

+98 possible points Name Key
+2 free points = 100 pts Total
Test #3

Directions: Please show all your work since partial credit is given. Answers without the necessary work will receive no credit. And remember, have fun!

1. Find the greatest common factor (GCF) of each list of terms.

+2

a) $60z^4, 70z^8, -90z^5$

$\boxed{\pm 10z^4}$

+2

b) $12m^3n^4, 18m^5n^3, 36m^8n^2$

$\boxed{6m^3n^2}$

2. Factor by grouping.

+4

a) $7ax + 28x + a + 4$

$\boxed{(7x+1)(a+4)}$

$(7ax + 28x) + (a + 4)$

$7x(a+4) + 1(a+4)$

$(7x+1)(a+4)$

+4

b) $t^3 + 2t^2 - 3t - 6$

$\boxed{(t^2-3)(t+2)}$

$(t^3 + 2t^2) - (3t + 6)$

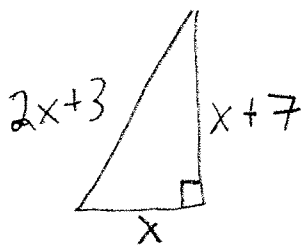
$t^2(t+2) - 3(t+2)$

$(t^2-3)(t+2)$

3. The length of the hypotenuse of a right triangle is 3 meters more than twice the length of the shorter leg. The longer leg is 7 meters longer than the shorter leg.

a) Let x be the length of the short leg. Draw and label a picture in terms of x .

+2



+4 b) Find the length of the short leg.

$\boxed{5 \text{ meters}}$

Pythagorean Thm: $a^2 + b^2 = c^2$

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

$x^2 + x^2 + 14x + 49 = 4x^2 + 12x + 9$

$2x^2 + 14x + 49 = 4x^2 + 12x + 9$

$0 = 2x^2 - 2x - 40$

$\rightarrow 0 = 2(x^2 - x - 20)$

$0 = (x-5)(x+4)$

$x = 5 \text{ or } x = -4$

+18

4. Factor the following polynomials completely.

+4

a) $100n^2r^2 + 30nr^3 - 50n^2r$

$$10nr \cdot (10nr + 3r^2 - 5n)$$

Only a GCF.

+4

b) $x^2 + 10x - 24$

Trinomial: $+12 \begin{array}{c} -24 \\ \times \\ -2 \\ \hline 10 \end{array}$

$$(x+12) \cdot (x-2)$$

+4

c) $-3y^2 + 21y - 18$

GCF = -3

$$-3 \cdot (y^2 - 7y + 6)$$

Trinomial: $-6 \begin{array}{c} 6 \\ \times \\ -7 \\ \hline -1 \end{array}$

$$-3 \cdot (y-6)(y-1)$$

+4

d) $6q^2 - 7q - 5$

Trinomial

$$36q \begin{array}{c} -30 \\ \times \\ 6q \\ \hline -105 \\ -7 \\ \hline +31 \end{array}$$

$$(3q-5)(2q+1)$$

+4 e) $8a^3 + 27$

Sum of Cubes

$$a^3 + b^3 = (a+b)(a^2 - ab + b^2)$$

$a = 2a, b = 3$

$$(2a+3)(4a^2 - 6a + 9)$$

+4 f) $w^2 + 400$

prime

$w^2 + (20)^2$

Sum of Squares

+24

+4 g) $9x^2 + 30xy + 25y^2$ $(3x+5y)^2$

Perfect Square Trinomial
 $a^2 + 2ab + b^2 = (a+b)^2$

$a=3x, b=5y$

$(3x+5y)(3x+5y)$

+4

h) $a^4 - 625$ _____

Difference of Squares

$(a^2)^2 - (25)^2$

$(a^2-25) \cdot (a^2+25)$

DO5 SO5

$(a-5)(a+5)(a^2+25)$

5. Solve the following equations:

+4 a) $x^2 - x - 56 = 0$ $x=8$ or -7

Trinomial $\begin{array}{r} -56 \\ -8 \quad +7 \\ -1 \end{array}$

$(x-8)(x+7) = 0$

$x=8$ or $x=-7$

+4 b) $49z^2 - 4 = 0$ $z = \pm 2/7$

DO5

$(7z)^2 - (2)^2 = 0$

$(7z-2)(7z+2) = 0$

$z = 2/7$ or $z = -2/7$

+4 c) $p^2 = -7p$ $p=0$ or -7

$p^2 + 7p = 0$

$p \cdot (p+7) = 0$

$p=0$ or $p+7=0$
 $p=-7$

+4 d) $t(t+2) = 80$ $t=-10$ or 8

$t^2 + 2t = 80$

$t^2 + 2t - 80 = 0$ Trinomial

$(t+10)(t-8) = 0$

$t=-10$ or $t=8$

$\begin{array}{r} -80 \\ +10 \quad -8 \\ +2 \end{array}$

+24

+4 e) $4p^2 + 40 = 26p$ $p = 4$ or $5/2$

$$4p^2 - 26p + 40 = 0$$

$$2(2p^2 - 13p + 20) = 0$$

Trinomial $\begin{array}{ccc} 2p & 40 & 2p \\ -8 & -13 & -5 \end{array}$

$$(p-4)(2p-5) = 0$$

$$p = 4 \text{ or } 2p - 5 = 0$$

$$2p = 5$$

$$p = 5/2$$

+4 d) $(2x+7)(x^2+2x-3) = 0$ $x = -7/2, -3, \text{ or } 1$

Trinomial $\begin{array}{ccc} & -3 & \\ +3 & & -1 \\ & +2 & \end{array}$

$$(2x+7)(x+3)(x-1) = 0$$

$$2x+7=0$$

$$2x = -7$$

$$x = -7/2$$

$$x = -3$$

$$x = 1$$

6. Find the value of $\frac{5c-2}{2c^2-7c-15}$ for the following values of c.

+2 a) $c = -2$ $-12/7$

$$\frac{5(-2) - 2}{2(-2)^2 - 7(-2) - 15}$$

$$= \frac{-12}{8 + 14 - 15} = \frac{-12}{7}$$

+2 b) $c = 5$ Undefined

$$\frac{5(5) - 2}{2(5)^2 - 7(5) - 15}$$

$$= \frac{25 - 2}{50 - 35 - 15} = \frac{23}{0}$$

+4 7. Find any values for which $\frac{x+5}{2x^2+6x-20}$ is undefined. $x = -5$ and $x = 2$

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

\uparrow \uparrow
 $x = -5$ $x = 2$

#16

8. Simplify each of the following *rational expressions*. Write your answers in lowest terms.

+4

a) $\frac{w^2-1}{w-1}$

$$\boxed{\frac{w+1}{1}}$$

$$\frac{(w+1)(\cancel{w-1})}{(\cancel{w-1})}$$

+4

b) $\frac{c^2+9c+20}{5c-10} \cdot \frac{-10c+20}{c^2-25}$

$$\boxed{\frac{-2(c+4)}{c-5}}$$

$$\frac{(c+5)(c+4)}{5(c-2)} \cdot \frac{-10 \cdot (c-2)}{(c-5)(\cancel{c+5})}$$

$$\frac{-10 \cdot (c+4)}{5(c-5)}$$

+4

c) $\frac{9x^2}{3x-4} \div \frac{6x^3}{8-6x}$

$$\boxed{\frac{-3}{x}}$$

$$\frac{9x^2}{3x-4} \cdot \frac{8-6x}{6x^3}$$

$$\frac{9x^2 \cdot (-2)(\cancel{3x-4})}{6x^3 \cdot (\cancel{3x-4})}$$

$$\frac{-18x^2}{6x^3} =$$

$$\frac{-3}{x}$$

+10

+4

d) $\frac{x^2+12x+27}{x^2+6x-7} \cdot \frac{x^2-13x+12}{x^2+16x+63}$

$$\frac{(x+9)(x+3)}{(x+7)(x-1)} \cdot \frac{(x-12)(\cancel{x-1})}{(x+7) \cdot (\cancel{x+9})}$$

$$\boxed{\frac{(x+3)(x-12)}{(x+7)^2}}$$

