

Secondary III 7-3 HW
Factoring Polynomials

Name: Answer Key

Factor the polynomial, or identify it as irreducible.

1. $x^3 + x^2 - 12x$ 1·12
2·6
-3·4
 $x(x^2 + x - 12)$
 $x(x-3)(x+4)$

2. $x^3 + 5$
Irreducible

3. $x^3 - 125$
 $(x-5)(x^2 + 5x + 25)$

4. $x^3 + 5x^2 + 6x$ 1·6
+2+3
 $x(x^2 + 5x + 6)$
 $x(x+2)(x+3)$

5. $8x^3 + 125$
 $(2x+5)(4x^2 - 10x + 25)$

6. $2x^3 + 6x$
 $2x(x^2 + 3)$

7. $216x^3 + 64$
 $(6x+4)(36x^2 - 24x + 16)$
 $2(3x+2) \cdot 4(9x^2 - 6x + 4)$
 $8(3x+2)(9x^2 - 6x + 4)$

8. $8x^3 - 64$
 $8(x^3 - 8)$
 $8(x-2)(x^2 + 2x + 4)$

9. $10x^3 - 80$
 $10(x^3 - 8)$
 $10(x-2)(x^2 + 2x + 4)$

10. $2x^4 + 7x^3 + 5x^2$
 $x^2(2x^2 + 7x + 5)$
 $x^2(2x+5)(x+1)$

$$\begin{array}{r} 2x+5 \\ \times \quad 1 \\ \hline 2x+5 \end{array}$$

$$\begin{array}{r} 5x \\ \times \quad 2x \\ \hline 10x \end{array}$$

11. $x^3 + 10x^2 + 16x$ 1·16
2·8
4·4
 $x(x^2 + 10x + 16)$
 $x(x+2)(x+8)$

12. $x^3 + 9769$
Irreducible

Factor the polynomial by grouping.

13. $(x^3 + 8x^2) + (6x + 48)$
 $x^2(x+8) + 6(x+8)$

$(x+8)(x^2+6)$

15. $(8x^4 + 8x^3) + (27x + 27)$
 $8x^3(x+1) + 27(x+1)$

$(x+1)(8x^3+27)$
 $(x+1)(2x+3)(4x^2-6x+9)$

17. $(x^3 + 2x^2) + (3x + 6)$
 $x^2(x+2) + 3(x+2)$

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

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

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

16. $(27x^4 + 54x^3) - (64x + 128)$
 $27x^3(x+2) - 64(x+2)$

$(x+2)(27x^3-64)$
 $(x+2)(3x-4)(9x^2+12x+16)$

18. $(4x^4 - 4x^3) - (x + 1)$
 $4x^3(x-1) - (x-1)$

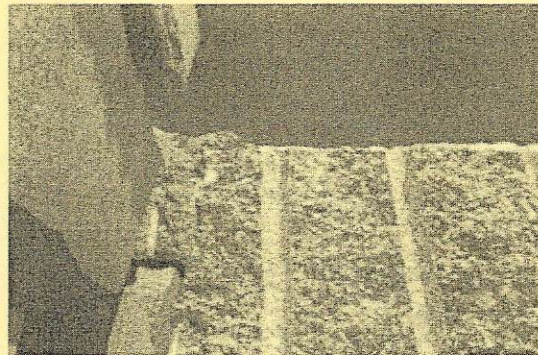
$(x-1)(4x^3-1)$

22. **Construction** A piece of granite is being cut for a building foundation. You want its length to be 8 times its height and its width to be 3 times its height. If you want the granite to be 648 cubic yards, what will its length, width, and height be?

$l = 8h$ $v = l \times w \times h$
 $w = 3h$ $v = 648$

$648 = 8h \times 3h \times h$
 $648 = 24h^3$
 $\sqrt[3]{27} \sqrt[3]{h^3} \quad h = 3$

$h = 3 \text{ yds}$
 $l = 24 \text{ yds}$
 $w = 9 \text{ yds}$



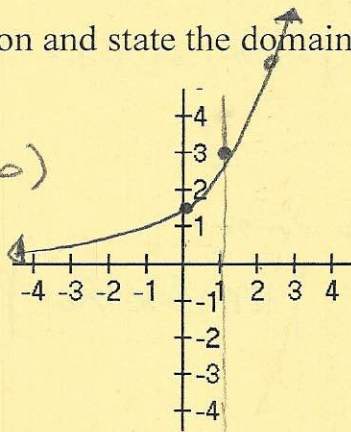
Review

Graph each function and state the domain and range

a. $g(x) = 3(2)^{x-1}$

Domain: $(-\infty, \infty)$

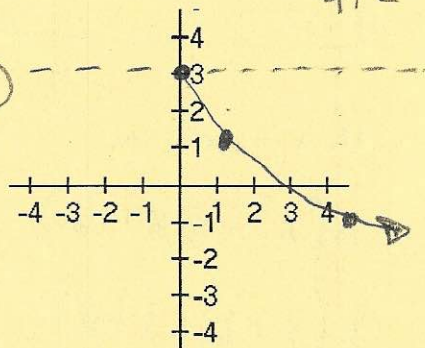
Range: $(0, \infty)$



b. $f(x) = -2\sqrt{x} + 3$

Domain: $[0, \infty)$

Range: $[3, \infty)$



x	y
-1	$\frac{1}{2}$
0	1
1	2

x	y
0	3
1	1
4	-1