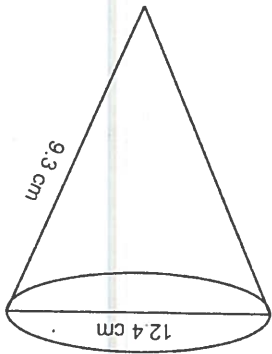




7. A cone has a diameter of 12.4 cm and a slant height of 9.3 cm. What is the surface area to the nearest  $\text{cm}^2$ ?



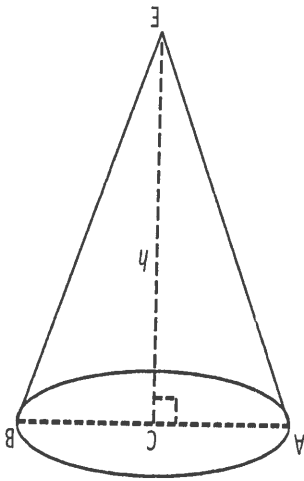
A) 201

B) 220

C) 302

D) 845

8. The volume of a right cone is  $14.7 \text{ cm}^3$ . If diameter  $AB = 3.7 \text{ cm}$ , what is the height,  $h$ , of the cone to the nearest tenth of a centimetre?



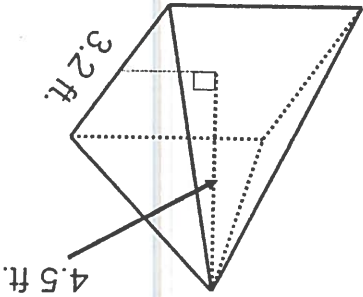
A) 0.3

B) 1.0

C) 1.4

D) 4.1

9. A square-based pyramid has side length 3.2 ft. and a height  $h$ . What is the volume to the nearest  $\text{ft}^3$ ?



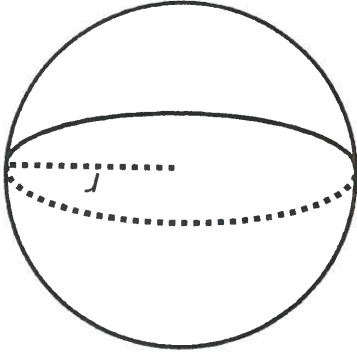
A) 5

B) 15

C) 19

D) 46

10. A sphere has a surface area of  $6.4 \text{ m}^2$ . What is the diameter of the sphere to the nearest tenth of a metre?



A) 0.5

B) 0.7

C) 1.0

D) 1.4

11. Betty has 18 yd. of material that she will cut into strips that must be exactly 15 in. wide. How many strips can Betty make?

A) 3

B) 6

C) 43

D) 44

Unit 2 – Powers and Roots

12. What is the greatest common factor of 54, 150 and 180?

- A) 6
- B) 9
- C) 30
- D) 54

13. What are the prime factors of 120 ?

- Ans* →
- A) 2, 3, 5
  - B)  $2^3, 3, 5$
  - C) 10, 20, 30, 40, 60, 120
  - D) 1, 2, 3, 4, 5, 6, 8, 10, 12, 15, 20, 24, 30, 40, 60, 120

14. Evaluate:  $\sqrt[3]{-64} + \sqrt{\frac{1}{4}}$

- A)  $-3\frac{15}{16}$
- B)  $-3\frac{1}{2}$
- C)  $4\frac{1}{16}$
- D)  $4\frac{1}{2}$

15. Which is irrational?

- A)  $\sqrt[3]{-8}$
- B)  $-\sqrt{\frac{4}{9}}$
- C)  $\sqrt{2.25}$
- D)  $\sqrt{14}$

16. Simplify:  $\frac{x^6 y^9 z^2}{x y^4 z^6}$

- A)  $x^5 y^5 z^4$
- B)  $x^6 y^5 z^4$
- C)  $\frac{x^5 y^5}{z^4}$
- D)  $\frac{x^6 y^5}{z^4}$

17. What is  $\sqrt[4]{8^3}$  expressed as a power?

A)  $8^{\frac{3}{4}}$

B)  $8^{\frac{4}{-3}}$

C)  $8^{\frac{3}{4}}$

D)  $8^{\frac{3}{4}}$

18. Evaluate:

$$\left(-\frac{27}{8}\right)^{\frac{3}{2}}$$

A)  $-\frac{4}{9}$

B)  $-\frac{4}{9}$

C)  $\frac{9}{4}$

D)  $\frac{4}{9}$

19. Simplify:  $(x^{-2}y^4)^{-3}$

A)  $\frac{y}{x^5}$

B)  $\frac{y}{x^5}$

C)  $\frac{y^{12}}{x^6}$

D)  $\frac{y^{12}}{x^6}$

20. Simplify:

$$\frac{(ab^2)}{\left(\frac{a^2b^{-\frac{1}{2}}}{\frac{a^3b^3}{1}}\right)}$$

A)  $\frac{a^{\frac{3}{2}}}{b^3}$

B)  $a^{\frac{8}{3}}b^{\frac{2}{9}}$

C)  $a^7b^5$

D)  $a^{\frac{4}{3}}b^{\frac{2}{9}}$

21. What is the exact value of  $\sqrt[3]{\frac{8}{27}}$ ?

A)  $\frac{2}{9}$

B)  $\frac{24}{81}$

C)  $\frac{4}{9}$

D)  $\frac{2}{3}$

22. Which is irrational?

A)  $\sqrt{0.36}$

B)  $\sqrt{\frac{16}{25}}$

C)  $\sqrt[3]{49}$

D)  $\sqrt[3]{64}$

23. What is  $6^{-\frac{2}{3}}$  expressed as a radical?

A)  $-\sqrt{6^3}$

B)  $-\sqrt[3]{6^2}$

C)  $\frac{1}{\sqrt{6^3}}$

D)  $\frac{1}{\sqrt[3]{6^2}}$

24. What is the least common multiple of 252 and 600?

A) 36

B) 210

C) 2100

D) 12600

25. What is the correct order, from least to greatest, of these mixed radicals?

$$2\sqrt{3}, 3\sqrt{2}, 2\sqrt[3]{-3}, 3\sqrt[3]{2}$$

(A)  $2\sqrt[3]{-3}, 2\sqrt{3}, 3\sqrt[3]{2}, 3\sqrt{2}$

(B)  $2\sqrt[3]{-3}, 2\sqrt{3}, 3\sqrt{2}, 3\sqrt[3]{2}$

(C)  $3\sqrt{2}, 3\sqrt[3]{2}, 2\sqrt{3}, 2\sqrt[3]{-3}$

(D)  $3\sqrt[3]{2}, 3\sqrt{2}, 2\sqrt{3}, 2\sqrt[3]{-3}$

26. What is  $\sqrt{80}$  as a mixed radical in simplest form?

(A)  $2\sqrt{20}$

(B)  $4\sqrt{5}$

(C)  $5\sqrt{4}$

(D)  $16\sqrt{5}$

27. Simplify:

$$\frac{18x^3y^2}{6x^4y}$$

(A)  $\frac{x}{3y}$

(B)  $3xy$

(C)  $\frac{12y}{x}$

(D)  $12xy$

Unit 3 – Factors and Products

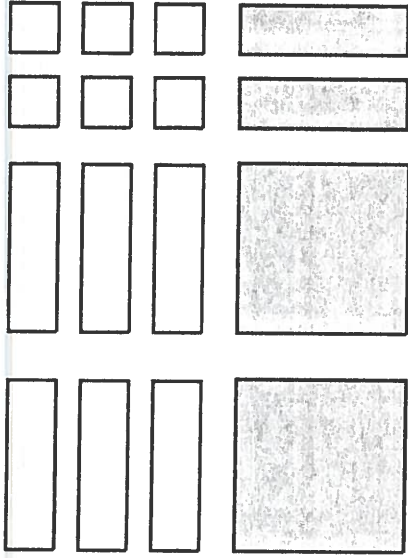
28. Which multiplication is represented by the algebra tiles? (Note: Shaded tiles are positive.)

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

(B)  $(2x - 2)(x + 3)$

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

(D)  $(2x + 2)(x - 3)$



29. Factor completely:  $24ab^2 - 16a^2b^2$

A)  $ab^2(24 - 16a)$

B)  $4ab(b - 4ab)$

C)  $8(3ab^2 - 2a^2b^2)$

D)  $8ab^2(3 - 2a)$

30. Expand and simplify:  $(6x + 7)(5 - x)$

A)  $-6x^2 - 37x + 35$

B)  $-6x^2 - 23x + 35$

C)  $-6x^2 + 23x + 35$

D)  $-6x^2 + 37x + 35$

31. Which model represents  $(x + 5)(x - 2)$ ?

A)

	$x$	$-$	$2$
$x$	$x^2$		$-2x$
$+$			
$5$	$5x$		$-10$

B)

	$x$	$-$	$2$
$x$	$x^2$		$2x$
$+$			
$5$	$5x$		$10$

C)

	$x$	$-$	$2$
$x$	$2x$		$-2x$
$+$			
$5$	$5x$		$-10$

D)

	$x$	$-$	$2$
$x$	$2x$		$-2x$
$+$			
$5$	$5x$		$3$

32. Which trinomial has  $(x - 3)$  as a factor?

A)  $x^2 - 5x - 6$

B)  $x^2 - x - 6$

C)  $x^2 + x - 6$

D)  $x^2 + 5x - 6$

33. Factor:  $2a^2 + 11a + 12$

A)  $(2a + 3)(a + 4)$

B)  $(2a + 4)(a + 3)$

C)  $(2a + 6)(a + 4)$

D)  $(2a + 8)(a + 3)$

34. Factor:  $25x^2 - 36y^2$

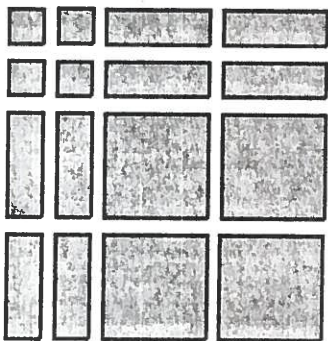
A)  $(5x - 6y)(5x - 6y)$

B)  $(5x - 6y)(5x + 6y)$

C)  $(5x + 6y)(5x + 6y)$

D)  $(6y + 5x)(6y - 5x)$

35. Which multiplication does the set of algebra tiles represent? (Note: shaded tiles represent positives.)



A)  $(2x + 2)(2x + 2)$

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

C)  $(2x^2 + 2x)(2x^2 + 2x)$

D)  $(2x + 2)(2x - 2)$

36. Factor completely:  $44x + 99x^2$

A)  $x(44 + 99x)$

B)  $11(4x + 9x^2)$

C)  $11x(4 + 9x)$

D)  $22x(2 + 9x)$

37. Factor:  $x^2 + 9x - 36$

A)  $(x + 12)(x - 3)$

B)  $(x - 12)(x + 3)$

C)  $(x - 2)(x + 18)$

D)  $(x - 18)(x + 2)$



38. Expand and simplify:  $(6p+3)(5p-6)$

- A)  $30p^2 + 21p - 18$
- B)  $30p^2 - 21p - 18$
- C)  $30p^2 + 51p - 18$
- D)  $30p^2 - 51p - 18$

39. Factor:  $16x^2 - 81y^2$

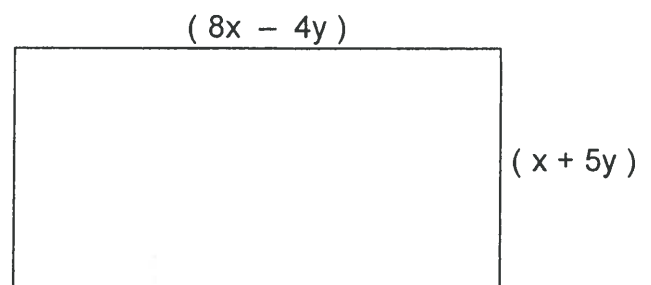
- A)  $(4x-9y)^2$
- B)  $(4x+9y)^2$
- C)  $(16x+9y)(x-9y)$
- D)  $(4x+9y)(4x-9y)$

40. Factor:  $4a^2 + 12a + 9$

- A)  $(2a-3)(2a+3)$
- B)  $(2a+3)(2a+3)$
- C)  $(4a-1)(a+9)$
- D)  $(4a+1)(a+9)$

41. Which polynomial represents the area of the rectangle?

- A)  $8x^2 + 36xy - 20y^2$
- B)  $8x^2 + 22xy - 20y^2$
- C)  $16x^2 + 72xy - 40y^2$
- D)  $8x^2 - 36xy - 20y^2$



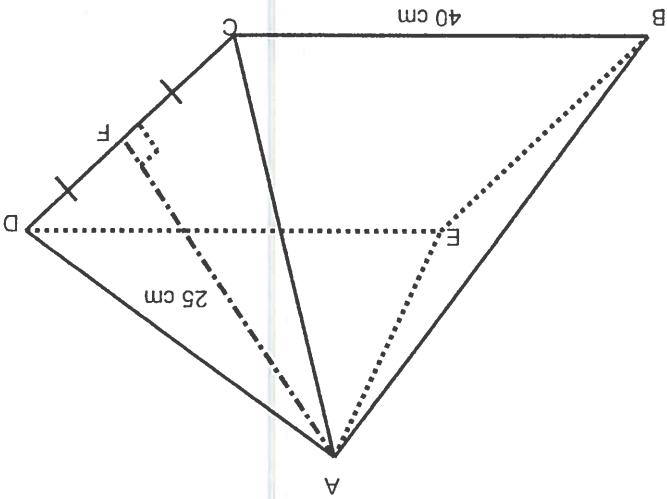
42.

Factor completely:  $8y^2 - 28y + 12$

- A)  $2(4y-2)(y-3)$
- B)  $2(4y-3)(y-2)$
- C)  $4(2y-1)(y-3)$
- D)  $4(2y-3)(y-1)$

Extended Response Questions

43. The right square pyramid is such that  $BC = 40$  cm and  $AF = 25$  cm. Find the volume of the right square pyramid to the nearest cubic centimeter.



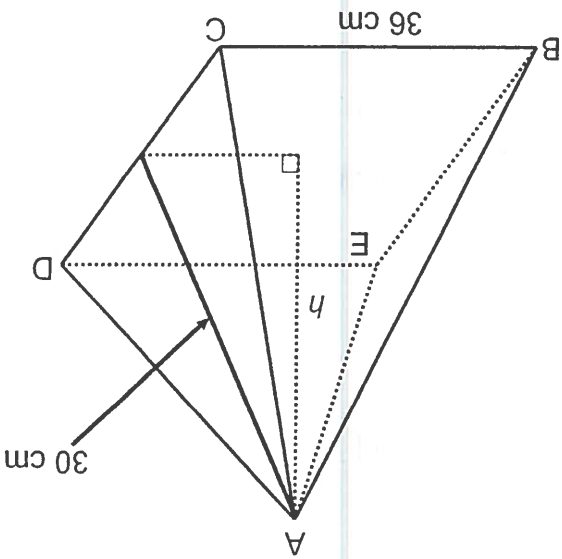
$$| h = 15 |$$

$$\text{Volume} = 8000 \text{ cm}^3$$

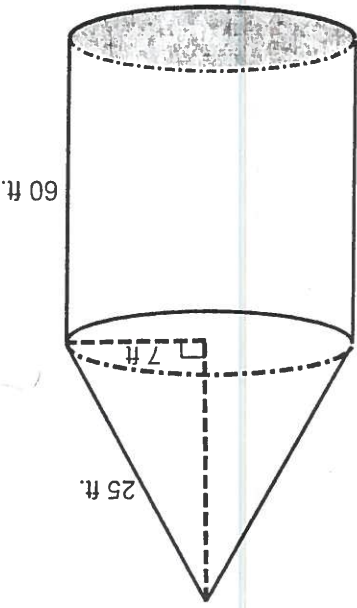
44. A right square pyramid has side length 36 cm and slant height 30 cm. What is the volume of the pyramid to the nearest  $\text{cm}^3$ ?

$$h = 24$$

$$| V = 10368 \text{ cm}^3 |$$



45. A farmer wishes to paint the exterior of his grain storage facility with dimensions as shown. If a can of paint covers  $460 \text{ ft}^2$ , how many cans of paint will the farmer need to purchase? (Note: the bottom of the storage facility is NOT to be painted.)



$$SA = 3188.7 \text{ ft}^2$$

$$\therefore 7 \text{ cans.}$$

46. Joe made a wooden scratching post for his cat and wants to cover it with carpet. About how much carpet will he need if he covers everything except the bottom of the square block?

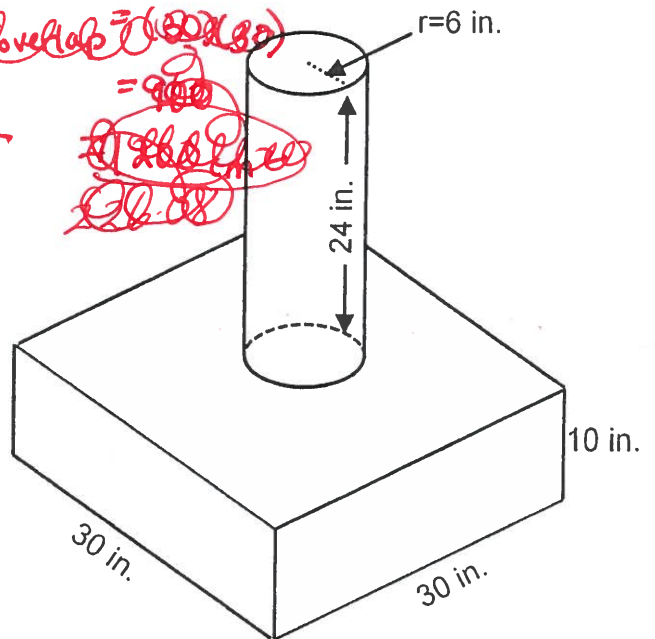
$$SA_{\text{cylinder}} = 1130.40 \text{ cm}^2$$

$$SA_{\text{rectangular prism}} = 2100 \text{ cm}^2$$

$$A_{\text{overlap}} = 2\pi r^2 = 226.08$$

$$SA_{\text{Total}} = 3004.32$$

Answer



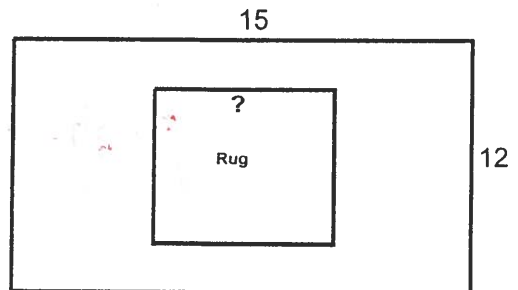
47. Shannon's rectangular dining room is 12 ft by 15 ft. There is a square rug that covers one-fourth the area of the floor. Determine the side length of the square rug. Express your answer in mixed radical form.

$$\text{Area Room} = 15 \times 12 = 180 \text{ ft}^2$$

$$\text{Area rug} = \frac{1}{4}(180) = 45 \text{ ft}^2$$

$$\text{Side length} = 3\sqrt{5} \text{ ft}$$

Answer →



48. a) The volume of a sphere is  $248.5 \text{ cm}^3$ . What is the radius?

$$V = \frac{4}{3}\pi r^3$$

$$V = 248.5 = \frac{4}{3}\pi r^3$$

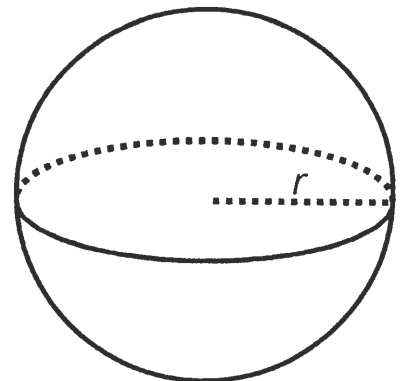
$$r = 3.9 \text{ cm}$$

- b) What is the surface area of the sphere?

$$SA = 4\pi r^2$$

$$SA = 191.8 \text{ cm}^2$$

$$\therefore 191$$



49. Stephen completed a math problem and made a mistake. In which step does his error occur? Rewrite Stephen's solution so that it is correct.

$$\frac{\begin{pmatrix} X^2 y \\ 3 \end{pmatrix}}{\begin{pmatrix} X^2 y^{-1} & X^0 y^{-2} \\ 4 & 3 \end{pmatrix}} = \begin{pmatrix} X^2 y^{-4} & X^0 y^{-3} \\ 4 & 3 \end{pmatrix} \begin{pmatrix} X^2 y \\ 3 \end{pmatrix}$$

Step 1 =

$$\begin{pmatrix} X^2 y^{-1} & X^0 y^{-2} \\ 4 & 3 \end{pmatrix} \begin{pmatrix} X^2 y \\ 3 \end{pmatrix} = \begin{pmatrix} X^2 y^{-1} & X^0 y^{-2} \\ 4 & 3 \end{pmatrix} \begin{pmatrix} X^2 y \\ 3 \end{pmatrix}$$

Step 2 =

$$\begin{pmatrix} X^2 y^{-2} \\ 3 \end{pmatrix} = \begin{pmatrix} X^2 y^{-2} \\ 3 \end{pmatrix}$$

Step 3 =

$$\begin{pmatrix} X^2 y^{-3} \\ 1 \end{pmatrix} = \begin{pmatrix} X^2 y \\ 3 \end{pmatrix}$$

Step 4 =

$$\frac{X^2}{y^3} = \begin{pmatrix} X^2 y \\ 3 \end{pmatrix}$$

Step 5 =

*Correct Solution:*

$$\frac{X^2 y}{X^2 y} = X^{1/2} y^0 = X^{1/2}$$

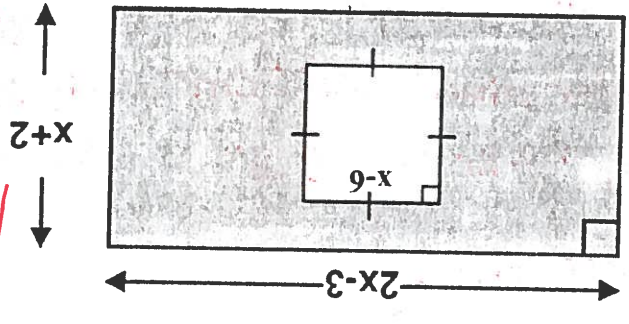
50. Expand and simplify:  $(2x^2 + 5x - 6)(5x^2 - 2x + 3)$

$$= 10x^4 + 21x^3 - 34x^2 + 33x - 18$$

51. Factor completely:  $6x^3 - 2x^2 - 8x$

$$= 2x(x+1)(3x-4)$$

52. A square and a rectangle have dimensions as shown below. Determine the expression (in simplest form) that represents the area of the shaded region.



$$\text{Area} = X^2 + 13X - 42$$

*shaded*

53. Simplify (the final answer must contain only positive exponents)

$$\left( \frac{x^6 y^{\frac{1}{3}}}{125 x^{-9} y^{\frac{8}{3}}} \right)^{\frac{1}{3}}$$

$$= \frac{x^{-6/3} y^{1/9}}{125^{-1/3} \cdot x^{9/3} y^{-8/9}}$$

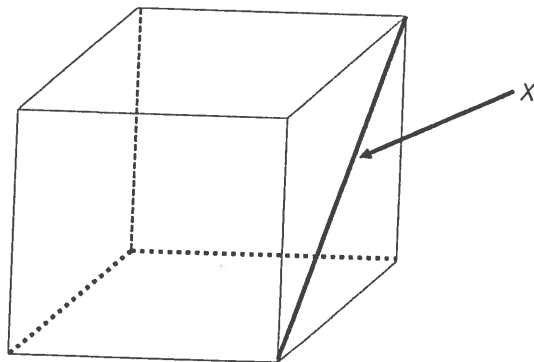
$$= 125^{1/3} \frac{x^{-2} y^{1/9}}{x^3 y^{-8/9}}$$

$$= 5 x^{-2-3} y^{1/9+8/9}$$

$$= \frac{5 y^1}{x^5}$$

54. The surface area of a cube is  $96 \text{ cm}^2$ . Determine the length of the diagonal,  $x$ , of one of the faces. Express your answer in simplest radical form.

$$x = 4\sqrt{2}$$

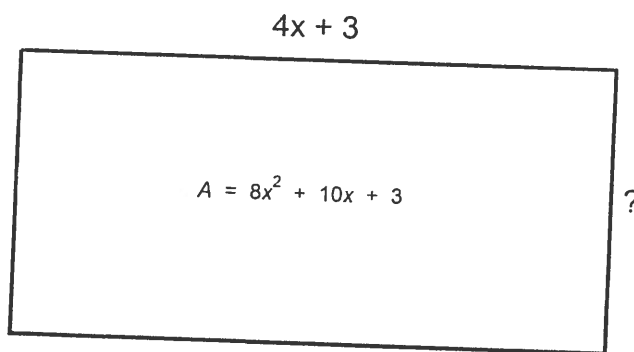


55. Expand and simplify:  $(2x - 7)(3x^2 + 4x + 2) = 6x^3 - 13x^2 - 24x - 14$

56. Factor completely:  $4x^3 + 6x^2 - 4x = 2x(2x-1)(x+2)$

57. The area of a rectangle is represented by the polynomial  $8x^2 + 10x + 3$ . If the length of one side is  $4x + 3$ , determine the width of the rectangle.

$$(4x+3)(2x+1)$$



58. Valerie plans to put siding on the front of her garage pictured below. Find an expression (in simplest form) to represent the area of the surface to be covered with siding. (Note: There will be **NO** siding on the two doors.)

$$A_{\text{siding}} = x^2 + 8x + 11$$

