 6x - 10$$

$$x^2 - 6x + 10 = 0$$

POLYSMLT
Completing Square
& Quadratic Formula

$$x = 3 \pm i$$

13. $3x^2 = 2(3x+1)$

$$3x^2 = 6x + 2$$

$$3x^2 - 6x - 2 = 0$$

Quad Formula

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

$$x = \frac{6 \pm \sqrt{36 - 4(3)(-2)}}{2(3)}$$

$$= \frac{6 \pm \sqrt{36 + 24}}{6}$$

$$= \frac{6 \pm \sqrt{60}}{6}$$

$$= \frac{6 \pm 2\sqrt{15}}{6}$$

$$= \frac{2(3 \pm \sqrt{15})}{6}$$

$$= \frac{3 \pm \sqrt{15}}{3}$$

14. $(\sqrt{2x+15})^2 = (2x+3)^2$

$$2x+15 = 4x^2 + 12x + 9$$

$$0 = 4x^2 + 10x - 6$$

$$0 = 2(2x^2 + 5x - 3)$$

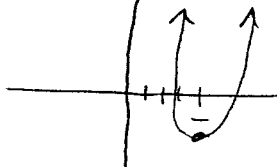
$$= 2(2x-1)(x+3)$$

$$x = 1/2 \quad x = -3$$

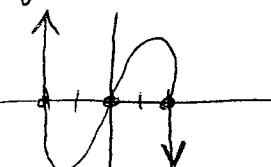
Ch: $x = 1/2$
 $\sqrt{1+15} = 1+3$
 $\sqrt{16} = 4$

Ch: $x = -3$
 $\sqrt{-6+15} = -6+3$
 $\sqrt{9} = -3$

19a) $y = (x-4)^2 - 2$



b) $y = -x^3 + 4x$



15. $(x + \frac{12}{x})^2 - 15(x + \frac{12}{x}) + 56 = 0$

Let $u = x + \frac{12}{x}$. $u^2 - 15u + 56 = 0$

$$(u-7)(u-8) = 0$$

$$u = 7 \quad u = 8$$

$$x(x + \frac{12}{x}) = 7 \quad x(x + \frac{12}{x}) = 8$$

$$x^2 + 12 = 7x$$

$$x^2 - 7x + 12 = 0$$

$$(x-4)(x-3) = 0$$

$$x = 4 \quad x = 3$$

$$x^2 + 12 = 8x$$

$$x^2 - 8x + 12 = 0$$

$$(x-6)(x-2) = 0$$

$$x = 6 \quad x = 2$$

16a) 14.10

b) 4.64

c) 2.51

17a) 7.5×10^{-23}

b) $32 \frac{(-4 \pm 5)}{6}$

c) $\frac{1}{16}$

18a) $i^7 = -i$

b) $\frac{6-4i}{5+4i} = \frac{14-44i}{41-41}$

20a) $y = \sqrt{x} + 4$



b) $y = |x-4|$

