INTERMEDIATE ALGEBRA EXAM 2 S* NAME_____

SHOW ALL WORK ON THIS TEST OR ON SEPARATE PAPER. Circle answers.
TURN IN ALL WORKSHEETS. CALCULATORS ARE PERMITTED ON THIS TEST.

$x^3 - y^3 = (x - y)(x^2 + xy + y^2)$
$x^3 + y^3 = (x + y)(x^2 - xy + y^2)$

In 1 - 4, factor completely:

1. $y^2 - 8y - 20$

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

3. $40x^5y^3 - 5x^2$

4. $(x^2 - 3x)^2 - 14(x^2 - 3x) + 40$

In 5 – 6, solve for x:

5. $x^2 + 2x = 8$

6. $(x - 3)(x + 3) = 8x$

In 7 - 10, perform the indicated operations (add, subtract, multiply, or divide.)
REDUCE ALL FRACTIONS COMPLETELY!

7. $\dfrac{8x^2 - 16x}{x^2 - 4x + 4}$

8. $\dfrac{7}{10xy^3} + \dfrac{8}{45x^4y}$

INTERMEDIATE ALGEBRA EXAM 2 S* NAME_____

9. $\dfrac{5}{x^2-10x+25} - \dfrac{3}{x^2-5x}$

10. $\dfrac{x}{x^2-25} - \dfrac{5}{5-x}$

In 11 - 12, solve the equations for *x*:

11. $\dfrac{x}{x+4} = \dfrac{6}{x-4}$

12. $\dfrac{1}{x^2-4x+3} - \dfrac{1}{x^2+4x-5} = \dfrac{1}{x^2+2x-15}$

13. y varies directly as z and inversely as the square root of *x*. If y = 12 when z = 3 and *x* = 4, find y when z=12 and *x* = 9.

INTERMEDIATE ALGEBRA EXAM 2 S* NAME_____

14. Divide:

a) $\dfrac{20x^4 - 4x^2 + 12}{4x^2}$

b) $\dfrac{x^3 + 2x^2 - 10x - 4}{x - 2}$

In 15 - 18, simplify the complex fractions:

15. $\dfrac{\frac{1}{x} - \frac{y}{4}}{\frac{1}{x} + \frac{y}{4}}$

16. $\dfrac{\frac{6x}{x-1} - 3}{4 - \frac{12}{x+4}}$

17. $(x^{-1} - y^{-1})^{-1}$

18. $\dfrac{(2x)^{-1} - 2x^{-1}}{(2x)^{-2}}$

INTER. ALG. EXAM 25* Solutions

1. $y^2-8y-20$

$(y-10)(y+2)$

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

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

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

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

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

3. $40x^5y^3-5x^2$

$=5x^2(8x^3y^3-1)$

$=5x^2(2xy-1)(4x^2y^2+2xy+1)$

4. $(x^2-3x)^2-14(x^2-3x)+40$

$=[(x^2-3x)-10][(x^2-3x)-4]$

$=(x-5)(x+2)(x-4)(x+1)$

5. $x^2+2x=8$

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

$(x+4)(x-2)=0$

$x=-4 \quad x=2$

6. $(x-3)(x+3)=8x$

$x^2-9=8x$

$x^2-8x-9=0$

$(x-9)(x+1)=0$

$x=9 \quad x=-1$

7. $\dfrac{8x^2-16x}{x^2-4x+4}$

$=\dfrac{8x(x-2)}{(x-2)(x-2)}$

$=\dfrac{8x}{x-2}$

8. $\dfrac{7}{10xy^3}+\dfrac{8}{45x^4y}$ LCD $=90x^4y^3$

$\dfrac{7}{10xy^3}\cdot\dfrac{9x^3}{9x^3}+\dfrac{8}{45x^4y}\cdot\dfrac{2y^2}{2y^2}$

$=\dfrac{63x^3+16y^2}{90x^4y^3}$

9. $\dfrac{5}{(x-5)^2}-\dfrac{3}{x(x-5)}$ LCD $=x(x-5)^2$

$=\dfrac{5\cdot x}{(x-5)^2\cdot x}-\dfrac{3}{x(x-5)}\cdot\dfrac{(x-5)}{(x-5)}$

$=\dfrac{5x-3x+15}{x(x-5)^2}$

$=\dfrac{2x+15}{x(x-5)^2}$

10. $\dfrac{x}{(x-5)(x+5)}-\dfrac{5}{5-x}$

$=\dfrac{x}{(x-5)(x+5)}+\dfrac{5(x+5)}{(x-5)(x+5)}$

$=\dfrac{x+5x+25}{(x-5)(x+5)}$

$=\dfrac{6x+25}{(x-5)(x+5)}$

11. $\dfrac{x}{x+4}=\dfrac{6}{x-4}$

$x(x-4)=6(x+4)$

$x^2-4x=6x+24$

$x^2-10x-24=0$

$(x-12)(x+2)=0$

$x=12 \quad x=-2$

12. $\dfrac{1}{(x-1)(x-3)}-\dfrac{1}{(x+5)(x-1)}$ LCD $=(x-1)(x-3)(x+5)$

$\dfrac{(x+5)}{(x-1)(x-3)(x+5)}-\dfrac{(x-3)}{(x-1)(x-3)(x+5)}=\dfrac{1}{(x-1)(x-3)(x+5)}$

$x+5-x+3=x-1$

$8=x-1$

$x=9$

13. $y=\dfrac{kz}{\sqrt{x}}$

$12=\dfrac{k\cdot 3}{\sqrt{4}}$

$24=3k$

$k=8$

$y=\dfrac{8\cdot 12}{\sqrt{9}}$

$=\dfrac{8\cdot 12}{3}=32$

14a) $\dfrac{20x^4-4x^2+12}{4x^2}$

$=\dfrac{20x^4}{4x^2}-\dfrac{4x^2}{4x^2}+\dfrac{12}{4x^2}$

$=5x^2-1+\dfrac{3}{x^2}$

b) $\dfrac{x^3+2x^2-10x-4}{x-2}$

$2\,|\,1\;\;2\;-10\;\;-4$

$\quad\;\downarrow\;\;2\;\;8\;\;-4$

$\quad 1\;\;4\;\;-2\;\;-8$

$x^2+4x-2-\dfrac{8}{x-2}$

15. $\dfrac{4x\left(\frac{1}{x}-\frac{y}{4}\right)}{4x\left(\frac{1}{x}+\frac{y}{4}\right)}=\dfrac{4-xy}{4+xy}$

16. $\dfrac{\frac{6x}{x-1}-3}{4-\frac{12}{x+4}}=\left(\dfrac{6x}{x-1}-3\right)\div\left(4-\dfrac{12}{x+4}\right)$

$=\dfrac{6x-3x+3}{x-1}\div\dfrac{4x+16-12}{x+4}$

$=\dfrac{3x+3}{x-1}\cdot\dfrac{x+4}{4x+4}$

$=\dfrac{3(x+1)}{x-1}\cdot\dfrac{x+4}{4(x+1)}$

$=\dfrac{3(x+4)}{4(x-1)}$

17. $(x^{-1}-y^{-1})^{-1}$

$=\left(\dfrac{1}{x}-\dfrac{1}{y}\right)^{-1}$

$=\left(\dfrac{y-x}{xy}\right)^{-1}=\dfrac{xy}{y-x}$

18. $\dfrac{(2x)^{-1}-2x^{-1}}{(2x)^{-2}}=\dfrac{\frac{1}{2x}-\frac{2\cdot 2}{x\cdot 2}}{\frac{1}{4x^2}}=\dfrac{1-4}{2x}\div\dfrac{1}{4x^2}$

$=\dfrac{-3}{2x}\cdot\dfrac{4x^2}{1}=-6x$