

Final Review

(Review for the EGAD and the LS 7B Final Exam)

Show all of your work. Simplify and circle your final answers.

Note: Figures are not always drawn to scale.

1. Simplify:

a) $7 - 3(5 - 3)^2 - 36 \div 3 \cdot 2$

b) $\frac{-5 - (-3) + 5(3 - 1)^2}{-40 + 7(3 - 5)}$

2. Solve:

a) $\frac{1}{3}x + 2 = \frac{3}{4}x + \frac{1}{6}$

b) $x^2 + x - 42 = 0$

c) $x^2 = 49$

d) $2y^2 - 3y = 9$

2. Continued

e) $x^2 = 7x$

f) $(x+3)^2 = 64$

g) $4x^2 + 11x + 6 = 0$

h) $-3 - (x+3) = -7 + 2(3x-2)$

i) $\frac{1}{x} - \frac{2}{3} = \frac{5}{6}$

j) $\frac{15}{x} - \frac{15}{x+2} = 2$

k) $\sqrt{2x+3} = 8$

l) $\sqrt{x-5} = x-7$

3. Solve the following. Give exact simplified solutions and approximate solutions to three decimal places.

a) $x^2 - 3x - 7 = 0$

b) $3x^2 - 2x = 4$

4. Solve:

a) $3 - 4x \leq -5$

b) $3x - 2 > 6x + 10$

5. Solve for L : $P = 2L + 2W$

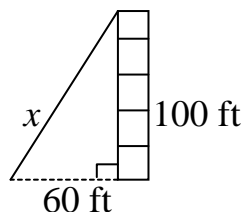
6. Solve for b : $A = \frac{1}{2}bh$

7. Solve the following systems of equations:

a)
$$\begin{aligned} y &= 4x - 1 \\ 3x - 2y &= -8 \end{aligned}$$

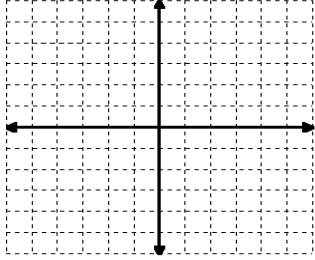
b)
$$\begin{aligned} 2x + y &= 7 \\ x - 2y &= 11 \end{aligned}$$

8. A shirt is on sale for 30% off. The sale price is \$13.44. What was the original price?
9. The length of a rectangle is four more than twice the width. The perimeter is 26 inches. Find the area of the rectangle.
10. The second angle of a triangle is 12° more than the first angle. The third angle is twice the first angle. Find the measure of the second angle.
11. The length of a rectangular garden is 3 feet more than the width. The area is 270 square feet. Find the length and the width.
12. A guy wire on a radio tower is attached to the top of the tower and to an anchor 60 feet from the base of the tower (see figure). The tower is 100 feet tall. Find the length of the wire to the nearest tenth of a foot.

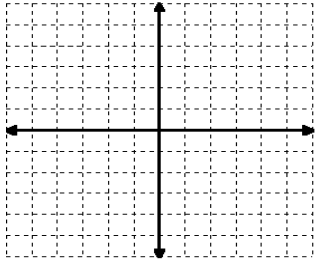


13. Graph the following:

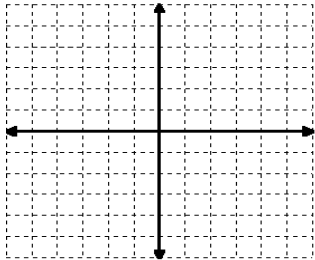
a) $-4x - 2y = -8$



b) $y = \frac{1}{3}x - 4$



c) $3x = -12$



14. Find the slope of the line containing the points $(-2,3)$ and $(-8,5)$.

15. Find the midpoint of the line segment connecting the points $(-2,3)$ and $(4,7)$. Note: The formula for the midpoint of the line segment between the points (x_1, y_1) and (x_2, y_2) is $\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$.

16. Determine whether the graphs of the given pairs of lines are parallel, perpendicular, or neither.

a) $y = 5x - 3$
 $10x - 2y = 7$

b) $4x - y = 3$
 $2x + 8y = 10$

17. Write the slope-intercept equation of the line with slope $m = -2$, that contains the point $(3,-1)$.

18. Write the slope-intercept equation of the line containing the points (5,6) and (3,-2).

19. Evaluate the following for $x = -3$: $x^2 - 5x - 20$

20. Simplify the following. Write the answers using positive exponents.

a) $\frac{x^2y^2}{x^8y^2}$ b) $-3x^7 \cdot 5x^2$ c) $5x^0$ d) $(-2x^2)^3(5x^4)$

21. Add or subtract as indicated.

a) $(3x^2 - 5x + 7) + (5x^2 - 2x - 9)$ b) $(3x^3 - 7x + 5) - (5x^3 + x^2 - 3x - 2)$

22. Multiply or divide as indicated.

a) $4x^2(x^2 + 5xy - 3y)$

b) $(x - 4)(2x + 5)$

c) $(5x - 7)^2$

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

e) $\frac{18x^5 - 12x^4 + 6x^3}{6x^3}$

f) $(6x^2 + 13x - 3) \div (2x + 3)$

23. Factor completely:

a) $2x^2 - 72$

b) $y^2 + 3y - 28$

c) $x^2 - 14x + 24$

d) $2x^2 - 3x - 20$

23. Continued

e) $9y^2 + 30y + 25$

f) $2x^3 - 4x^2 + 3x - 6$

24. Find all numbers for which the rational expression is undefined:

a) $\frac{x+6}{x-2}$

b) $\frac{x^2 + x - 42}{x^2 - 8x + 12}$

25. Simplify:

a) $\frac{2x-8}{x^2-x-12}$

b) $\frac{3x^2-7x-6}{x^2-9x+18}$

26. Multiply or divide, as indicated:

$$\text{a) } \frac{x^3 + 3x^2}{x^2 - 8x + 7} \cdot \frac{x^2 - 49}{2x^2 + 6x}$$

$$\text{b) } \frac{x^2 - 5x + 6}{x^2 - 6x + 9} \div \frac{x^2 - 3x + 2}{2x^2 - 5x + 3}$$

27. Add or subtract, as indicated:

$$\text{a) } \frac{7}{x} + \frac{3}{2x}$$

$$\text{b) } \frac{3}{xy^2} - \frac{5}{x^2y}$$

$$\text{c) } \frac{3}{a^2 - 6a + 5} + \frac{7}{a^2 - 3a - 10}$$

$$\text{d) } \frac{x}{x^2 + 11x + 30} - \frac{5}{x^2 + 9x + 20}$$

28. Simplify: (Assume all variables represent positive numbers.)

a) $\sqrt{98x^3}$

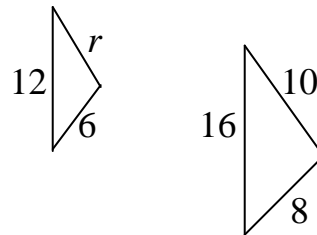
b) $\sqrt{108x^2y^3}$

29. Perform the indicated operation:

a) $\sqrt{12} - 5\sqrt{27}$

b) $(\sqrt{x} + 3)(\sqrt{x} - 5)$

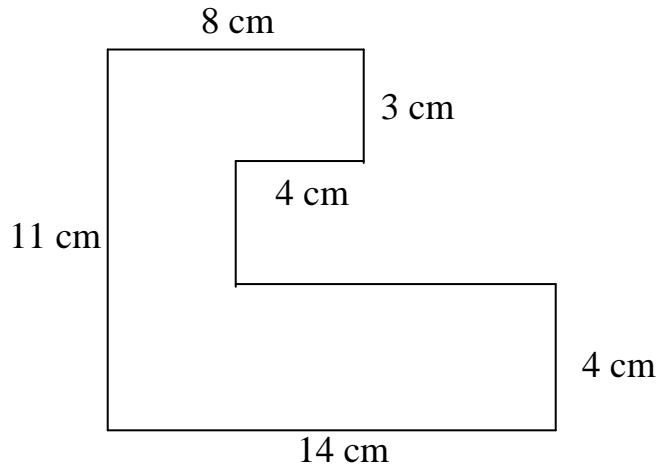
30. Find r for the following pair of similar triangles.



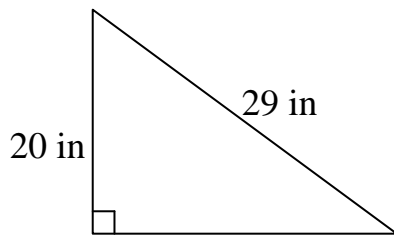
31. A rectangle has length 12 feet and width 5 feet. Draw the rectangle. Label the length and width. Find the length of its diagonal.

32. Find the perimeter and area of the following figures.

a)

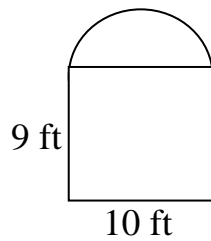


b)

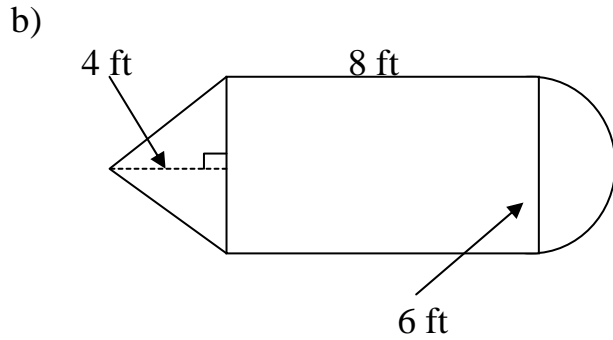


33. Find the perimeter and area of the following figures. (use $\pi = 3.14$)

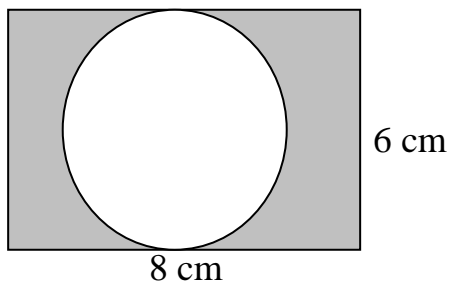
a)



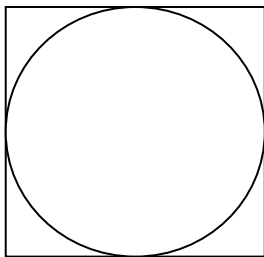
33. Continued



34. Find the area of the shaded region. (use $\pi = 3.14$)

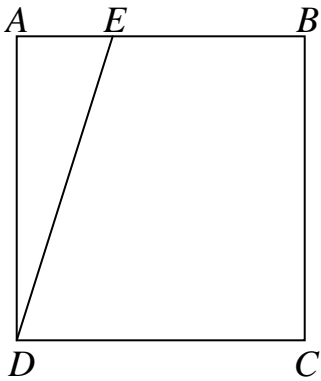


35. Find the area of the square below given that the radius of the inscribed circle is 3 meters.

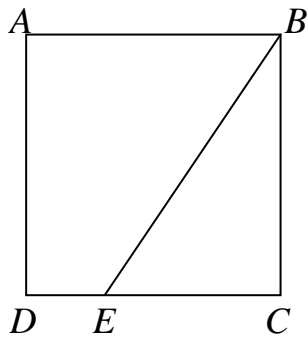


36. The area of a circle is 16π square inches. Find the diameter of the circle.

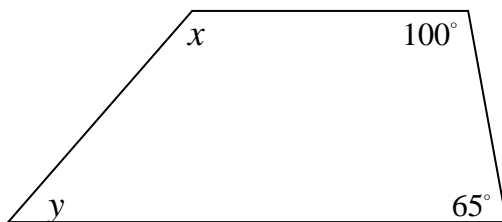
37. In the square $ABCD$ in the figure below $DC = 12$ inches and $AE = 4$ inches. Find the area of triangle DAE .



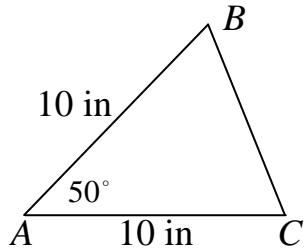
38. Find the area of square $ABCD$ in the figure below given $EB = 10$ meters and $EC = 6$ meters.



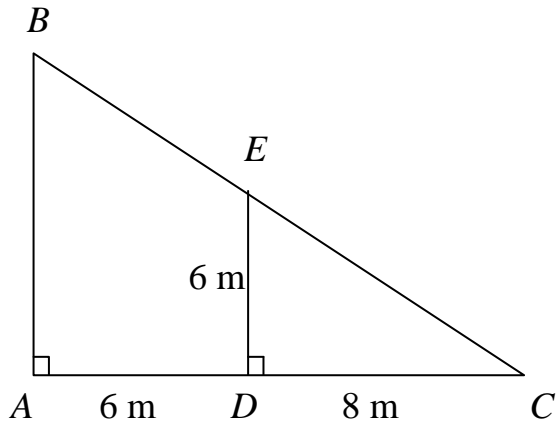
39. Find $x + y$ in the following quadrilateral. Note: The sum of the angles of any quadrilateral is 360° .



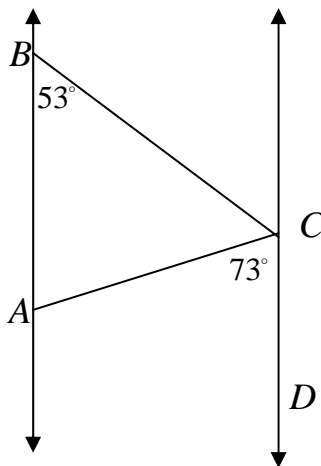
40. Find the measure of $\angle B$ in the following triangle.



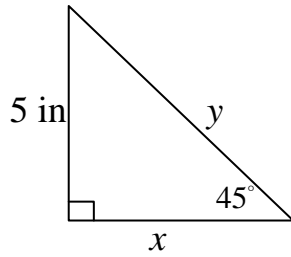
41. Find the length of AB in the following figure, given that DE is parallel to AB .



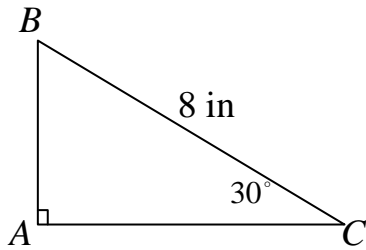
42. In the figure shown below, line AB is parallel to line CD . Find the measure of $\angle BCA$.



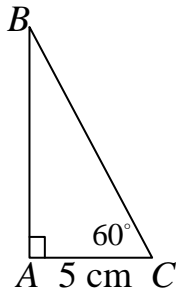
43. Find x and y . Give exact answers and approximate answers to the nearest tenth of an inch, when applicable.



44. Find the lengths of AB and AC in the following triangle.



45. Find the lengths of AB and BC in the following triangle.



46. Find the surface area of a cube that has edges 5 inches long.

47. A cube has a volume of 8 cubic feet. Find the length of an edge of the cube.

48. Find the surface area and volume of the following rectangular prism.

